

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of:)	
)	
Fostering Innovation and Investment in the Wireless Communications Market)	GN Docket No. 09-157
)	
A National Broadband Plan for Our Future)	GN Docket No. 09-51

**COMMENTS OF
INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION**

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The Information Technology and Innovation Foundation (ITIF) is pleased to offer the following comments on the FCC’s Notice of Inquiry on the above-titled matters. ITIF has long been an advocate of a modernized, streamlined approach to spectrum regulation, innovation stimulus, and increased rates of broadband deployment and adoption. We recognize the societal value of universal adoption and use of broadband networks and the addition value that wireless access provides to mobile and rural users.

In this reply, we summarize an approach to spectrum regulation that addresses a number of the questions posed in the NOI. We congratulate the Commission for assembling such a large number of questions on the subject, and regret that the pressure of time and the need to attend to a number of other matters precludes our offering a more detailed set of comments at this time. We offer a commitment to participate in the reply phase with additional suggestions and clarifications as appropriate.

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¹ ITIF is a nonprofit, non-partisan public policy think tank committed to articulating and advancing a pro-productivity, pro-innovation and pro-technology public policy agenda internationally, in Washington and in the states. Through its research, policy proposals, and commentary, ITIF is working to advance and support public policies that boost innovation, e-transformation and productivity.

Observations

- 1) All the important new uses of spectrum in the last 15 years have been digital, and we expect that trend to continue for the foreseeable future. Consequently, it would be wise for the Commission to build on its expertise in digital regulation by moving into the sphere of emphasizing digital properties such as coding, framing, and media access control (MAC) protocols going forward.
- 2) The Commission can gain a great deal of leverage by partnering with competent standards authorities such as the IEEE 802 and the industry consortia that provide certification for compliance with IEEE 802 standards such as the Wi-Fi Alliance. A working partnership enhances the effectiveness of both parties, and brings potential value to the public.
- 3) Analog regulation will remain a part of spectrum regulation, but a much smaller one. The attributes of analog regulation that will be most important are radiation patterns and, obviously, the effects of digital uses on legacy analog licenses.
- 4) To the extent feasible, analog licenses should be replaced by digital licenses, which can be done expeditiously for government licenses. As digital uses are more spectrally efficient than analog ones, digital conversion has the potential of freeing spectrum for non-government uses.
- 5) Interference mitigation in the digital realm is as much a task of receivers as transmitters. Consequently, regulations for unlicensed uses must specify responsibilities to filter or ignore messages not coded and framed appropriately to the receiver's protocol.
- 6) The Commission has played an indispensable role in enabling wireless innovation in the last few years by:
 - Guiding the DTV transition
 - Supporting Wi-Fi deployment
 - Enabling Ultra-wideband
 - Releasing the White Spaces order.

There are many lessons to be learned from each of these events both on the positive and negative sides, so it would be useful to conduct a post-mortem on each to establish what was done right and what could have been done better. This has been a learning experience for the Commission and for its counterparts in other countries as NRA's transition from the analog world to the digital one. With hindsight, it's difficult to see that each could have been improved if we knew at the time of the order all the things we know now. DTV would obviously be better off if COFDM had been used instead of 8-VSB. Now that the DTV transition has completed, it would be wise to begin working on its phase-out, especially if it will take another 15 years.

Wi-Fi has certainly been a screaming success, but it would be even more successful if its spectrum weren't also used by so many other services. Amending the rules to transition out the analog devices and more primitive forms of Wi-Fi could have productive consequences.

Ultra-Wideband has been the opposite of Wi-Fi, a screaming failure. While some of the blame certainly falls on the shoulders of the warring camps that prevented the IEEE 802.15.3a from reaching a consensus, there's also a perception that the Commission's regulation on power levels may have been too strict. This deserves some examination.

White spaces is too early in the process to assess, but there may be utility in devising more detailed Media Access Control (MAC) protocols for this space; these are sometimes referred to as "spectrum etiquettes". Similarly, the power limits for the White Spaces are very conservative, and there's obviously potential for increasing them, especially in rural areas where the relative absence of TV signals and high-speed wireline options coexist.

- 7) Once the approach to spectrum regulation has shifted from an analog foundation to a digital one, the Commission can expect debates over unlicensed and secondary use to embrace such issues as contention-based MAC protocols vs. scheduled ones, mesh configurations vs. hub-and-spoke topologies, mobile uses vs. stationary ones, etc. These properties can and should become parts of future regulations on spectrum use.
- 8) We now realize that technology changes over time, and therefore must incorporate this revelation into our regulatory process. This factor has a number of implications for regulation, such as easing transitions from one standard to another, facilitating multiple uses during transition, and signaling to obsolete standards in coding they understand when packets from more advanced systems are on the air. IEEE 802.11 has acquired a great deal of experience in this area that's bound to be of use to the Commission. Regulations for digital use must incorporate phase-out facilities in every case.
- 9) The preceding observations apply to unlicensed and secondary uses; licensed use will continue to be important as the primary driver of innovative new technologies what will ultimately spill over into the unlicensed space. High-value, licensed spectrum is the site of the most significant innovations in wireless technology simply because the greatest barriers are absent from it; spectrum licensees have the greatest ability to free their frequencies of obsolete systems and the greatest motivation to maximize efficiency. Maintaining a rich system of licensed, unlicensed, and secondary use is the correct model.
- 10) We shouldn't regard such innovations as cognitive radio and software-defined radio as futuristic concepts. Wireless systems have incorporated spectral sensing and frequency agility for some time. The White Spaces database systems are

helpful on the gross time scale, but they're no substitute for the microsecond-by-microsecond behavior of the competent Dynamic Frequency Selection and Dynamic Channel Selection functions in existing Wi-Fi products.

Conclusion

We thank the Commission for opening this inquiry and considering our summary remarks.