

# A Summary of Recent Actions by the FCC

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Over the past several months, the Federal Communications Commission (FCC) has proposed or acted on several matters of importance to the telecommunications industry. Some of these involve significant changes to existing rules and practices relating to spectrum management.

## Investigation Begun into the Concept of "Interference Temperature"

In an attempt to address complex issues that are not adequately defined by Part 15 of the Rules, the FCC issued a Notice of Inquiry and Notice of Proposed Rulemaking (FCC 03-289) on a new approach to interference management. From the November 2003 news release on this action:

"Termed 'interference temperature,' this model for addressing interference takes into account the actual cumulative radiofrequency (RF) energy from transmissions of spectrum-based devices, and would set a maximum cap on the aggregate of these transmissions. In contrast, the current approach for managing interference focuses on specifying and limiting the transmit powers of individual spectrum-based devices as the chief way to prevent interference.

"The 'interference temperature' approach may facilitate more intensive use of the radio spectrum, creating the opportunities for new services and improving the predictability of any interference to existing services.

"The Notice of Inquiry seeks comment on a number of issues related to the need for, development, and implementation of an interference temperature model for managing interference."

To test the concept, the Notice of Proposed Rulemaking seeks comment on various technical rules that would establish procedures and use the interference temperature model on a limited basis in the 6525-6700 MHz band and portions of the 12.75-13.25 GHz band. These bands are used primarily for satellite uplinks and point-to-point microwave links; the purpose of the new rules would be to establish whether unlicensed devices could operate in these bands.

Comments will likely include questions about the expansion of this interference measurements method

to other bands, particularly where reception of relatively weak signals is commonplace. These users have learned to deal with narrowband interference, but could see service reduced if the overall "noise + interference temperature" was allowed to be increased.

An area of more specific interest involves ultra-wideband (UWB) signals. Present "harmful interference" and field strength standards are not adequate to define the allowable radiation levels for UWB emitters. An inherently broadband definition of power density, as is expected for "interference temperature" rules, seems appropriate for UWB. Technical discussion is expected to revolve around correlation of the new method with current Part 15 levels and the behavior of currently operating services in the presence of an increased apparent noise floor.

## Smart Radios

Frequency-, power- and modulation-agile radios are already in limited use within certain bands and services (WLAN and some commercial mobile radios). Notice of Proposed Rulemaking and Order (FCC 03-322), "...seeks comment on the ways in which the Commission can encourage and remove regulatory impediments to continued development and deployment of smart radio technologies, including, for example, facilitating the ability of licensed spectrum users to deploy them for their own use to increase spectrum efficiency, and to facilitate secondary markets, allowing licensees to lease their spectrum access to third parties using such technologies. The Notice also seeks comment on ways in which smart radios can facilitate opportunistic use of the spectrum by unlicensed devices, while protecting incumbents from harmful interference.

"In addition, the Notice seeks comment on rules permitting additional technical flexibility, including allowing unlicensed devices in limited bands to use higher transmit powers in rural and underserved areas. This would potentially reduce network infrastructure costs, facilitating broadband and other services in these areas. The Notice also seeks comment on a specific technical approach that would provide licensees with the ability to retain real-time access to

spectrum they lease to third parties, such as public safety entities, if the Commission decides to permit such leasing. Also, the Notice seeks comment on how smart radios could facilitate public safety interoperability. Specifically, because of their frequency agility, smart radios may potentially be used as a communications bridge between two different radio services—effectively translating the signals from one service into the format and frequency of another. This could enhance the ability of different public safety entities to communicate with one another in the event of an emergency.

“The Notice also seeks comment on specific applications for smart radios, such as mesh networks and real-time frequency coordination between NGSO satellite and other services. Further, the Notice proposes changes to the Commission’s equipment authorization processes to better accommodate software-defined radios and smart radio systems.”

### Broadband Over Power Lines (BPL)

On February 4, 2004, the FCC issued Notice of Proposed Rule Making (FCC 04-29), proposing “changes to certain technical rules that will foster broadband deployment using the significantly untapped capabilities of the nation’s power grid, while safeguarding existing services against harmful interference.” Specifically, the Notice adopted by the Commission:

“- proposes rules requiring BPL devices to employ adaptive interference mitigation techniques to prevent harmful interference to existing users, such as public safety and amateur radio operators. These techniques would enable BPL devices to cease operations altogether, dynamically reduce transmit power, and/or avoid operating on specific frequencies to prevent harmful interference;

“- proposes developing a public database that would include such information as location, operational frequencies, and modulation type of BPL devices, which will facilitate the resolution of interference issues in a timely fashion;

“- seeks comment on specific RF measurement guidelines for BPL devices and other carrier current systems. These guidelines will ensure that emission measurements for these systems are made in a consistent manner. While the Notice addresses RF measurement guidelines, it does not propose any changes to existing applicable emission limits.”

This NPRM has drawn a firestorm of response from the Amateur Radio community and a number of public safety and mobile radio users, which consider BPL a serious interference threat, given the anticipated significant radiation from power lines when used as antennas at operating frequencies as high as 80 MHz,

as proposed for some BPL systems.

A recent study and report by the Commerce Department’s National Telecommunications and Information Administration (NTIA) identifies a number of potential interference issues, and states that there are “rigorous technical solutions” that would enable BPL to exist without interference to other services. Among the solutions proposed in the report are: “a notch solution for the most sensitive and severely impacted systems; local registration of BPL frequency use; intelligent power management; and the use of a Web-based interface for potentially impacted parties.” A Phase 2 study is planned for later this year to examine skywave propagation characteristics of BPL and its effects regarding interference.

The glowing statements of FCC Chairman Powell, and, recently, by President Bush, suggest that BPL is a high priority in this Administration, despite the concern for its interference potential.

### Ease Restrictions on Unlicensed Devices

The FCC has asked for public comment on changes to several technical rules in Parts 2 and 15. The rule changes would permit operators and device manufacturers to more readily modify or substitute technically equivalent parts, facilitating increased deployment of broadband services. The Commission proposes several rule changes that will remove regulatory impediments to deployment of advanced technologies for wireless networking, including provisions for the use of sectorized and phased array antenna systems to increase spectrum efficiency through greater re-use of the same radio frequencies.

### Other Actions

The FCC has adopted a rule change allowing higher power and longer-duration transmissions from RFID equipment operating at 433.5-434.5 MHz. Homeland security is a major reason given for the change, so RFID can to provide more extensive monitoring of shipping containers.

An additional 255 MHz of spectrum is now available in the 5.470-5.725 GHz U-NII band for unlicensed devices, with note of services offered by wireless internet service providers (WISPs). The authorization requires that U-NII devices operating in the 5.250-5.350 GHz and the 5.470-5.725 GHz bands employ dynamic frequency selection (DFS)—a listen-before-talk mechanism—and transmit power control (TPC).

A proceeding has been initiated “to foster the introduction of wireless broadband operations in the 3650-3700 MHz band.” The FCC proposed to allow unlicensed devices to operate in some or all of the 3650 MHz band with higher power than currently authorized under Part 15 of the Rules.