

An hourglass-shaped graphic with a globe in the top bulb and another globe in the bottom bulb. The hourglass is light blue and has a dark blue cap at the top. The globe in the top bulb is dark blue, and the globe in the bottom bulb is light blue. The text is centered within the hourglass.

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*Spectrum Policy: Public Safety and Wireless
Communications Interference*

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Abstract. This report deals with radio frequency assignments for public safety use by states and localities.

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CRS Report for Congress

Spectrum Policy: Public Safety and Wireless Communications Interference

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**Prepared for Members and
Committees of Congress**

Spectrum Policy: Public Safety and Wireless Communications Interference

Summary

In mid-2005, wireless communications managers commenced the process of moving selected public safety radio channels to new frequencies. This was the first step in a three-year plan to move public safety users to new channels in order to mitigate persistent problems with interference to their radio communications. The interference usually takes the form of dropped calls or dead spaces with radio transmissions — primarily to or from first responders — in certain frequencies. The majority of documented incidents of interference have been attributed to the network operated by Nextel Communications, Inc. As part of an agreement originally made between Nextel and the Federal Communications Commission (FCC), some public safety wireless users have moved or will move to new frequencies, with the wireless company paying all or part of the cost. Nextel in 2005 completed a merger with Sprint Corporation, creating Sprint Nextel. The rebanding agreement was not affected by the merger. In return for the expenditures, and reflecting the value of spectrum that Sprint Nextel is relinquishing as part of the band configuration, the FCC assigned new spectrum licenses to the wireless company. The FCC set the windfall value of the new licenses, after allowing for the value of the licenses being relinquished, at \$2.8 billion. The costs that Sprint Nextel incurs in the rebanding process are being applied to the \$2.8 billion windfall. If the total is less than \$2.8 billion, Sprint Nextel will be required to make an “anti-windfall” payment to the U.S. Treasury for the difference. If the costs exceed \$2.8 billion, Sprint Nextel is obligated to pay them without any new concessions from the FCC.

The rebanding plan is being implemented by the 800 MHz Transition Administrator (TA), created by the FCC for this purpose. The TA’s ongoing responsibilities are to set priorities, establish schedules, and oversee reimbursement to parties for eligible expenses associated with relocation. Disagreements about the implementation of the plan that the TA cannot resolve on its own or through mediation are in most cases referred to the FCC. From the outset, there have been debates about the transition plan, such as maintaining interoperability, scheduling, and reimbursement for costs incurred. As the band reconfiguration proceeds, debates have often become protracted negotiations — and even litigious disputes — slowing the transition process. Despite the delays in moving public safety from frequencies designated to be swapped with Sprint Nextel, the FCC ruled that Sprint Nextel is to discontinue commercial operations on frequencies intended for public safety in accordance with the timetable as originally agreed. Courts have upheld the FCC decision that Sprint Nextel is obligated to vacate the contested frequencies no later than June 26, 2008, before the frequencies it plans to move to are available. As it might be difficult for Sprint Nextel to maintain its “push-to-talk” service with reduced spectral capacity, it is expected that the FCC will negotiate new terms with Sprint Nextel and grant an extension of the deadline.

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Spectrum Policy: Public Safety and Wireless Communications Interference

Introduction

Wireless signals are subject to various types of interference, even when operating within assigned frequencies. The Federal Communications Commission (FCC) regulates commercial radio, television, commercial wireless services, and state and local public safety and other non-federal uses of radio frequency spectrum. Its primary tool in dealing with interference to wireless transmissions is to prevent it by the judicious allocation of radio frequencies, following band plans designed to preclude or minimize most types of interference. In the case of frequencies at 800 MHz,¹ interference has been caused primarily by transmissions from commercial cell phone towers, many of which are part of Sprint Nextel's "push to talk" network.² When the frequencies in the 800 MHz band were first assigned, the FCC did not anticipate that channels in that band intended for short messages over commercial mobile radio (used by taxi dispatchers, for example) would — with time, technology, and soaring consumer demand for wireless service — be converted to a heavily-trafficked national cell phone network. The commercial allocations at 800 MHz were closely interleaved with public safety allocations, with the expectation that the (presumably) low-usage commercial assignments would act as buffers to prevent interference with public safety channels.

The FCC announced in 2004 that it had agreed upon a rebanding plan to consolidate public safety frequencies and those used by some other operators, such as utilities, in the lower part of the 800 MHz band, while moving some of the 800 MHz channels acquired by Nextel, and some other commercial users, to the higher end of the band. The subsequent merger between Sprint Corporation and Nextel Communications, Inc., creating Sprint Nextel, does not alter the agreement reached between the FCC and Nextel. The band reconfiguration is expected to eliminate

¹ Radio frequency spectrum is measured in hertz. Radio frequency is the portion of electromagnetic spectrum that carries radio waves. The distance an energy wave takes to complete one cycle is its wavelength. Frequency is the number of wavelengths measured at a given point per unit of time, in cycles per second, or hertz (Hz). Typical designations are: kHz — kilohertz or thousands of hertz; MHz — megahertz, or millions of hertz; and GHz — gigahertz, or billions of hertz.

² In a letter it filed with the FCC, dated May 16, 2003, Nextel wrote: "Ten percent of all public safety agencies licensed at 800 MHz have reported experiencing interference from the lawful operations of Nextel [and others]." This letter and other comments can be found by going to the FCC Electronic Comment Filing System (ECFS) on the FCC website [<http://www.fcc.gov/cgb/ecfs/>]. In ECFS, click "Search for Filed Comments," insert "02-55" in the box marked "Proceeding," and then search the file.

interference caused by the close proximity and interleaving of commercial and public safety channels. The decision reached by the FCC in general supported a rebanding plan first proposed by Nextel in 2001. After months of negotiations, clarifications and technical corrections, a modified plan was accepted in February 2005.³ The conversion process was scheduled to be completed by June 26, 2008, within three years of the official start date set by the FCC.

Highlights of the FCC Rebanding Plan

The news release announcing the FCC decision regarding the decision for rebanding provided a summary of key points,⁴ some of which are highlighted below. These provisions, negotiated with Nextel, apply to Sprint Nextel effective as of the date of the merger.

- Separate “generally incompatible technologies” by eliminating interleaving.
- Move channels designated for interoperability to the lower end of the band, close to the planned public safety band at 700 MHz.
- Require public safety systems to relocate to channels at 809-815 MHz and 854-860 MHz.
- Require certain business and industrial users to relocate to channels at 809-815 MHz and 854-860 MHz.
- Require Enhanced Specialized Mobile Radio users, “ESMR,” to relocate to 817-824 MHz and 862-869 MHz.
- Until the band relocation plan is complete, apply “Enhanced Best Practices” to define and correct interference that will place “strict responsibility on carriers to fix such interference.”
- Require Nextel to give up some of its licenses at 800 MHz and all of its licenses at 700 MHz.
- Modify Nextel’s licenses to provide the right to operate at 1910-1915 MHz and 1990-1995 MHz, “conditioned on Nextel fulfilling certain obligations specified in the Commission’s decision.”
- Value the 1.9 GHz spectrum rights to be assigned to Nextel at almost \$4.9 billion, less the cost of relocating incumbent users in those channels.
- Credit Nextel the value of the spectrum rights it is relinquishing at 700 MHz and 800 MHz plus the “actual costs” to Nextel in relocating “all incumbents in the 800 MHz band.”
- Require Nextel to make an “anti-windfall payment” to the Treasury at the conclusion of the relocation process that will equal the difference between the \$4.9 billion valuation and the cumulative credits.
- Require Nextel to provide public safety users at 800 MHz and incumbent users at 1.9 GHz with “comparable facilities.”

³ “Nextel Accepts FCC 800 MHz Interference Solution,” FCC News, February 7, 2005, at [http://www.fcc.com].

⁴ “FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio System,” FCC News, July 8, 2004, at [http://www.fcc.gov].

- Require Nextel to establish escrow accounts and a letter of credit in the amount of \$2.5 billion, to “ensure that the band reconfiguration process will be completed.”
- Provide an independent “Transition Administrator” to authorize disbursements, “subject to *de novo* Commission review.”

Costs of Rebanding

The FCC rebanding plan required that Sprint Nextel pledge \$2.5 billion in cash and letters of credit to cover relocation costs for public safety. Sprint Nextel’s obligation to cover the costs of rebanding is not limited to \$2.5 billion, however. Sprint Nextel is expected to pay all the agreed upon costs, even if this total exceeds \$2.5 billion. The difference between the values of the spectrum Sprint Nextel is relinquishing and of the new spectrum it is receiving is an increase — a potential windfall — of approximately \$2.8 billion. This is the value, before specified relocation costs, that Sprint Nextel might be obligated to pay the U.S. Treasury. If the rebanding plan costs reach \$2.5 billion, the “anti-windfall payment” due the U.S. Treasury would be \$300 million. If the costs exceed \$2.8 billion, the Treasury receives nothing. If the costs are no more than \$850 million (a preliminary estimate provided by Nextel), the payment to the Treasury could approach \$2 billion. Therefore, all the relocation costs reimbursed by Sprint Nextel must be tallied and documented to be applied toward the potential anti-windfall payment.

Reimbursement of Costs

Among the clarifications provided in a late-2004 supplemental order⁵ from the FCC was confirmation that the Transition Administrator (TA) has the authority to advance funds to pay for rebanding plans, based on a detailed estimate of costs and of time needed to complete rebanding. In early 2006, APCO⁶ and other public safety groups contacted the FCC to express concern about difficulties in obtaining funding from Sprint Nextel for planning.⁷ According to the letter, Sprint Nextel required that cost estimates of rebanding plans be submitted for approval by Sprint Nextel before being presented to the TA. The letter stated that “properly managed reconfiguration planning” is needed to assure continuity of operation during the rebanding process. Furthermore, the letter reported that “only two” plans had been approved for advanced funding while “a number” of plans were in mediation. The letter expressed concern over the delays in the process and its possible consequences in the future.

⁵ FCC, *Supplemental Order and Order of Reconsideration*, December 22, 2004, WT Docket No. 02-55.

⁶ Association of Public-Safety Communications Officials — International. APCO helps coordinate frequency assignments for public safety and often assists the FCC in implementing spectrum policy for public safety.

⁷ Letter to Catherine W. Seidel, Acting Chief, Wireless Telecommunications Bureau, FCC from APCO, International Association of Chiefs of Police, International Association of Fire Chiefs, Major Cities Chiefs Association, Major County Sheriffs’ Association, National Sheriffs’ Association, January 12, 2006, WT Docket No. 02-55.

In response to the concerns expressed by the public safety groups, the TA modified requirements for requesting reimbursement for reconfiguration planning. Under new rules, the requests go first to the TA for review and are then forwarded to Sprint Nextel for action.⁸

Delays related to cost reimbursement persisted, however. In a letter sent to the FCC on May 9, 2007, public safety officials expressed their concerns about the delays in rebanding, which they attributed to “hundreds of protracted negotiations between Sprint Nextel and public safety licensees regarding the cost of planning for and implementing the rebanding...”⁹ The letter identified as a “root cause” Sprint Nextel’s narrow interpretation of an FCC requirement that funds requested for rebanding be “the minimum necessary.” Sprint Nextel is said to have explained that this standard required “absolute lowest cost,” and that their diligence in reviewing costs was necessary in order to justify the sums that would be credited against the \$2.8 billion windfall. The FCC responded with a Memorandum Opinion and Order¹⁰ clarifying its intent regarding the calculation of these costs. It stated that “minimum necessary” was to be interpreted in the broad context of the goals of the rebanding plan and that a higher cost could be justified if it brought about a benefit, such as speedier transition.

Interference at 800 MHz

Public safety currently uses 9.5 MHz of spectrum in the 800 MHz range at 806-821MHz and 851-869 MHz. The allocation of this spectrum interleaves public safety and private commercial communications using narrow slices of spectrum. This close proximity of public and commercial utilization is widely believed to be the primary cause of interference to communications by public safety and other entities using 800 MHz channels.

Although many wireless carriers have been identified in investigations of reports of interference, a large number of the documented cases of interference have been linked to operations of Nextel. To address the problem, Nextel prepared a White Paper¹¹ regarding use of the 800 MHz band and submitted it to the FCC in

⁸ Announced February 1, 2006; the revised process is on the TA website at [http://www.800ta.org/content/PDF/reconfiguration_materials/RFPF_FS.PDF]. Viewed June 4, 2008.

⁹ Letter at [<http://www.apcointl.com/frequency/documents/GroupItrtoChairmanMartin.pdf>]. APCO maintains a file of documents related to the 800 MHz rebanding effort at [<http://www.apcointl.com/frequency/800hp.htm>]. Both viewed June 4, 2008.

¹⁰ FCC, *Memorandum Opinion and Order*, May 18, 2007, WT Docket No. 02-55.

¹¹ “Promoting Public Safety Communications: Realigning the 800 MHz Land Mobile Radio Band to Rectify Commercial Public Radio - Public Safety Interference and Allocate Additional Spectrum to Meet Critical Public Safety Needs.” Available at [<http://www.fcc.gov/cgb/ecfs/>], under Nextel, docket numbers 00-258, 95-18, 99-81 or 99-87, dated November 21, 2001.

November 2001. In the letter to the FCC that accompanied the White Paper,¹² Nextel attributed interference problems to earlier actions by the FCC “authorizing public safety communications providers and [commercial] licensees to operate essentially incompatible systems on mixed, interleaved and adjacent 800 MHz channels ... Intermodulation is the dominant cause of interference, with wideband noise and receiver overload playing a secondary role.” In the paper, Nextel presented a plan for spectrum realignment that would place public safety and commercial mobile radio services (CMRS) in separate blocks of contiguous spectrum. Nextel argued that the root cause of interference is the manner in which the spectrum has been allocated and that changing the allocation will eliminate the problem.

Benefits of Rebanding

Radio frequency spectrum provides an invisible roadway for wireless transmissions; each band of measured spectrum is like a highway lane guiding communications to their destination. Spectrum allocations are divided into channels. When many channels are within a designated spectrum band, the allocation is referred to as narrowband. Broadband has comparatively fewer channels and therefore greater capacity for sending images and other data at high speeds. Contiguous spectrum for broadband is important for advanced wireless applications. The term wideband is sometimes used in the telecommunications industry to describe limited broadband applications transmitted on narrowband channels. An example is “mobile data” networking for public safety. This system provides voice and data communications and supports interoperability for text messages. The possibility that contiguous spectrum for public safety at 800 MHz could be leveraged for better wideband applications¹³ is one potential benefit of the rebanding proposals.

Another benefit of rebanding would be the relocation of “NPSPAC” channels¹⁴ — reserved for special public safety uses — to the lower end of the spectrum band. This relocation effectively creates contiguous spectrum from channels at 700 MHz designated for public safety¹⁵ through the 809-815 MHz frequencies to be allocated to public safety under the rebanding plan. The relocation plan also provides for an increase in the amount of spectrum at 800 MHz potentially available to public safety. This also could be considered a benefit.

¹² From Robert S. Foosaner, Senior Vice President and Chief Regulatory Officer, Nextel Communications, Inc., to Mr. Thomas Sugrue, Chief, Wireless Telecommunications Bureau, November 21, 2001.

¹³ Nextel, in its filings regarding its proposal, maintains that there will be enough contiguous spectrum to support low-speed data, high-speed data, and video.

¹⁴ Frequencies designated by the National Public Safety Planning Advisory Committee for uses such as mutual aid and interoperability.

¹⁵ These frequencies are to be available no later than February 18, 2009. See CRS Report RL31764, *Spectrum Management: Auctions*, by Linda K. Moore.

Transition Administrator

BearingPoint was chosen as the Transition Administrator (TA) by a committee appointed by the FCC. The responsibilities of the TA are to facilitate a smooth transition and to oversee the administration and financial management of the plan.¹⁶ A key responsibility is establishing a relocation schedule on a region-by-region basis. In general the TA has been instructed by the FCC to give priority to regions on the basis of population but the TA can establish priorities based on other criteria, such as severe interference problems. The TA is also to monitor progress in the rebanding plans and to enforce the deadlines set by the FCC. It is the TA that requests estimates of rebanding costs from public safety and private wireless networks covered by the plan, and decide whether or not to provide funds in advance. Disagreements about the implementation of the plan that the TA cannot resolve on its own or through mediation will in most cases be referred to the FCC.

In a May 30, 2007 Opinion and Order¹⁷ the FCC ruled on a number of disputes that had been brought before it. Most of these revolved around claims by licensees that they should be included in the rebanding plan, and entitled to reimbursement for the costs or relocating to new frequencies. In general the FCC ruled in favor of the claimants and against Sprint Nextel in requiring the company pay costs associated with rebanding.

Rebanding Schedule

In a review of Sprint Nextel's performance in the rebanding program,¹⁸ the FCC concluded that Sprint had failed to meet the transition program's mid-point milestone of December 26, 2006. To counter these shortcomings, the FCC set additional benchmarks for progress with deadlines for completion.¹⁹ Although some extensions have been granted and others may be considered, the FCC reiterated its expectations for Sprint to adhere to the original June 2008 deadline.²⁰ Notably, the FCC confirmed that its orders require Sprint to vacate most channels by the original deadline of June 26, 2008.²¹ Sprint subsequently filed a petition for review of the FCC's action in the U.S. Court of Appeals for the District of Columbia (Case No. 06-1111); on May 2, 2008, the court ruled in favor of the FCC (No. 071416).

Supported by the court decision, the FCC can choose to enforce the requirement that Sprint Nextel discontinue commercial operations on frequencies intended for

¹⁶ See the TA website at [<http://www.800ta.org/>] for additional information. Viewed January 30, 2006.

¹⁷ FCC, *Second Memorandum Opinion and Order*, May 20, 2007, WT Docket 02-55 *et al.*

¹⁸ FCC, *Third Memorandum Opinion and Order*, September 11, 2007, WT Docket No. 02-55, at [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-167A1.pdf]. Viewed June 4, 2008.

¹⁹ *Ibid.*, Sections B, C, and D.

²⁰ *Ibid.*, paragraphs 47 and 48.

²¹ *Ibid.*, paragraphs 25 and 28.

public safety in accordance with the timetable as originally agreed, before the frequencies it plans to move to are available. As it might be difficult for Sprint Nextel to maintain its “push-to-talk” service with reduced spectral capacity, it is expected that the FCC will negotiate new terms with Sprint Nextel and grant an extension of the deadline.