

## **Federal Access to Non-Federal Spectrum: Systematizing MOU Structure & Usage and Workshop Recommendations**

### **I. BACKGROUND**

The National Telecommunications and Information Administration's ("NTIA's") Commerce Spectrum Management Advisory Committee ("CSMAC"), Subcommittee on Federal Access to Non-Federal Bands ("Subcommittee"), was formed as part of NTIA's efforts to address ever-increasing national spectrum needs. The Subcommittee recommends: (i) an increased systemization of Memorandums of Understanding ("MOU") structures and recording across Federal agencies as one method to expedite and facilitate sharing; and (ii) a multiday multi-stakeholder workshop to better address issues facing Federal users in meeting their spectrum needs including matters that hinder Federal and non-Federal users sharing spectrum and other Federal processes that may deter sharing. While the Committee's work has focused on these tangible next steps, we also note that institutional barriers at the FCC and NTIA, including the existing regulatory and legal structures are not designed to facilitate sharing. Our work here is designed as a first step towards addressing these issues; additional study and reform on the broader issues remains important to long term effective spectrum management.

#### **NTIA's Question for the Subcommittee**

Among other questions, NTIA has charged the Subcommittee with answering the following:

- What elements should a regulatory framework include for enabling flexible federal access to non-federal spectrum on a shared basis across a broad range of short-, mid-, and long-range time frames?
- How could this framework balance the "regulatory certainty" that commercial spectrum users and federal agencies need to make longer-term investment decisions for shared access to be viable?<sup>1</sup>

#### **The Subcommittee's Recommendations (June 2016)**

The Subcommittee submitted the following four recommendations during a June 2016 full CSMAC meeting, in response to NTIA's questions:

- (1) Because the process to share non-Federal spectrum is not universally known by Federal Agencies, NTIA, in coordination with the FCC, should prepare a reference document describing the existing protocols for Federal agencies to gain access to non-Federal public safety spectrum.

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<sup>1</sup> See *Subcommittee Update: Federal Access to Non-Federal Bands at 2* (June 8, 2016), [https://www.ntia.doc.gov/files/ntia/publications/federal\\_access\\_to\\_non\\_federal\\_bands\\_subcommittee\\_-\\_03182016\\_update.pdf](https://www.ntia.doc.gov/files/ntia/publications/federal_access_to_non_federal_bands_subcommittee_-_03182016_update.pdf)

- (2) NTIA should develop and maintain a database that reports (pending and) executed bi-directional MOUs as both a reference and evidence of best practices, or in the alternative coordinate with the FCC on its development and maintenance of such a database. (Regardless of which agency maintains the database, both should provide easy access/links to it on their websites.)
- (3) NTIA, in collaboration with the FCC, should explore whether there is any benefit (e.g., no need for an MOU) to Federal agencies holding an authorization for non-Federal government spectrum and a non-Federal entity holding an authorization for Federal spectrum, recognizing the current spectrum management authorities for each.
- (4) NTIA, in coordination with the FCC, should carefully develop a multi-disciplinary workshop to address issues facing Federal users in meeting their spectrum needs, including issues that hinder Federal and non-Federal users sharing spectrum and other Federal processes (including, for example, equipment certification) that may deter sharing.<sup>2</sup>

This white paper explores the recommendations in more detail below.

## II. SHARED SPECTRUM ACCESS: MOUs' ROLE

### *NTIA and the FCC Have Established a Federal/Non-Federal Spectrum Sharing Framework Frequently Using MOUs.*

In 2003, NTIA and the Federal Communications Commission (“FCC”) signed an agreement calling for increased interagency spectrum coordination.<sup>3</sup> One outgrowth of this agreement has been a Federal/non-Federal spectrum sharing system that often relies on the use of MOUs as the primary organizational and commemorative mechanism, particularly in sharing between public safety and Federal users. It is critical to stress the continued importance of trusted and consistent coordination between the NTIA and the FCC on actions facilitating sharing between the respective entities each agency coordinates.

### *Relevant MOUs for Federal/Non-Federal Spectrum Sharing Come in Two Varieties.*

Federal/non-Federal spectrum sharing MOUs are best divided into two categories, based on the nature of the non-Federal entity party to the agreement: those between Federal agencies and public safety entities (“Federal/public safety”), and those between Federal agencies and general commercial licensees (“Federal/commercial”). In either instance, Federal operations (governed by NTIA) in bands designated for public safety or commercial usage (governed by the FCC) requires strong inter-agency coordination and supporting policy changes.

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<sup>2</sup> *Id.* at 5.

<sup>3</sup> Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration (Jan. 31, 2003), *available at* [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-230835A2.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-230835A2.pdf) (last visited May 24, 2016) (while the agreement between the FCC and the NTIA is itself a Memorandum of Understanding, we avoid using the term in the body of the text to keep the spectrum sharing MOUs that are the focus of this paper terminologically distinct).

*The Current MOU Process Is Predominantly Ad Hoc.*

Formation of a Federal/non-Federal spectrum sharing agreement generally begins when the Federal agency in question approaches relevant public safety or commercial parties to propose Federal activity. (In commercial/Federal user sharing scenarios, such agreements typically have been relied on to facilitate and implement sharing as was the case with the 2025-2110 MHz arrangements between DoD and the broadcasters. In such cases, MOUs have been executed within the technical rules established by the allocation change.) MOU negotiations are complex undertakings; even when both parties are eager to see the deal done, the selection of specific bands, the selection of geographic regions, and consideration for interference with incumbents in adjacent bands all require technical analyses, policy changes that allow such sharing arrangements and sophisticated understanding of spectrum and telecommunications engineering – all challenging while protecting confidential and classified system information. While some transactional costs to these negotiations are unavoidable, these broader barriers to Federal access to non-Federal bands are currently exacerbated by the regulatory structure, including the lack of a point of entry for agencies to be able to “ask the question” as to whether shared access is possible in the first place

First, all parties currently face high transaction costs from the lack of transparency around existing MOUs. Federal agencies seeking access to non-Federal spectrum currently face a fundamental information asymmetry when seeking out potential new partners in a given locality; no centralized database or repository of information exists for Federal agencies to determine what other sharing arrangements have already been set up. Similarly, the lack of centralized information on already-in-place Federal agency MOUs increases transaction costs for public safety entities and private parties that might be open to entering into spectrum sharing arrangements. Such non-Federal entities have no efficient way to know what Federal agencies are currently seeking access, what Federal agencies have done in the past, or what the operational needs and constraints may typically be.

Additionally, the parties generally must negotiate a new MOU from whole cloth every time an agreement is reached. These agreements may vary substantially based on the use case involved – for example, Federal sharing with public safety entities might look significantly different than Federal sharing with commercial entities. This once again unnecessarily escalates transaction costs.

While some individual agencies – such as the Department of Defense (“DOD”) – have established spectrum sharing MOU templates for would-be partners,<sup>4</sup> overarching problems still exist. First and most obviously, a lack of Federal standardization means templates are not consistent extra-agency; no two agencies use identical forms or templates, limiting efficiencies for non-Federal entities willing to potentially partner with government to the finite universe of use cases desired by a given agency. Second, even in cases where a given agency has MOUs in place pursuant to a template, the content of said MOUs may only be sporadically available. For

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<sup>4</sup> See Appendix A, *infra*.

instance, in the DOD's case, its MOU with the Society of Broadcast Engineers<sup>5</sup> was publically filed in two FCC dockets; however, other arrangements – like those with the National Association of Broadcasters,<sup>6</sup> or with the State of Alaska<sup>7</sup> – are mentioned only in academic articles or the trade press. Third, even in those use cases where a MOU is both well-crafted and publicly available – take, for instance, the MOU between the Department of the Interior and the State of Wyoming<sup>8</sup> – such MOUs do not necessarily extrapolate to intra-agency, much less extra-agency, future needs. Commercial and security concerns by either party may further chill parties' willingness to publicly disclose these agreements. All these factors ultimately combine to necessitate an effective re-invention of the wheel for every MOU entered into.

Finally, negotiating an MOU for access is a challenging exercise; very little practical experience exists for most participants. Moreover, in developing the use cases and ultimate negotiations of the MOUs, transactions costs also rise because of the lack of pervasive understanding as to what (i) all parties desire, and (ii) is realistic for licensees in the ecosystem. We recommend that NTIA convene a multi-stakeholder workshop to explore these issues, especially as they relate to co-primary sharing between Federal and non-Federal users.

### III. SYSTEMATIZING AND STREAMLINING MOUS IN FEDERAL/NON-FEDERAL SPECTRUM SHARING

As outlined above, spectrum sharing MOU formation is currently hindered by high transaction costs on all parties.<sup>9</sup> However, the barriers to sharing associated with MOUs could be lowered by effective systematization and streamlining.

#### *Consistent Forms for MOUs are Necessary.*

While a one-size-fits-all regulatory approach to MOUs would not reflect the discrete and distinct requirements the many varieties of Federal and non-Federal agencies (including distinctions between public safety and commercial licensees) potentially involved in spectrum sharing possess, voluntary inter-agency cooperation on template design would go a long way towards lowering transaction costs and easing sharing.

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<sup>5</sup> See Letter from Dane Ericksen & Richard Rudman, Society of Broadcast Engineers, Inc., to Marlene H. Dortch, Secretary, FCC, in ET Docket No. 00-258, WT Docket No. 02-55 (filed Dec. 29, 2009), <http://apps.fcc.gov/ecfs/document/view?id=7020354936>.

<sup>6</sup> John Eggerton, *Broadcasters, DoD Strike Deal on Sharing BAS Band*, Broadcasting & Cable (Nov. 25, 2013, 5:45 PM), <http://www.broadcastingcable.com/news/washington/broadcasters-dod-strike-deal-sharing-bas-band/125322>.

<sup>7</sup> J. Brad Bernthal et al., *Collaborative Networks and the Alaska Land Mobile Radio System: A Framework for Analyzing Inter-Agency People Problems Which Frustrate Public Safety Interoperability*, available at <http://www.silicon-flatirons.org/documents/publications/faculty/BernthalRobertsonTurnerCollaborativeNetworks.pdf> (last visited May 24, 2016).

<sup>8</sup> In said MOU, the State and DOI clearly delineate in plain language the purpose of the MOU, each parties' reason for entering into the arrangement, and the respective responsibilities (including who bears what costs). See Appendix B, *infra*.

<sup>9</sup> See Section II, *supra*.

For example, the DOD's Spectrum Sharing MOU Template, attached here as Appendix A, establishes several basic and key elements universal to all MOUs. The DOD Template clearly outlines the relevant bands, licenses, and parties at the outset, along with an explanation of what services are to be used in the shared spectrum. The Template also designates clearly labeled sequential appendices for: technical and operating parameters for the DOD; technical and operating parameters for the licensee; an analysis of anticipated incompatibility scenarios; and a formalized Coordination Plan to act as a mechanism for resolving unanticipated incompatibility issues.

***A Centralized Database for Extant Sharing MOUs Is Necessary.***

As discussed above, in addressing the many issues related to MOUs, centralized database maintained jointly by the FCC and the NTIA recording extant MOUs would similarly help lower transaction costs for formation of Federal/non-Federal spectrum sharing agreements. Federal agencies might seek to join collaborative efforts to save time, save taxpayer dollars, and draw on cross-agency commonality-of-solutions. Non-Federal entities would be able to more easily avoid certification or coordination issues with other entities in areas potentially conflicting with existing MOUs between Federal agencies and public safety entities. While recognizing the benefits of a centralized data base, there may be confidentiality and security issues for some MOUs, requiring the adoption of access protocols to the database.

#### **IV. HOLDING DIRECT "AUTHORIZATIONS"**

MOUs between Federal and non-Federal government entities (e.g., State, public safety agencies) are normally pursued and executed in those instances when there are mutually collaborative benefits associated with sharing wireless infrastructure and/or wireless systems applications and objectives in specifically defined geographic areas. When spectrum use goals are aligned, spectrum sharing requirements are more predictable enabling the parties to define sharing protocols within the specifically tailored MOUs.

However, there are spectrum-based systems/applications that are unique to either Federal Government or non-Federal Government entities where neither infrastructure nor system collaboration with each other is realistic or necessary, but where spectrum may be available for bi-directional sharing. NTIA should explore whether, in the proper circumstances and outside of an MOU-like framework, it would be beneficial to have protocols in place where the respective spectrum management authorities (NTIA and the FCC) could formally receive spectrum use requests from their respective constituencies for spectrum managed by the other agency. It should consider how such a process might work. For example, it could then submit the request for spectrum access to its counterpart authorizing agency and, assuming the spectrum is available and approved for sharing, issue on behalf of its constituent, a formal authorization. Such an authorization would contain administrative and technical information, including responsible party data, technical user contacts, general system technology, spectrum band and bandwidths to be used, equipment type-acceptances, emission designators, exclusive geographical use areas, commencement dates, authorization expiration dates, interference

mitigation/termination processes, authorization renewal expectations, and any financial remuneration requirements from any affected spectrum licensees.<sup>10</sup>

To facilitate the process and to promote efficiencies, applications could contain documentation from the applicants that the desired spectrum was in fact available for use on a shared basis through concurrences obtained from licensed (FCC) or authorized (NTIA) incumbents or from internal/external spectrum management organizations. Applications may also contain indications of the use of FCC type accepted equipment or NTIA certified equipment only; adherence to the sharing rules in place; and if the spectrum is auctioned, approval from the affected incumbent licensee or, if site-specific based, approval from an FCC certified spectrum manager. In other words, it would be the responsibility of the applicant to verify that the spectrum was in fact available.

Initial issues to be addressed, among others, might include eligibility requirements, system scope limitations, geographic use limitations, initial eligible bands/excluded bands, mandatory response timelines from responsible agencies, identifying justifications for spectrum use denials, and the need to maintain in respective data bases approved sharing requests.

## **V. A MULTI-STAKEHOLDER WORKSHOP TO EXPLORE SHARING, ESPECIALLY CO-PRIMARY SHARING, BETWEEN FEDERAL AND NON-FEDERAL SYSTEMS**

Finally, the DOD proposed that the FCC add Federal “Fixed and Mobile Service Primary” spectrum allocations to the 2155-2180 MHz band so that it could gain access to portions of the band on a localized level. It was clear from two productive meetings with DOD personnel that we could benefit from a more detailed and comprehensive review of the problems that lead Federal users to seek access to non-Federal spectrum. It would be helpful to use this request as a proxy to explore in greater depth the issues that the government seeks to resolve through co-primary access to commercially auctioned and licensed spectrum. An MOU for secondary access to public safety allocations as described above, is very different than, for example, a regulation permitting co-primary access to the auctioned spectrum that the DOD is seeking.<sup>11</sup> A multi-day, multi-disciplinary workshop to explore these issues fully would be an ideal first step in tackling this problem. This workshop could also address some of the issues raised by the subcommittee’s recommendation, described more fully in Section IV above, that NTIA explore whether there is any benefit (e.g., no need for an MOU) to Federal agencies holding an authorization for non-Federal government spectrum and a non-Federal entity holding an authorization for Federal spectrum. In the past, government, academia, and industry have held similar workshops that have had substantive results. For example, in the early 1990s the Washington Annenberg Washington Program gathered leading auction experts for a one-day

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<sup>10</sup> The FCC routinely issues authorizations for Special Temporary Authority which defines administrative and technical information for unique or urgent RF system deployments. STA’s normally are issued for periods of six (6) months or less, but for bi-directional sharing processes, term limits could be extended.

<sup>11</sup> The relevant spectrum was auctioned in 2015 as part of the AWS-3 proceeding. Fed. Comm’n’s Comm’n, *Auction 97: Advanced Wireless Services (AWS-3)*, [http://wireless.fcc.gov/auctions/default.htm?job=auction\\_summary&id=97](http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=97) (last visited June 1, 2016).

workshop, the results of which strongly influenced the FCC's original spectrum auction structure.

## **VI. CONCLUSION**

Ultimately, until Federal/non-Federal forms for spectrum sharing MOUs are systematized, and their recording centralized, transaction costs will remain high and deter some sharing. Policymakers should remove unnecessary disincentives to the more efficient use of radio spectrum and implement the measures discussed above, as well as pursue additional study of the other significant institutional barriers to sharing including but not limited to incentives, single points of entry, and legal challenges.

## **Appendix A**

# **Department of Defense Spectrum Sharing MOU Template**

MEMORANDUM OF UNDERSTANDING  
SPECTRUM SHARING TEMPLATE

- A. This Memorandum of Understanding (MOU) describes the radio frequency sharing arrangement of the frequency band *<band>* MHz among military facilities authorized by the Department of Defense (DoD) and licensees of the Federal Communications Commission (FCC) in the *<service(s)/licensee(s)>* pursuant to the *<policy>*.
- B. The parties to this MOU are the DoD Chief Information Officer, representing the interests of the DoD; *<organization(s)>*, acting as joint advocates for the interests of the *<service(s)/licensee(s)>* as the sponsor of the private sector frequency coordination program for the *<band>* as documented in the attached Addenda. As used herein, the term “*<band>* licensees” includes the *<service(s)/licensee(s)>*. All services are included in the arrangements documented in this MOU.
- C. The sharing of the *<band>* is mandated at paragraph ## of the *<policy>*, which, with footnotes omitted, reads as follows:  
  
\* \* \* \* \*
- D. The text of paragraph ## of the *<policy>* establishes that...
- E. The *<policy>* added United States footnote US## to the Domestic Table of Frequency Allocations relative to the sharing of the *<band>*. That US footnote reads as follows:  
  
\* \* \* \* \*
- F. Thus, the text of paragraph ## of the *<policy>* and the provisions of Footnote US## above call for the creation of a coordination plan pursuant to this Memorandum of Understanding. The *<policy>* sets forth the fundamental principles underlying the agreed coordination plan to facilitate compatible sharing of the band. These are as follows:  
  
\* \* \* \* \*
- G. The set of technical and operating parameters defining DoD operations are set forth in Exhibit A hereto.
- H. The set of technical and operating parameters defining the *<band>* licensees’ operations are set forth in Exhibit B hereto.
- I. The agreed-upon metrics to avoid or prevent harmful interference to non-Federal operations for specific deployment scenarios of the DoD fixed and mobile systems, and calculation methodologies to be used in this process, are attached as Exhibit C hereto.
- J. An analysis of potential incompatibility scenarios for anticipated DoD deployments of fixed and mobile systems, and a list of technical or operational mitigation options which may be employed to resolve any incompatibilities, is attached hereto as

Exhibit D. This Exhibit may be the product of equipment testing, analytical modeling, simulations or any combination of thereof. Use of mitigation options other than those listed can be employed subject to agreement by all Parties to this MoU.

- K. The Coordination Plan is attached hereto as Exhibit F. The Plan includes a mechanism for resolving any incompatibility issues that may arise that are otherwise unresolvable through the normal coordination process contained in the Plan.
- L. Upon execution of this MOU with all exhibits attached, the entire document will be considered a baseline for the purpose of the coordination process. This includes all the Operating Parameters of the identified DoD and <service(s)/licensee(s)> equipment and terminals and the parameters of the DoD and <service(s)/licensee(s)> operations. Any changes or additions to these items will be the subject of a future coordination wherein all parties would be expected to negotiate and resolve any issues regarding changes to this MoU in good faith and to cooperate fully in integrating the DoD operations into the band. All parties agree to notify the other of any needed changes to the set of Operating Parameters and technical characteristics (discussed in G and H above) at least 90 days in advance of any planned operational changes.
- M. This MOU shall be valid after the date of signing by all parties and can only be modified by mutual consent of all parties. It is binding on the parties and their successors and assigns according to its terms. Each party agrees to bear its own costs associated with the implementation and performance of the obligations set forth in this MOU.
- N. This MOU is subject to the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook), and the applicable FCC rules in Title 47 of the Code of Federal Regulations including (without limitation) the domestic table of frequency allocations. It is anticipated that this MOU will be reviewed by its signatories or their representatives every five years.

In Witness Whereof, the parties hereto have signed this Memorandum of Understanding this

\_\_\_\_\_ day of \_\_\_\_\_, 201X.

**Department of Defense  
Chief Information Officer**

By: \_\_\_\_\_  
      <Name>

**<Organization 1>**

By: \_\_\_\_\_  
      <Name>

**<Organization 2>**

By: \_\_\_\_\_  
      <Name>

**Exhibits A-F**