

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Nextel Communications Inc. and Pacific)
Wireless Technologies, Inc.)
)
Request for Assignment of Licenses) WT Docket 01-192
)
Nextel Communications and Chadmoore)
Wireless Group, Inc.)
Request for Assignment of Licenses) WT Docket 01-193

COMMENTS OF NEXTEL COMMUNITIES

The Cities of Philadelphia, Pennsylvania; Phoenix, Arizona and Scottsdale, Arizona together with Queen Anne County, Maryland; ("Nextel Communities"), hereby respond to the Commission's invitations to comment on the captioned applications.¹ The Nextel Communities would also associate themselves with the numerous other sister municipalities such as the Hamilton County and the District of Columbia that plan to file individual comments regarding these matters.

Nextel proposes to acquire 188 licenses from Pacific Wireless and 1062 licenses from Chadmoore. Most of these licenses are in the Specialized Mobile Radio ("SMR") frequency bands in the 800 MHz region of the radio spectrum. The licenses operate on frequencies adjacent to, or "interleaved" with, frequencies assigned to public safety radio licensees such as the Nextel Communities.

¹ DA 01-1931, released August 14, 2001, and DA 01-1955, released August 17, 2001.

Increasingly, this proximity of use -- not only by Nextel but also by other commercial wireless providers -- is being identified as a cause of interference to critical public safety radio transmissions affecting the safety of human life and protection of property. Attached (Exhibit A) is one press account of the difficulties experienced by local governments across the country, including some of the Nextel Communities. Nextel Communities would also remind the Commission that it was concerned enough about the problem to convene, 18 months ago, a working group composed of representatives of public safety licensees, wireless carriers and radio equipment manufacturers to consider solutions.

One product of that effort is *A Best Practices Guide* (December 2000), available in paper and electronically through one of the work group participants, the Association of Public-Safety Communications-International, Inc. ("APCO").² In its charge to the work group, the FCC stated:

[A]necdotal accounts appeared to correlate the increased interference with the recent expansion of 800 MHz CMRS systems -- particularly enhanced Specialized Mobile Radio ("SMR") systems and cellular networks -- using digital technology and employing more intensive frequency reuse to serve an expanding customer base. (Guide, 3)

The Guide suggests that:

Public safety radio systems designed for the frequency coordinated, less congested and less intensively used RF environments of ten and 15 years ago, for example, may not be capable of rejecting locally robust commercial transmissions on adjacent frequencies. (6) On the other hand, "some digital commercial networks . . . may also increase the local noise floor above that in which older public safety equipment was intended to operate." *Id.* Moreover, the trend from primarily vehicular to hand-held devices increases "the mobility of the units and the potential interference effects." *Id.*

For existing systems, the Guide recommends several measures to mitigate interference, including retuning commercial channels to increase their separation from public safety

² The Guide was funded by Nextel and the equipment manufacturer, Motorola.

frequencies, modifying commercial power levels and other system characteristics and improving the local signal strength of public safety systems. (Guide, 12) These mitigation efforts, however, typically result in “sub-optimal” use of either commercial or public safety systems, or both.

(Guide, 13) The better solution would be to “segregate” public safety from commercial spectrum assignments:

Public safety organizations, commercial wireless carriers and equipment manufacturers should consider whether segregating public safety and commercial channels would be useful, and seek FCC permission to “swap” or reassign channels. . . .Frequency swaps that enable each party to fully utilize its licensed channels serve the public interest by promoting spectrum efficiency and the widespread availability of both public safety communications and commercial wireless services. *Id.*

While the Guide speaks of swapping and reassignment in particular cases, the Nextel Communities believe that this would be less efficient than a general, national solution to end the present “interleaving” of commercial with public safety frequencies.

The FCC’s present approach is to encourage public safety authorities and commercial carriers to work out local problems themselves through mitigation or individual applications for frequency swapping or reassignment. The agency’s “no-fault” attitude toward the failure to predict the popularity of cellular services and the enhancement of SMR into an interconnected mobile telephony service is illustrated by the Guide:

[W]hen the allocations [at 800 MHz] were promulgated, neither the FCC, the wireless industry nor the public safety communications community could have anticipated the revolutionary changes in mobile communications technology that would occur during the 1990s, nor the explosive demand for commercial communications services and increased need for additional public safety communications capacity and capabilities. (4-5)

For the Nextel Communities, the fixing of blame is less important than finding a cost-effective solution and an affordable means of paying for it. We are disappointed to read that “the

FCC sees no need to mandate any changes because Nextel and public safety officials are already working together to solve the issue.³” As is clear from Exhibit A, the statement of Scottsdale Communications Technology Manager Gale Denny (Exhibit D) and the discussion below, the degree of cooperation between commercial providers and public safety varies widely, as do the results of attempted mitigation.

The construction of new public safety systems and the purchase of new, interference-resistant public safety radios are multi-million dollar undertakings which (a) might be unnecessary, or capable of deferral, if frequency segregation could be accomplished, and (b) are too expensive to build only to find out afterward that commercial interference persists. Perhaps the greater cost is the staff time spent on mitigation “band-aids” when surgery is the preferred answer. And the greatest potential expense is the cost of human life and property which are at risk in interference-prone communities.

Exhibit B from the City of Phoenix contains a timeline illustrating the gradual diagnosis of interference to its Mobile Data Radio (“MDR”) system and the application of less-than-satisfactory solutions. Point 15 from the timeline states:

The concept of spectrum efficiency is dead because of the design requirements to compensate for the Nextel interference.

³ A vivid example of the lack of coordination, if not lack of cooperation, may be found in the statement of Gail Denney, Communications Technology Manager of the City of Scottsdale Arizona. Ms Denny summarizes her experiences (attachment D) as follows:

“Nextel does not discuss it's plans to implement new cell sites with the public safety community and does not seek their input prior to implementation. For the most part Public Safety is not aware that a Nextel site is even in place until the complaints begin to come in from officers who cannot communicate from locations where previously all communications was possible. It is a sad state of affairs when officer and citizen safety is compromised for commercial ventures and we have to wait until a problem exists before we can get any relief.”

PUBLIC SAFETY CHANNELS ARE EXTREMELY LIMITED. We have essentially run out of resource and have nowhere else to go. (caps in original)

In an appended summary of a Congressional briefing on the problem, the City's Deputy Director for Information Technology states:

They [Nextel] have not agreed to turn down power at their transmitters or ameliorate interference with any actions on their part. Their argument is that they are operating legally and it would hurt their business if they had to compromise their current technical operations in any way.

The City of Philadelphia is in the final stages of testing a new 800 MHz public safety communications system. In an effort to assure the satisfactory performance of the new system, the City contracted for an "Interference Avoidance Study," the summary of which is attached as Exhibit C. From the results of field evaluation:

The RCC Field Survey Team found that the Motorola XTS 300R portable radio's receiver was degraded when it was in the proximity of a CMRS cell site operated by Nextel Communications and/or Cingular Wireless. The degradation to the receiver was mainly due to receiver front end overload. The condition can present itself when the receiver is exposed to very strong signal levels of an undesired source. . . .

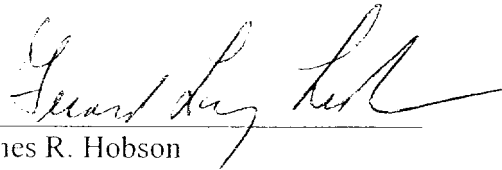
The RCC team also checked for intermodulation ("IM") products, a function of frequency proximity, and found that as commercial transmitters were turned off "the interference did not go away completely, however it was reduced." In sum, the study could not guarantee the City's new 800 MHz system complete freedom from commercial interference, but offered recommendations for amelioration along the lines of the Guide.

None of the above accounts, when combined with the press report at Exhibit A, inspires confidence in the FCC's current case-by-case approach to the problems of commercial interference to public safety radio systems at 800 MHz.

Nextel has stated that it is working on a general proposal for frequency reallocation that would segregate commercial from public safety bands of the 800 MHz spectrum.⁴ The sooner that proposal is submitted to the FCC, and the sooner the agency takes action on it, the more likely will be a cost-effective, durable solution to interference problems which now are consuming too much local time and money and threatening public safety.

For these reasons, the Nextel Communities urge the Commission to condition any approval of the Nextel applications for assignment on Nextel's filing, by a prompt and certain date, of a plan for the feasible segregation of public safety frequencies from commercial channels at 800 MHz which includes proposals for covering the costs of any needed public safety licensee relocations or network and equipment changes.

Respectfully submitted,



James R. Hobson
Gerard Lederer
Miller & Van Eaton, P.L.L.C.
Suite 1000
1155 Connecticut Avenue N.W.
Washington DC 20036-4320
(202) 785-0600

Attorneys for Nextel Communities

September 13, 2001

⁴ This claim is captured in the Comments of Hamilton County in this matter filed August 30, 2001.

EXHIBIT A

Emergency calls crowded out

08/05/01

EMILY TSAO

and RYAN FRANK

An invisible threat endangers the lives of police officers: Across the country, officers grab for a radio only to find their voices blocked by a nearby cellular phone tower emitting more powerful transmissions.

In a six-month investigation, The Oregonian found that in at least 28 states, public safety agencies reported at least one instance of cell phone tower interference with their radios or in-car computers.

No officers have been hurt or killed as a result of the impediment. But agencies across the country say the interference often threatens public safety -- and the lives of police officers and firefighters.

Among the incidents:

In June, two Denver police officers on a narcotics surveillance witnessed a shooting and tried to call for emergency backup. Their radios wouldn't work until they ran a block. Radios failed again in the same location two weeks later during a foot chase.

In April, two Portland officers lost radio connection as they rushed to a reported burglary near the airport.

In November 2000, 12 officers in Scottsdale, Ariz., stood within 100 feet of one another but couldn't use their radios as they searched for a man who had waved a gun during a barroom brawl.

In June, 2000, a Tigard police officer faced an armed man and radioed for backup. Only the word "gun" went through. "The worst-case scenario is an officer gets killed," said Detective Aaron Minor of the Scottsdale, Ariz., Police Department, which estimates that signals from a nearby cell phone tower interfered with police radios at least 300 times during a seven-month period last year.

"Obviously, this could involve the loss of life," said Gloria Tristani, a commissioner with the Federal Communications Commission.

In interviews, public safety managers and FCC officials say that one cell phone company alone - Nextel Communications of Reston, Va. -- is the source of interference with public safety communications in 21 states.

Unlike other cell phone companies, Nextel uses radio frequencies intertwined with or adjacent to those used by public safety radios.

Nextel agrees the interference is serious but says it occurs in only a handful of the hundreds of cities where it operates. "This isn't a widespread national problem," said Nextel Vice President Lawrence Krevor, who acknowledges that the towers the company uses cause interference in 12 states.

Nextel estimates a nationwide fix could cost millions of dollars. Public safety officials say it could be billions. But neither they, Nextel nor the FCC can agree on whom should pay.

Krevor said Nextel is committed to stopping the interference on a case-by-case basis. But those fixes often only reduce interference, not stop it.

The Federal Communications Commission, which regulates the airwaves, admits it unwittingly set the stage for this problem three decades ago when it doled out the frequencies that now conflict. But Kathleen Ham, deputy chief of the FCC's Wireless Telecommunications Bureau, said the commission is not responsible for fixing it because no one is breaking the law.

Police and fire chiefs could reduce interference with new equipment, but officials say they can't afford to replace outdated radios.

This weekend -- more than two years after a Washington County radio technician first alerted the FCC that Nextel towers were garbling firefighters' communications near Beaverton -- state, federal and company officials are meeting in Salt Lake City to try to determine the extent of the problem nationwide and lay out a program to fix it.

The wireless industry projects that its customer base will grow by more than 40 percent over the next two years, to 168 million. As a result, a wide range of industry experts say cell phone tower interference will get worse.

Frequencies allocated All radio transmissions -- from television signals to satellite communications to AM/FM radio -- are sent through the air in waves of varying lengths. All these waves are transmitted through a spectrum that ranges from about 9 kilohertz for submarine communications to 300 gigahertz for scientific satellites. The FCC regulates all transmissions in the United States, allocating users from one end of the spectrum to the other.

In the 1970s, long before cellular phones became popular, police officers fought for extra space in the spectrum, particularly in urban areas where the airwaves were used heavily. Their allocations stuck them in the lower frequencies with little or no space to add radios for new officers.

From 1974 to 1986, the FCC made available a section of the 800 megahertz band for police and fire departments and taxi and tow truck companies, among others.

The best use of the airwaves, the FCC decided, was to intertwine the users in 250 channels. The result was like 250 lanes on a highway, with police officers driving on lanes in between taxis and tow trucks. A separate allocation -- a block of 800 MHz channels that are not intertwined -- actually placed police between what would become two cellular companies.

The areas in which cellular carriers abut public safety transmissions would become hot spots for complex midair conflicts.

Nextel's birth In 1987, a former FCC lawyer named Morgan O'Brien launched Nextel's precursor company, a mobile radio firm, with a dream of turning it into a nationwide wireless phone provider.

Starting out as a two-way radio company, O'Brien bought thousands of 800 MHz radio frequencies from small taxi and tow truck companies. The neighbors coexisted peaceably for years. Then, in 1991, the FCC made what would turn out to be a crucial decision. The federal agency allowed O'Brien's company to use the frequencies for a new purpose: to build a digital network for wireless phones.

The decision gave O'Brien's company an advantage because the radio licenses he bought were far cheaper than the ones that had been allocated to the cell phone companies that were his competitors.

These 800 MHz radio frequencies, however, were the very ones that abutted police officers and firefighters in the radio spectrum. The FCC, not realizing its decision would later affect police officers, hailed the company for using the radio spectrum more efficiently.

The company O'Brien founded later became Nextel and has flourished into the nation's fifth-largest wireless provider with 7.7 million U.S. subscribers.

The discovery In the spring of 1998, firefighters at one of Washington County's busiest fire stations noticed a mysterious phenomenon.

The alarm system at Tualatin Valley Fire & Rescue's station near the Washington Square mall stopped working properly, sometimes delaying firefighters' response to some emergency calls in the district that covers 10 cities. Crucial radio information was sometimes garbled. Firefighters at the station complained to their 9-1-1 managers.

Spurred by the complaints, Joe Kuran, Washington County's lead radio technician, launched an investigation.

Kuran knew that radios are not perfect. Police radios, like AM/FM radios, sometimes experience poor transmission inside buildings or tunnels. Sometimes police radios don't work because of equipment failure, weather or nearby hills.

When Kuran and his staff checked the fire district's radio equipment, everything seemed to function properly. But when technicians tested the radio signals, they found something

mysterious. Some areas had normal signals, and other spots just a few feet away had no signal at all.

Adding to the mystery was the discovery that radio transmissions were clearer inside the station with the garage door closed and when the station's antenna was moved inside.

Kuran and the staff looked harder.

About a quarter-mile away, they found the problem planted on top of a red-brick building: a Nextel antenna.

When Nextel shut off its site, the interference vanished.

Nextel was transmitting at frequencies similar to those used by the fire station. Because the cell phone tower was so close to the station, its signals overpowered fire dispatch transmissions coming from a county communications tower more than four miles away atop Council Crest.

The discovery made Washington County one of the country's first agencies to prove cell tower interference.

Growing mystery

an unassuming 54-year-old with wire-rimmed glasses, Kuran doesn't have a fancy college engineering degree. He tinkered with ham radios while in high school in Wisconsin and worked in U.S. Air Force communications. He spent part of his 30-year career as a Motorola radio technician.

In November 1998, armed with his discovery, Kuran started his crusade against cell phone tower interference. He wrote what would be the first in a series of letters to FCC officials, notifying them of the problem that he said could potentially lead to the loss of life and property.

Kuran also wrote an article that appeared in the March 1999 issue of the trade journal *Mobile Radio Technology*, which is read by industry executives and communication engineers. His article prompted public safety officers around the country to scrutinize their own systems and wonder if cell towers were creating problems.

"Joe Kuran was the first to really nail it down," said Kevin Kearns, telecommunications manager for King County, which includes Seattle. "He was the one who put some technical meat behind it."

But much like in Washington County, other radio technicians had trouble confirming the sources of interference.

Cell phone operators move frequencies from tower to tower based on demand. Companies may use a handful of frequencies at one tower overnight but move them to another tower for rush-hour demand.

Some police radios constantly change channels, automatically seeking an open frequency each time officers push the talk button. Standing near a cell tower during a commuter rush, an officer's radio may be blocked and an hour later, just fine.

As other agencies homed in on the problem, Kuran waited to hear from the FCC.

On January 19, 2000 -- 13 months after Kuran wrote his letter -- the FCC wrote back.

D'wana R. Terry, the FCC's chief of public safety and private wireless division, wrote a four-paragraph letter that said neither Nextel nor Washington County violated federal guidelines. She said the parties should resolve the issue on their own.

Call for help

Six months later, interference was still cropping up in Washington County -- this time near the Tigard police station and across the street from a fire station. This incident alerted county officials that the problem was growing.

When police officers enter an unknown situation, they say, their radios are one of the most important tools they can carry because they enable officers to call for help for themselves and for others. In Tigard, the radio particularly is important because officers drive the streets alone.

"The radio -- it is your lifeline," said Tigard Officer Jeff Lain. "It is the only way you can get help and to let people know what is going on around you. When you are on your own it is scary."

Just before 6 a.m. June 9, 2000, Lain spotted a 1984 gray Buick sedan that he said ran a stop sign. Although it looked like it would be another routine traffic stop, Lain said he also knew it could turn deadly.

His car's red and blue lights flashed in the early morning light.

The driver and Lain stopped at a storage facility on Southwest Burnham Street, near the police station. Across the street, Anthony Passadore, also of the Tigard police, sat in his patrol car writing reports. A Nextel cell tower stood nearby.

Lain radioed his location to the dispatch center but later said that dispatcher couldn't hear him. He said he later learned that the only words that made it through were "traffic" and "Burnham."

Passadore said he saw Lain and heard static on his radio. Passadore said he moved his patrol car to get a better view of Lain but did not want to intrude.

When Lain approached the car, he noticed the driver's jacket hid a handgun, according to a police report. Lain said he called for back-up but again almost all of the transmission was blocked.

Passadore said he again only heard static and did not hear Lain's request for help. A third officer, R.J. Newman, said he heard only the word "gun."

With no backup, Lain asked the man to get out of the car. Lain removed a loaded 9 mm handgun. By then, Newman arrived. "At no time did (the driver) inform me that he was armed," Lain wrote in his report.

"It was lucky for me," Lain said. "It was lucky everything turned out all right."

Nextel admits its towers caused the interference. "It scares the hell out of us," said Sandra Baer, a Nextel consultant in Reston, Va. "None of us wants that to happen. Police officers should be able to use their communications interference free."

Widespread problem

During its investigation, The Oregonian contacted more than 100 public safety officials in 50 states by phone or e-mail. In 28 states, this survey found at least one case in which officials confirmed or suspected cell phone towers had interfered with city, county or state radio systems. Among them:

Every day for at least six months last year, Tigard police officers ending their shift could not sign off with the dispatch center while parked at the Police Department.

In Portland, one of every three radio or computer transmissions have been interfered with in the past 2 1/2 years.

The city has spent more than \$50,000 researching interference and worked closely with Nextel engineers to alleviate it. But Nancy Jesuale, Portland's director of communications and networking, said their efforts have provided only isolated improvements.

"We cannot have any tolerance for interference to our communications from the galloping cellular market. This is unacceptable," said Portland Police Chief Mark Kroeker, who relayed his concerns during meetings with two FCC commissioners in Washington, D.C. last month.

In Denver, police officers reported 60 complaints of interference since September. "We have not encountered that life-threatening situation, but that is our concern -- you're living on borrowed time," said Steven Cooper, division chief for the Denver Police Department.

In Scottsdale, Ariz., during a seven-month period last year police officers could not use their radios when they charged into bars to break up brawls in a one-square mile entertainment district.

In Seattle, since 1999, radios have been swamped with static or don't work at all hundreds of times each day.

In Phoenix, Ariz., the reach of the Police Department's radio signals to its in-car computers was reduced by more than 13 percent, preventing officers from checking motorists for outstanding warrants.

In 21 of the 28 states, officials say they have identified Nextel as the source of the interference. In at least five other states, officials think Nextel is the cause but haven't been able to prove it. In two states, other cellular companies are thought to be the problem.

In a handful of states where Nextel signals are causing interference, other wireless companies also have contributed to the problem.

Public safety officials say Nextel has the most definitive list of cities experiencing interference. The company refused to disclose its list to The Oregonian.

Nextel's Krevor acknowledged his company is causing interference in 12 of the 27 states: Arizona, California, Colorado, Florida, Louisiana, Maryland, New Jersey, New York, North Carolina, Ohio, Oregon and Washington. The company is working to reduce interference caused by its cell towers as they become known, he said.

In the other states Krevor said Nextel was not the cause of interference or that he had not been notified of any problems.

Some of the problems, public safety officials say, were handled by local Nextel staff. Officials in San Diego and Houston said they are experiencing only minor interference from Nextel towers.

But public safety officials say these aren't all the cases.

"Undoubtedly, there are people experiencing the problem that we don't know about yet," said Glen Nash, president-elect of the Association of Public-Safety Communications Officials, a lobbying group based in Daytona Beach, Fla.

Who's to blame? Nextel and the FCC deny they are responsible for fixing the problem.

Nextel officials say the company is a victim of circumstance. After all, they say, the FCC approved the company's plan to build a digital network on frequencies next to police and fire departments.

"With all due respect, Nextel didn't cause the problem," said Robert S. Foosaner, a Nextel senior vice president and former chief of the FCC Private Radio Bureau in the 1980s.

Nextel engineers searched for potential interference before the company launched its network in 1996 but didn't find any, Krevor said. "Certainly we didn't expect it to occur," he said. ". . . This is not resulting from anything we're doing outside the rules and regulations."

King County's Kearns said he has worked with the company to eliminate part of the interference and doesn't "want to characterize Nextel as the great evil. We are in the same boat. We both kind of got stuck by the FCC."

But, like Nextel, FCC officials say they couldn't have predicted the interference and they are doing all they can to fix it.

"I really think it's very unproductive to engage in fingerpointing," the FCC's Ham said. ". . . We're all very sensitive and do not want to cause situations where there is interference" to police and fire departments.

A report commissioned by the FCC last year said interference was an unfortunate byproduct of Nextel's popularity and police departments' demand for frequencies.

"That's what the industry wanted," Foosaner said of the 250 intertwined frequencies where Nextel and public safety departments operate. "There was nothing controversial about it. It was a no-brainer as far as the government was concerned. Unfortunately, 25 years later with the advance of technology, it has turned out to be a poor decision."

Dale N. Hatfield, chief of the FCC's Office of Engineering and Technology from 1998 to 2003, said the commission might have predicted the interference if its engineering staff wasn't so overworked.

Even if the commission couldn't have predicted the problem, some public safety officials want it fixed by the FCC, which wields broad enforcement powers.

But the FCC said it sees no need to mandate any changes because Nextel and public safety officials already are working together to resolve the issue.

Foosaner said the FCC doesn't have the people or money to spend on a solution. The FCC has one-tenth the number of employees of Nextel, and a \$248 million annual budget compared with Nextel's \$5.7 billion in annual revenues.

The FCC's Ham did point her finger at police departments' outdated analog radios, which reel in Nextel's signals and the interference, which newer technology could deflect.

Public safety officials admit they could halt part of the interference with new radios, but police and fire chiefs are reluctant to ask taxpayers to hand over millions of dollars to pay for them.

Washington County's Kuran says the agency seven years ago spent \$6.7 million on a state-of-the-art Motorola radio system with a 10-year life span. This year, the agency is planning a \$9 million system update that doesn't include new handheld radios.

Portland spent \$15 million on a system with a 15-year life span in 1994. The city also is in the midst of a \$250,000 upgrade to beam stronger signals to the 80 agencies covered by the system.

Technicians designed the system around its known weaknesses: thick walls and deep canyons. But the Nextel interference introduced flaws the radios weren't designed to work around, Kuran said.

Repeat mistake? Some public safety and cellular industry experts fear that the FCC is setting the stage for another midair clash -- this time in the 700 MHz band.

The commission plans to allocate a section of the band for police officers and wireless companies such as Nextel.

The FCC says it has taken measures to prevent cellular frequencies from bleeding into public safety channels.

But public safety officials and those in the cellular industry, including Nextel and equipment manufacturer Motorola, say the measures are not enough.

Motorola officials say the FCC rules still allow cellular companies to use powerful transmissions that would clash with public safety frequencies, creating a virtual repeat of the problems on the 800 MHz band.

"The effect on public safety system would be cataclysmic . . ." Steve Sharkey, the company's director of telecommunications regulation, wrote to the FCC in December.

The 700 MHz auction was most recently scheduled for September but was delayed for the fifth time last month while the FCC considers the concerns. The auction has not been rescheduled.

News researchers Lynne Palombo and Margie Gultry of the Oregonian contributed to this story. You can reach Emily Tsao at 503-294-5968 or by e-mail at emilytsao@news.oregonian.com. You can reach Ryan Frank at 503-294-5955 or by e-mail at ryanfrank@news.oregonian.com.

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EXHIBIT B

1. 1993-94: Phoenix PD installs Mobile Data Radio system infrastructure comprising 7 base stations.
2. Radio coverage testing using 4500 points throughout 475 sq. miles (Phoenix city limits) shows 98% coverage.
3. 1998, Phoenix Fire joins the system. System is expanded to 14 base stations to cover 1100 sq. miles.
4. Phoenix Fire reports poor coverage. Phoenix Police reports nodes of no coverage within a half-mile of new towers determined to be Nextel towers.
5. Phoenix technical staff at PD and ITD determine the problem to be a combination of transmitter noise (emitting from the Nextel sites) and receiver front-end overload.
6. October 1999, Motorola brought in to study the problem. Motorola presents final results October 14th that basically concurs with the ITD and PD conclusions. **MOTOROLA DETERMINES THAT THE OVERALL SYSTEM DEGRADATION IS 20 dB.** (See attached Executive Summary)
7. Motorola further determines that the new, 800 MHz Trunked Radio System Project has been designed with sufficient signal level that the broadband noise observed should not affect the new system.
8. Both Nextel and Phoenix are operating within the parameters of their respective FCC licenses.
9. Phoenix ITD, Police, Fire and Motorola meet with Nextel representatives and outline the ITD Radio Section/Motorola study findings. Nextel was asked to "cooperate and communicate" with the CoP by:
 - turning down power at the "problem" sites now. This was rejected. They cited their basic business need to operate at a power level that provides adequate service to their customers.
 - providing CoP with their future growth plans as an ongoing process, so that CoP can maintain a database of cell sites in order to track trends and identify potentially interfering sites ASAP. This was accepted.
10. Phoenix feels that the basic problem is that FCC failed to understand basic frequency coordination: Don't put multiple (50-200 sites) high power transmitters (particularly digital ones with 18 per site) operating in the adjacent frequency band in the same service area where public safety mobile and portable receivers are operating. Closest transmitter to receiver separation for our MDT system is 290Khz.
11. January 2000, Motorola brought in to determine solutions.
12. Phoenix PD and FD decide that they can live with no more than a 300 foot outage area around a Nextel site.
13. Best "solution" (NOT A FIX) is to redesign, at our expense, our MDT infrastructure. We must raise power levels 6 to 10 dB and add several new sites to cover critical areas. A great amount of City and Motorola engineering time and resources have been brought to bear on this problem. There is no other option.
14. Due to the nature of the cellular phone business, we must now continually monitor where MDT outages are and redesign our MDT infrastructure continually to accommodate (very expensive).
15. The concept of spectrum efficiency is dead because of the design requirements to compensate for the Nextel interference. **PUBLIC SAFETY CHANNELS ARE EXTREMELY LIMITED.** We have essentially run out of this resource and have no where else to go.

Briefing for Meeting on Interference Issues between the City of Phoenix and the staff of US Senator John McCain

The City of Phoenix is currently experiencing interference with the Police and Fire Department's Mobile Data Terminal (MDT) system, which operates in the 800 MHz band. This is occurring in a radius of several hundred yards of Nextel transmitter sites. The MDT System is a relatively low powered system with few transmitter sites, using at least 15 year old technology in the front-end of the receivers. The system was never designed to operate in the current Radio Frequency (RF) environment created by these major cell and CMRS (Commercial Mobile Radio Service) transmitters. The MDT receiver experiences a "desensitization" because it is being overpowered by the Nextel transmitters as the Police vehicle moves into close proximity of the transmitter.

Phoenix is working on a plan with Motorola (the vendor for the MDT system, AND the Nextel system) to install more transmitters, operate all of our transmitters at higher power (if the FCC approves), and upgrade the MDT receivers so that they do a better job of detecting the CoP signals and rejecting the Nextel signals. This is very expensive, and is complicated by the fact that the FCC has no alternative or new Public Safety interference-free frequencies available for us to move to, or additional frequencies with which we could supplement our system.

Nextel has listened to our complaints, but so far has cooperated only as far as helping us test at their sites to better understand the problem. They have not agreed to turn down power at their transmitters or ameliorate interference with any other actions on their part. Their argument is that they are operating legally and it would hurt their business if they had to compromise their current technical operations in any way.

We have received information via our Police communications staff from Joe Kuran, the Tech.Systems Mgr. for Washington County, Oregon, stating he is aware of at least 10 other municipalities and companies affected in the same way, including King County (Seattle), WADOT, and Multnomah County (Portland). He has been dealing with both Nextel and the FCC on the issue. The City of Phoenix has sent letters to the FCC about this problem, has met with representatives of the FCC (Councilwoman Bilsten), and has actively participated in the research on the problem conducted by the FCC, Motorola, Nextel and APCO (Association of Public-Safety Communications Officials).

The City has recently learned from Motorola that some of the same conditions causing interference in the 800 MHz band, including insufficient Out of Band Emission standards (OOBE), will be replicated in the current recommendations for the 700 MHz band. Another condition that will be replicated is the misappropriation of bandwidth, with incompatible, potentially interference-causing applications positioned too close to one another in the channel spacing. The current plan from the FCC, to move Public Safety to the new 700 MHz band allocation in the next few years, is vulnerable to the same conditions that are intolerable now. The City of Phoenix proposes that the FCC suspends the auction of the 700 MHz band to commercial providers in March 2001 until the interference issues with 700 MHz and 800 MHz are resolved.

Peg Davis
Deputy IT Director - Telecommunications Services
City of Phoenix
01/08/01



CITY OF PHILADELPHIA

800 MHZ RADIO SYSTEM
IMPLEMENTATION

PRELIMINARY
INTERFERENCE STUDY

August 21, 2001

RCC Consultants, Inc.

100 Woodbridge Center Drive * Suite 201 * Woodbridge, New Jersey 07095-1125 * Tel (732) 404 2400 * Fax (732) 404 2580

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1. INTRODUCTION

RCC Consultants, Inc. has completed the preliminary phase of the Interference Avoidance Study with respect to the implementation of the City's new 800 MHz Radio System. The survey revealed areas of potential interference and identified the primary sources of the interference. The following detailed report will provide background information, technical field data, and recommend solutions. This summary will review the findings and recommendations of the study in technical and non-technical terms.

2. BACKGROUND INFORMATION

Many Public Safety Radio Systems operating in the 800 MHz band have been experiencing an increase in field unit receiver degradation. These experiences have been noted on a nationwide scale and not just limited to major markets or urban environments. The major component to the increase in interference is the proliferation of the number of Commercial Mobile Radio Service cell sites. Along with the increase in cell sites is the fact that CMRS operators must re-use frequencies within a relatively small area. This lends itself to certain design criteria that can cause interference to a public safety system. Some of the design criteria are relatively low antenna centerlines, antenna downtilt, relatively high RF ERP levels for the design area, constant keyed transmitters, hybrid transmitter combiners with very little filtering, and increased density of sites to overcome channel capacity limitations and ensure efficient call hand-offs. Additionally, the transition from analog technology to digital technology has also contributed to interference complaints.

The result of these types of design criteria is an increase in the intensity of the CMRS signal that a subscriber unit receives. This is necessary because these systems are designed on an "Interference Limited" basis. That is to say their signal must be strong enough to overcome a similar signal from their own system in a nearby cell site that is serving other subscriber units so that both units can operate efficiently on the same RF channel. Additionally, the increased signal intensity is required to increase the probability of providing in-building coverage without the expensive and often complex in-building wireless solutions.

What all this means to the public safety receiver in the field is it must operate in an increasingly harsh RF environment. This condition creates a greater potential for receiver front-end overload, receiver inter-modulation distortion, and overall degradation to the receiver's effective operational margin. All these factors add to the potential for the public safety unit to operate intermittently or not at all when in proximity of a CMRS cell site.

The Wireless Communications Industry, while recognizing that problems do exist, has done very little to proactively alleviate interference issues. The interference to 800 MHz Public Safety systems was first revealed publicly in 1999. To date there has been some level of cooperation between vendors, carriers and public safety systems to resolve interference complaints.

City of Philadelphia – 800 MHz Radio System Interference Avoidance

More recently a joint effort between APCO, CTIA, Nextel, and Motorola has produced "A BEST PRACTICES GUIDE" (12/2000), which provides an explanation of the problem with a historical review. However the guide only provides minimal practical solutions to users. Additionally, Motorola produced its "INTERFERENCE TECHNICAL APPENDIX" (12/2000), which addresses the 800 MHz interference in more detail. It also describes various scenarios, provides technical data, and offers both CMRS and PS practices to avoid interference.

The test procedures, technical data, and resolutions described in MOTOROLA'S INTERFERENCE TECHNICAL APPENDIX were the baseline for the evaluations and measurements made by RCC Consultants, Inc. during field testing.

3. RESULTS OF FIELD EVALUATION

As with any good scientific evaluation all test equipment, subject radio, and accessories were checked and verified for proper operation prior to deployment in the field. Baseline reference measurements were made on each start date and test equipment routinely verified through self-calibration modes. Reference data was recorded and can be reviewed later in this document.

The RCC Field Survey Team was given a list of CMRS sites to check for potential interference. Some of these sites were co-located sites; they are sites that contain more than one commercial carrier. Other sites that were surveyed only had one commercial carrier.

Several sites were sampled throughout the City geographically so as to obtain a reasonable cross section of data based on variations due to topography, building density, and vehicular traffic.

The RCC Field Survey Team found that the Motorola XTS 3000R portable radio's receiver was degraded when it was in the proximity of a CMRS cell site operated by Nextel Communications and/or Cingular Wireless. The degradation to the receiver was mainly due to receiver front end overload. This condition can present itself when the receiver is exposed to very strong signal levels of an undesired source. The undesired energy could potentially force its way past the selectivity elements and cause limiter or AGC circuits to be activated. This reduces the available gain for the desired signal resulting in a loss of receiver sensitivity.

Additionally the RCC Field Survey Team met with a representative from Nextel Communications at one of their sites to try various combinations of transmitters turned on and then off to check for IM products. While an IM study revealed a number of mathematical IM hits on the City's frequencies, the tests conducted showed that as transmitters were turned off the interference did not go away completely, however it was reduced. Further IM studies will be required and are currently ongoing with the cooperation of Nextel Communications and Cingular Wireless.

The complete tabular field measurement data can be reviewed in Appendix A of this report. Additionally, spectral displays from various locations can be reviewed in Appendix B of this report. These displays are printouts of various frequencies and signal levels the Field Survey Team observed when in proximity of CMRS site of interest. The displays are used to determine levels of desired and undesired signals and to review noise variations and disruptions in the noise floor of a selected channel.

4. RECOMMENDATIONS

It is the recommendation of RCC that the City organize a meeting with the Commercial Carriers (Cingular, Nextel, and Verizon) serving the Philadelphia Metro Area to review and discuss the findings of this report. FCC rules stipulate the system operators involved must work cooperatively to resolve any reports of interference. Additionally the Commercial Carriers should be prepared to offer specific advice and solutions regarding interference when their site is the cause of the interference.

Some of the following actions described here can be taken to minimize Radio Frequency Interference between systems operating at 800 MHz within the same geographical location.

Actions for CMRS operators include:

- Change frequencies to increase frequency spacing between channels
- Lower transmitter power as much as possible
- Increase the center of radiation on transmit antennas to > 80 ft. AGL will increase the local path loss to the affected units
- Use cavity combiners instead of hybrid combiners for increased filtering

Actions for the PS system include:

- Increase the desired signal strength and design systems for in-building coverage. This will present higher desired levels "on-the-street", with the potential to override IM interference where it is more likely to occur (**this is part of Philadelphia's design criteria**)
- Avoid using portables with an IMR specification of <75dB (XTS 3000R has IMR of -74dB)
- Reduce EPR of the undesired transmit channel as much as possible. A 1dB reduction in ERP will reduce 3rd order products by 3dB and 5th order products by 5dB
- Maintain communications and contact with carriers and create database on frequencies and update when frequency changes are made so that IM studies can be re-evaluated for specific sites

City of Philadelphia – 800 MHz Radio System Interference Avoidance

These are just some of the action items for both the Commercial Carrier and the Public Safety System Operators. For more detailed information on these items and additional items for future interference avoidance refer to "MOTOROLA'S INTERFERENCE TECHNICAL APPENDIX", Issue 1.23 (12/2000) p.37, 12. Resolving Interference.

In closing we trust this report and evaluation will satisfy your requirements and wish to extend our appreciation for allowing us to be of service to you. Of course, if you have any questions or require additional information or assistance, please do not hesitate to call.

Exhibit D

Scottsdale, Arizona Statements

From: Denney, Gail [SMTP:gdenney@ci.scottsdale.az.us]
Sent: Wednesday, September 12, 2001 6:12 PM
To: Bronski, Donna
Subject: RE: Nextel Interference brief-CONFIDENTIAL ATTORNEY CLIENT WORK PRODUCT

The concerns that we have with Nextel are some of the same that are outlined in the letter that was attached. Although the problem we experienced with their site on the Galleria was fixed within approximately 1 month after it was reported to them, the issue had been an ongoing concern of the officers for approximately 6 months prior to the diagnosis and solution. There are still issues with poor quality of reception by portable radios in the area of the Galleria, and it is unclear, based on the testing that has been done, if the problems are Nextel's and they are reluctant to look into it further unless we are able to absolutely point the finger at them. When the city is on the new Smartzone radio system, it will be looked at again for possible resolution.

In the area of Hayden and Pierce to Hayden and McKellips there is another Nextel tower. The interference in this area apparent to radio users, but because of the 2 other cellular towers and the battery manufacturing plant, it again is unclear if the dead spot along Hayden for this 1/2 mile is directly a Nextel issue.

To summarize, Nextel does not discuss it's plans to implement new cell sites with the public safety community and does not seek their input prior to implementation. For the most part Public Safety is not aware that a Nextel site is even in place until the complaints begin to come in from officers who cannot communicate from locations where previously all communications was possible. It is a sad state of affairs when officer and citizen safety is compromised for commercial ventures and we have to wait until a problem exists before we can get any relief.

Gail Denney

Communications Technology Manager

From: Guthrie, Johnny [SMTP:JGuthrie@ci.scottsdale.az.us]
Sent: Wednesday, September 12, 2001 6:31 PM
To: Bronski, Donna
Subject: RE: Nextel Interference brief-CONFIDENTIAL ATTORNEY CLIENT WORK PRODUCT

I believe the comments sent to you by Gail Denney are right on target. In fact, the inability to "pinpoint" problem areas adjacent to Nextel towers only exacerbates an already existing problem: It affords commercial entities to point the blame at any number of "possible" interference alternatives, while public safety personnel continue to deliver services with greatly compromised communications systems.

Johnny Guthrie,
Assistant City Attorney
Police Legal Liaison
City of Scottsdale

gdenney@ci.scottsdale.az.us