

**Enforcement Subcommittee
Commerce Spectrum Management Advisory
Committee
October 9, 2014**

The following slides summarize proposed responses to NTIA questions that have been prepared by the Subcommittee. CSMAC member comments are solicited.

Introduction

- The Subcommittee has met on three occasions crafting responses to the NTIA questions – principal drafting responsibility for individual questions were assigned to teams of Subcommittee members
- Complete draft responses, as available, are provided separately
- On September 23, the Subcommittee met with the leadership of the FCC Enforcement Bureau (EB) - the EB is fully aware of its future challenges and is preparing to address them through a variety of means

Question 1

In a shared spectrum environment involving both federal and non-federal users, what types of sharing criteria would need to be specified in the FCC's *ex ante* regulations, and what can be subject to post-rulemaking/post auction negotiated coordination agreements or other sharing arrangements?

Assumption - the FCC and NTIA shall identify and report within the *ex ante* rules, the majority of the operational and technical rules governing the sharing of Federal Government spectrum, including interference mitigation and enforcement processes, to provide abundant clarity for incumbent Federal Government users and prospective commercial operators in advance of the commencement of any competitive bidding action.

Authors of Draft Response - Mark Crosby and Audrey Allison

Question 1 – Response Summary

Critical Subjects

- Incumbent Reconfiguration/Expansion Rights
- Definition of Exclusion, Coordination and/or dynamic sharing zones
- Spectrum Access/Occupancy Rights
- Interference Limits/Tolerances
- Use/Powers of a SAS
- Equipment Standards
- Dispute Resolution Processes
- Definitions of unacceptable interference levels (Harms Claim Thresholds)

Question 2

How would negotiated coordination agreements or other sharing arrangements be enforced and by whom?

Authors of Draft Response – David Donovan and Jennifer Warren

Question 2 – Response Summary

- NTIA & FCC have jurisdictional boundaries
 - Requirement for coordination and planning (47 U.S.C. § 922 & FCC /NTIA MOU in 2003)
 - Do not contemplate enforcement in the dynamic sharing
- Exploring a revised two-tiered MOU approach
 - Overarching MOU between FCC/NTIA outlines enforcement process to be followed
 - Specific MOUs between federal/commercial end users
- Significant issues remain
 - Elements of MOU, e.g. arbitration, fast track interference resolution, dispute resolution process, appeals process etc...
 - Aspects of this issue have been addressed in some recent FCC proceedings – further research under way

Question 3

In a shared spectrum environment where many consumers have widespread access, what additional tools do the FCC and NTIA need to ensure compliance with sharing criteria or arrangements?

Author of Draft Response – Mariam Sorond

Question 3 – Response Summary

- NTIA & FCC have existing tools in place, first these must be identified
 - NTIA is looking at the possibility to provide additional information regarding the existing tools

- In general ...
 - Receivers must be capable of measuring the aggregated received signal from other users, with further capability of isolating the individual interference source.
 - Interference criteria and the resolution agreement must be identified with the NTIA and FCC, then the appropriate software and hardware tools would be customized based on agreements.
 - Meaningful device type-acceptance processes need to be developed to ensure devices are capable of following the sharing protocols, including switching and shut downs.
 - Technical response teams are required– Reasonable staff and hours to support field initiatives
 - Sophisticated tools are needed that could fine tune coordination/exclusion zones, as opposed to the conventional use of radii based on theoretical assumptions.

Question 4

How can service providers, federal users and regulators quickly identify and stop harmful interference as quickly as possible?

Author of Draft Response – Tom Dombrowski

Question 4 – Response Summary

- Prevention, adjudication and enforcement are the key pillars to controlling the interference environment
- There is a need for not only the Federal government but also commercial parties to play a fundamental role in interference resolution
- Potential recommended areas for further study include:
 - Define harmful interference
 - Create an unique identifier
 - Additional spectrum monitoring by all parties
 - Privatize enforcement of interference issues
 - Update equipment certification
 - Ensure transparency and sharing of interference data
 - Enact special measures to combat bad actors and industrial users of spectrum

Question 5

How should NTIA and the FCC identify and rectify harmful interference resulting from an aggregate of operations from multiple co-channel and out-of-band emitters?

Authors of Draft Response – Dale Hatfield and Dennis Roberson

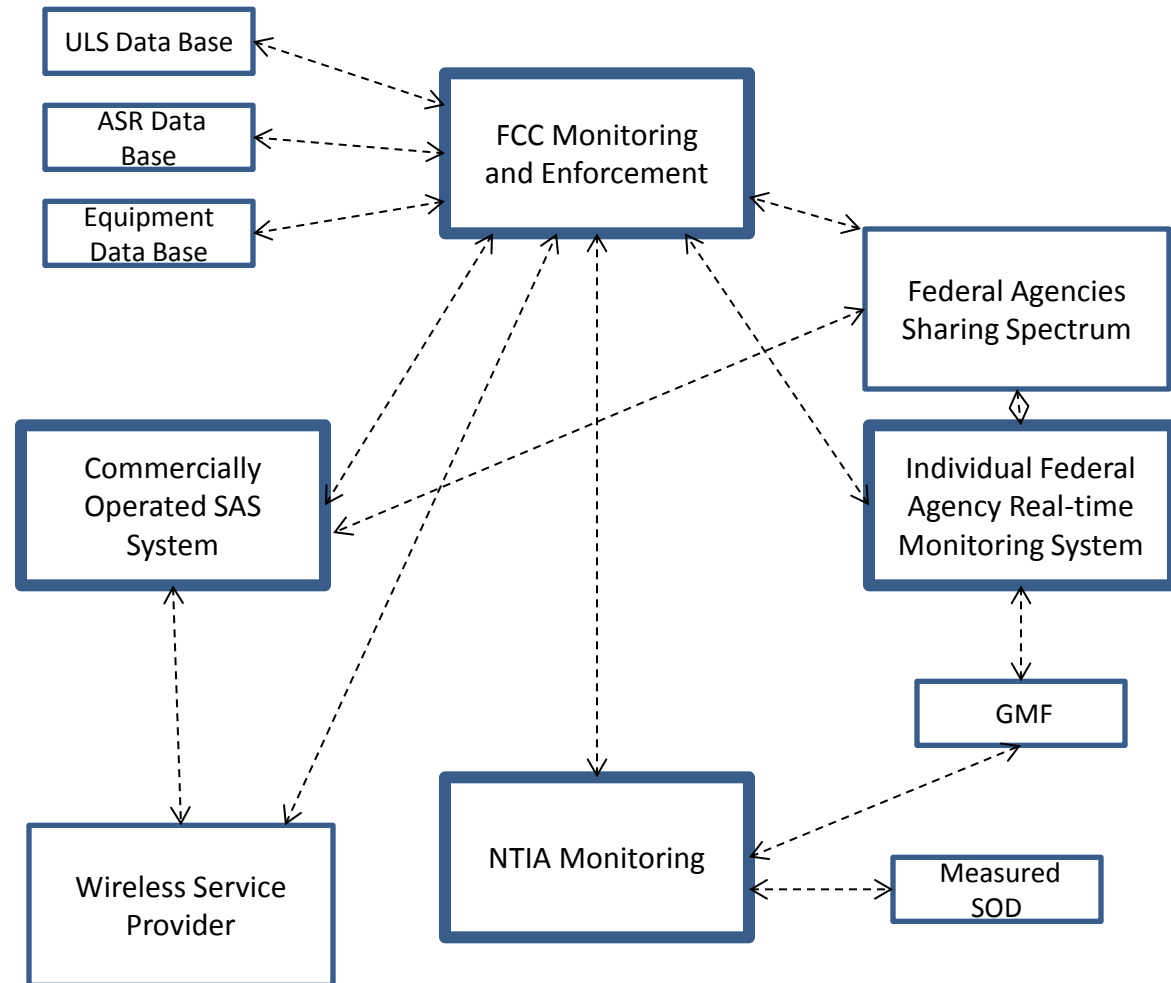
Question 5 – Response Summary

- Approach Taken: Create a “Straw-man” Enforcement Proposal
 - Designed to stimulate discussion, thus:
 - Certain aspects of the proposal may well prove untenable because of legal, technical, economic and policy realities
 - Parts may be eliminated entirely, modified significantly, or replaced in the final recommendations
- Critical Assumptions (Examples):
 - Initial focus on protecting incumbent federal government systems
 - Assumes existence of objective Harm Claim Thresholds, Interference Limits, or Reception Limits

Question 5 – Response Summary

- Critical Assumptions (Examples): Continued
 - Not intended to address situation where there is an immediate threat to safety of life and property
 - Existence of four major subsystems: (a) commercially operated SAS system; (b) FCC interference resolution and enforcement system; (c) real-time spectrum monitoring systems operated by individual federal incumbents; (d) spectrum monitoring system operated by NTIA
- Straw-man Enforcement Proposal – Aggregate Interference:
 - Two cases of aggregate interference are considered: (1) - multiple interfering signals that are strong enough to be detected, located, and identified/classified/characterized (2) - multiple noise-like interfering signals from potentially millions of intentional and unintentional radiators
 - The systems, including processes and associate logic for dealing with both cases, are described in the full draft proposal
 - Also discusses wideband I/Q measurements, crowdsourcing, legal/policy issues and notes privacy and security issues

Straw-man Enforcement Architecture



Straw-man Enforcement Architecture
(End User and Sensor Devices Not Shown)

Subcommittee Members

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