

New Times, New Methods: Upgrading Spectrum Enforcement
A Silicon Flatirons Roundtable
14 November, 2013

Reading List
Version 2.0

This closed-door roundtable will convene a small group of spectrum experts with a wide variety of backgrounds and expertise to map the landscape and provide consensus recommendations regarding interference resolution, enforcement programs and procedures, and methods for improving interference measurement and mitigation.

This memo offers participants background reading and references, organized in reverse chronological order. We marked priority readings with an asterisk (*); for quick reference, they are:

- [*Proposed Future CSMAC Work, Enforcement*](#), NTIA (August 21, 2013).
- Dale Hatfield, [*TAC Enforcement Slides, Preliminary Thoughts on Enforcement: Background, Questions, and Proposed Deliverables*](#), Spectrum and Receiver Performance Work Group (April 10, 2013).
- Mohammed Altamimi, Martin Weiss, and Mark McHenry, [*Enforcement and Spectrum Sharing: Case Studies of Federal-Commercial Sharing*](#), TPRC 41 (March 29, 2013).
- TAC, Receivers and Spectrum Working Group, [*Interference Limits Policy: The use of harm claim thresholds to improve the interference tolerance of wireless systems*](#), Version 1.00, White Paper (February 6, 2013). Section 6: Enforcement.

Readings:

Michelle Hersh, [*A Study on the Role of Spectrum Usage Rights within Disputes*](#), Note, J. ON TELECOMM. & HIGH TECH. L. (Forthcoming, Spring 2014).

- Provides a background on spectrum usage rights in the United States (Pg. 2-15).
- Utilizes Peter Tenhula's taxonomy for enforcement of spectrum usage rights in his paper, Enforcement of Spectrum Usage Rights: Fair and Expedient Resolution of "Interference" Disputes (2012, q.v.).
- Upholds Tenhula's emphasis on the "importance of regulators strengthening procedural spectrum usage rights, in the form of equitable, transparent, and efficient procedural mechanisms, in order to provide a foundation for more efficient spectrum use and reduce the transaction costs associated with implementing new uses of spectrum." (Pg. 15).
- Argues that "the current state of spectrum usage rights and expectations inhibit private negotiations during disputes, weaken the secondary market within the spectrum space, and stifle innovation on behalf of confident new entrants." (Pg. 15).

- Confirms Tenhula’s predictions of the state of spectrum usage rights in conflicts; specifically, that “spectrum usage rights do not establish the same set of rights guaranteed under the property ownership model” and “the dispute and resolution process illuminates the Commission’s inability to entirely transition away from the command-and-control regime of the previous decades, despite the notable efforts to reform spectrum policy.” (Pg. 25-30)

Joshua Turner, Mark Sweet, Eve Reed, Brendan Morrissey, Umair Javed, & Katy Ross, [*FCC Enforcement Bureau Primer*](#), Wiley Rein LLP (Fall 2013).

- “In light of recent changes in the FCC’s Enforcement Bureau policies, standards and areas of interest, the Wiley Rein Enforcement Practice Group has prepared an FCC Enforcement Bureau Primer that examines how the Enforcement Bureau operates, what enforcement actions have been recently taken and what is likely to happen in the upcoming year.”
- See Section I: Overview of FCC enforcement role, authority, responsibilities and process.
- See Section II: Overview of key areas of FCC enforcement and policies and actions that apply to each area.
- See Section III: Enforcement actions of the Commission and the Enforcement Bureau over the past three years and trends.
- Appendix A: Survey of all of the enforcement decisions and consent orders issued or reached in the last three years.

Brad Revare, [*The Implications of Adjudicating Spectrum Usage Rights with ALJs*](#), working paper (October 2013).

- Examines of the implications of the FCC strengthening its enforcement of spectrum usage rights through increasing the number of Administrative Law Judges (ALJs) adjudicating two parties’ rights related to interference (see also Weiser (2009, q.v.) and Kapnik (2012, q.v.)).
- Speculates that costs likely outweigh the benefits in adjudicating spectrum rights through increased use of ALJs.

* [*Proposed Future CSMAC Work, Topic: Enforcement*](#), NTIA (August 21, 2013).

- Proposes work to help the NTIA “develop new or revised strategies for responding more efficiently and effectively to the fundamental technological, operational, and other trends in the complex interference and enforcement environment.”
- Asks how the FCC’s enforcement tools can be updated for new forms of sharing (e.g. coordination zones vs. exclusion zones), identifying specific questions about coordination between the FCC and NTIA, forms of mitigation measures when an operator is interfering, and making technical showings of compliance pre-and post-deployment in the new sharing scenarios.

* Dale Hatfield TAC Enforcement Slides and TAC Enforcement Update Slides

- Dale Hatfield, TAC Enforcement Update Slides, [*Interference Resolution and Enforcement*](#) (September 2013).

- *Dale Hatfield, TAC Enforcement Slides, [*Preliminary Thoughts on Enforcement: Background, Questions, and Proposed Deliverables*](#), Spectrum and Receiver Performance Work Group (April 10, 2013).

* Mohammed Altamimi, Martin Weiss, and Mark McHenry, [*Enforcement and Spectrum Sharing: Case Studies of Federal-Commercial Sharing*](#), TPRC 41 (March 29, 2013).

- Highlights case studies of the 1675-1710 MHz band (Meteorological-Satellite) and 3500-3650 MHz band (150MHz) (DoD radar systems), focusing on spectrum conflicts to establish a better understating of the extent of spectrum usage rights (SURs) within the licensed space.
- Relies on Peter Tenhula’s proposition, methodology, and predictions concerning the role of SURs.
- Asserts that the current state of spectrum usage rights and expectations inhibit private negotiations during disputes, weaken the secondary market within the spectrum space, and stifle innovation for new entrants and new services.

* TAC, Receivers and Spectrum Working Group, [*Interference Limits Policy: The use of harm claim thresholds to improve the interference tolerance of wireless systems*](#), Version 1.00, White Paper (February 6, 2013).

- See Section 6: Enforcement (Pg. 25-31).
- States that “successful negotiations are based on the ability to assert operating rights and enforce prohibitions against their violation” and regulators should be able to specify mechanism(s) by which this can be demonstrated. (Pg. 26).
- Provides a flow diagram of the process by which adjacent band interference situations would be resolved under a regime of receiver limits (based on harm claim thresholds).

Peter Tenhula, [*Enforcement of Spectrum Usage Rights: Fair and Expedient Resolution of “Interference” Disputes*](#), TPRC (2012).

- Attempts to foster development of a more consistent, data-driven analytical approach to evaluating the procedural options (or lack thereof) for resolving all types of spectrum access or interference disputes.
- Recommends an evaluation of case studies that represent procedural situations before national regulatory bodies with the goal of improving the procedural methods used to resolve spectrum access or interference disputes.
- Discusses the appropriate processes or venues available for resolving spectrum access or interference disputes (e.g., the current regulatory framework v. encouraging negotiated solutions as a result of not having reliable processes or venues).
- Proposes a taxonomy to evaluate the resolution of harmful interference disputes and proposes that identifying case studies in each of three main categories of conflicts and evaluating those cases will “foster development of a more consistent, data-driven analytical approach to evaluating the procedural options (or lack thereof) for resolving all types of spectrum access or interference disputes...” (Pg. 1).
 - Three main categories of disputes to be evaluated are: (1) Establishment of new rights, (2) Modification of existing rights, and (3) Enforcing existing rights.

- Argues that enforcement, not rights definition, is the most important tool in addressing interference problems: “Notwithstanding the continuous clamor to clearly define SURs, especially those related to harmful interference, among disparate, neighboring and competing spectrum users, enforcement of those rights is equally, if not more, important.” (Pg. 2).

Martin BH Weiss, William H. Lehr, Liu Cui, and Mohammed Altamimi, [*Enforcement in Dynamic Spectrum Access Systems*](#), Telecommunications Policy Research Conference (September 2012).

- Argues that enforcement mechanisms need to vary given that the rights to use spectrum and for protection from harmful interference vary by band and type of use/users.
- Provides a taxonomy for evaluating alternative mechanisms for enforcing interference protection for spectrum usage rights, with special attention to the potential changes that may be expected from wider deployment of Dynamic Spectrum Access (DSA) systems. Expecting multiple layers of enforcement that will mutually re-enforce each other for a bright future for efficiency-enhancing novel radio technologies like CR/SDRs.
- Explains that different enforcement strategies are better for different types of DSA systems.

Benjamin Kapnik, [*Affirming the Status Quo?: The FCC, ALJS, and Agency Adjudications*](#), 80 GEO. WASH. L. REV. 1527 (July, 2012).

- See Part III (Pg. 11-12).
- Responds to Phil Weiser’s paper, *Institutional Design, FCC Reform, and the Hidden Side of the Administrative State* (2009, q.v.).
- Presents a study examining affirmance rates of FCC decisions at the United States Court of Appeals for the District of Columbia Circuit; suggests that ALJs do not improve the quality of FCC adjudications; and concludes that “[b]ecause ALJs do not appear to offer higher quality decisionmaking,” federal agencies should not make the significant investments necessary to retain ALJs for adjudications.
- Part III proposes alternative means for improving fact finding and in turn FCC adjudication, including employing administrative judges (AJs).

Madelaine Maior, [*Efficient Interference Management: Regulation, Receivers, and Right Enforcement*](#), A report on a Silicon Flatirons Summit, held October 18, 2011 (January 10, 2012).

- See Section 4 on enforcement (Pg. 13-17).
- Reviews the roundtable participants’ discussion about alternatives to rulemaking and traditional adjudication for resolving interference disputes, including: (1) a “rocket docket”; (2) baseball-style arbitration; (3) non-FCC solutions; and (4) using smart devices to aid in enforcement.
- Takeaways were unclear. There was uncertainty about what enforcement actually meant, and the wide range of activities made it difficult to pin down how to improve enforcement mechanisms.

Phil Weiser, [*Institutional Design, FCC Reform, and the Hidden Side of the Administrative State*](#), U of Colorado Law Legal Studies Research Paper No. 09-1 (February 2, 2009).

- See Section III.B. “Adjudications, Enforcement, and the Use of ALJs (Pg. 31-34).

- Calls for the FCC to use independent ALJs instead of its typical agency review process to “improve the quality of [the FCC’s] policymaking process because it would provide the agency with a more rigorous factual understanding of the relevant issues than can be obtained by sorting through a paper record to identify the salient facts.” (Pg. 34)
- Highlights the need for the FCC to develop the capability to enforce its rules in a credible manner so it can, in appropriate instances, shift from its legacy focus on restricting what parties can do before-the-fact to evaluating the impact of actual behavior after-the-fact.
- Uses the example of the satellite radio providers’ (Sirius Satellite Radio and XM) long unenforced stint of violating terms of their licenses.

John Chapin and William Lehr, [*Time-Limited Leases for Innovative Radios*](#), IEEE Proceedings of the Dynamic Spectrum Access Networks (DySPAN2007) (April 12-20, 2007).

- States, “By limiting the potential harm to a stakeholder’s interests, leases enable shifting from today’s dominantly *ex ante* enforcement approach to one more balanced between *ex ante* and *ex post* enforcement of those interests. This facilitates innovations where there is high perceived risk due to novelty or complexity.”

Phil Weiser and Dale Hatfield, [*Policing the Spectrum Commons*](#), 74 FORDHAM L. REV. 101 (2005).

- Focuses on developing additional proactive measures to limit the potential for interference and improving the FCC’s system of back-end enforcement, outlining the basics of the current spectrum management regime and discussing the alternative possible approaches (i.e., other than public regulation) for policing commons access spectrum.

R. Paul Margie, [*Can You Hear Me Now? Getting Better Reception from the FCC’s Spectrum Policy*](#), 2003 STAN. TECH. L. REV. 5 (2003).

- See Paragraph 20.
- Provides background on interference regulation and states that enforcement requires clear definitions of interference.
- States that “Coase’s treatment of interference policy is based on a system where spectrum users have property rights.” And “[a]lthough today’s spectrum users do not have property rights, his analysis remains useful in setting permissible interference temperatures that give spectrum licensees the ability to petition the Commission for interference protection rather than seek judicial action to enforce an element of a property right.” (Paragraph 73 fn. 127.)