

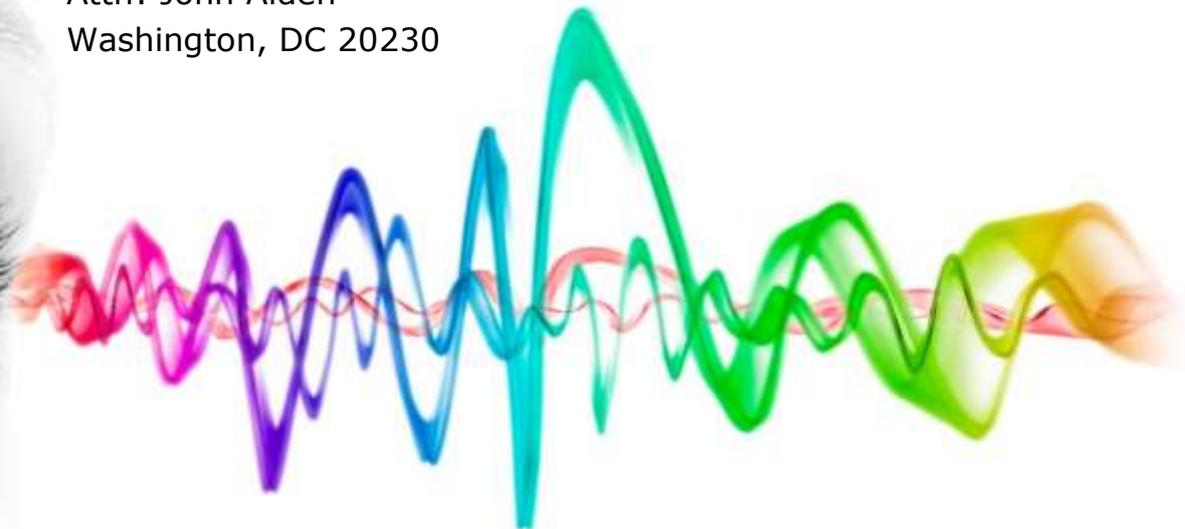
LS telcom Comments for NTIA Docket No. 181130999-8999-01

Developing a Sustainable Spectrum Strategy for America's Future

Presented to

National Telecommunications and Information Administration

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1 LS telcom Background

LS telcom is a worldwide provider of integrated, scalable, and automated system solutions and strategic consulting service for radio Spectrum Management and radio spectrum monitoring. The system solutions (SPECTRA and OBSERVER) comply with global ITU standards and integrate regional and national coordination agreements. LS telcom is an ITU-R and ITU-D Sector Member, a White Space Database provider certified by the FCC, and actively participates in radio communications programs with prestigious universities and research institutes around the world. Regulatory authorities/commissions, defense organizations, and network operators in more than 100 countries rely on the commanding capabilities provided by its advanced system solutions and its internationally recognized consulting expertise in all aspects of the radio Spectrum Management and monitoring discipline. The Canadian regulator ISED (Innovation, Science and Economic Development), an FCC peer regulatory authority, has implemented LS telcom's flagship product SPECTRA Enterprise which replaced their legacy system and modernized their Spectrum Management environment to support the Spectrum Management lifecycle from spectrum planning and allocation, technical frequency and interference analysis, licensing and billing to national and international coordination, including cross-border coordination with the relevant US government organizations.

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3 LS telcom Response to NTIA Questions

The following is the input presented by LS telcom for the seven questions asked by the NTIA pursuant to the topic of Developing a Sustainable Spectrum Strategy for America's Future.

1. In what ways could the predictability of spectrum access for all users be improved?

With the continued expansion of 4G, the rapid introduction of 5G services, and the constant pressure for the most efficient use of spectrum, next generation Spectrum Management must be implemented to keep pace. The Spectrum Management systems used for both Federal and Civil Spectrum Management in the United States must be upgraded to support the current and future demands of spectrum sharing and dynamic allocation.

Two key elements to deliver the foundation for next generation Spectrum Management capabilities are a common database of spectrum information and consistent Spectrum Management methods implemented through automation (both at the engineering level as well as the business process). The consistency of decision making that reliable data and automation provide allows for the pace of the Spectrum Management procedures and policies to match requirements. This can be defined on a service by service basis as well as be differentiated between groups of users and locations all while working from the consistent baseline of data. Consistent Spectrum Management processes and procedures also facilitate data analytics that identify areas to be optimized and improved.

2. To what extent would the introduction of automation facilitate assessments of spectrum use and expedite the coordination of shared access, especially among Federal and non-Federal spectrum stakeholders?

The introduction of automation is a foundational element in moving to next generation Spectrum Management. The ability to automate allows the speed of Spectrum Management transactions to increase and also allows for greater consistency of results. This leads to more accurate allocations of spectrum and facilitates greater interworking between departments as all follow a consistent set of rules. It has been the experience of LS telcom with regulators around the world, that automation is the cornerstone of next generation Spectrum Management. By establishing the baseline of functionality with a common validated database, business processes and spectrum allocation procedures can be developed to match spectrum requirements.

LS telcom's regulator customers have seen great benefit from automation with cross border coordination between countries. The automated processes are defined based on the policies of each regulator. This allows each side to prequalify a selected frequency based on the regulator's policy. As well the requesting regulator can execute the other regulator's policy before the application is submitted to identify potential issues. This can all be done through automated processes that provide the necessary checks and balances required to facilitate a rapid allocation of the frequency while maintaining consistency in the policy of each stakeholder. This type of approach can be applied to the shared access for Federal and non-Federal spectrum stakeholders that may employ different allocation policies for their access to the spectrum resources. The implementation of automation to arbitrate these allocations allows for a consistent process each time.

Once automation is implemented, services and areas of spectrum can evolve to dynamic access by changing the automation algorithm implemented. The speed at which automation is executed can be defined and derived from the requirements of the spectrum stakeholders and the allocation policy for the spectrum.

3. What is the practical extent of applying standards, incentives, and enforcement mechanisms to promote efficient and effective spectrum use?

A common oversight in Spectrum Management is the monitoring and enforcement to verify the proper usage of spectrum. While also a requirement for static frequency allocations, monitoring infrastructure must be implemented for dynamic spectrum environments. As a regulator allocating spectrum to users, the rules of engagement for the spectrum use whether a single user license or a dynamic allocation require monitoring and oversight to provide an objective view of usage and assurance of proper operations by those parties involved. Additionally, as guard bands are reduced and complexities of spectrum usage are increased, the borders between spectrum bands and licenses for services and capabilities should also be actively monitored for compliant operations.

Additionally, the value of shared spectrum is still being defined in the market. Oversight for the operational aspects of the spectrum allocation to assure compliance is required as validation for the values being established. Proper systems for this implementation include the accurate allocation of the spectrum for use as well as the real time monitoring information that is factored into data analytics that validate usage as well as compliant operations within the rules of engagement for the service and spectrum.

Monitoring capabilities can be incorporated with spectrum allocation data to determine the spectrum operating profile for a service or location. This type of monitoring over a longer term can define patterns of usage that may also be identified as candidates for sharing scenarios.

4. How might investment in RDT&E improve spectrum-utilization methods, and spectrum-sharing tools and techniques?

RDT&E can be leveraged to demonstrate the value of automation as well as a consistent baseline database. While the true benefit of this type of implementation can only be fully realized after it is applied across services and spectrum, providing a pilot program to demonstrate the effectiveness of these types of solutions (that have been proven with other regulators around the world) can build the requisite example implementation that can then motivate a wider deployment. These two key principles form the foundation for implementing the next generation of Spectrum Management. At LS telcom we have used this type of approach with numerous regulators allowing for a limited implementation as an initial step that then facilitated a wider implementation for the regulator.

A target candidate for the United States market is cross border coordination with Canada. There are currently defined processes and procedures that can show the immediate benefit of process automation. Once implemented the results can be compared to show the time efficiency gained with automation as well as the increased accuracy of results.

5. What are the risks, if any, to the global competitiveness of U.S. industries associated with Spectrum Management and policy actions?

As the United States leads the way to 5G, the efficient, coordinated use of spectrum is paramount to delivering on this leadership role. 5G does not exist without spectrum. By implementing Spectrum Management systems and capabilities that facilitate the next generation of wireless while accommodating the current incumbent systems, the United States will create the environment for continued innovation and leadership.

6. How could a Spectrum Management paradigm be structured such that it satisfies the needs of commercial interests while preserving the spectrum access necessary to satisfy the mission requirements and operations of Federal entities?

There are numerous methods of sharing spectrum that can facilitate such models. However, implementing these solutions requires a Spectrum Management system that can support the unique requirements of Federal and Commercial Spectrum Management from a common platform.

While this has not been the typical approach in the United States (NTIA and FCC have separate systems), LS telcom has numerous global deployments of its Spectrum Management system (SPECTRA) with regulators that support both (commercial and federal) systems from a common platform. This combined deployment does present some unique requirements for information security and process support. For example, the Spectrum Management system must incorporate the applicable security enclave for the Federal use while also be able to provide the appropriate interfaces to the financial systems as required for Commercial use. Additionally, the system must provide the Information Assurance and obfuscation between Federal and Commercial data and users. LS telcom has deployed these combined solutions and understands the unique requirements that both types of usage present.

7. What are the likely future needs of spectrum users, both terrestrially and for space-based applications, within the next 15 years? In particular, are present allocations of spectrum sufficient to provide next generation services like Fifth Generation (5G) cellular services and emerging space-based applications?

Given the exponential growth trajectory of bandwidth requirements over time, the key for the next fifteen years will be how efficiently the available spectrum can be used. To support the increased efficiency which also must incorporate legacy systems, it is imperative that the Spectrum Management system in place provides the foundation for the evolution of spectrum allocation into dynamic environments, shared usage, and increasingly tighter tolerances. A continued operation with disparate databases and varied processes can produce inconsistencies in Spectrum Management lead to interference, lack of coverage and ultimately unpredictable disruption in services. To prepare for the next 15 to 20 years the proper foundation must be established including consistency in data and process automation.