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December 13, 2000

BY HAND DELIVERY

Ms. Blanca S. Bayo, Director
Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: Docket No. 000761-TP

Dear Ms. Bayo:

Enclosed for filing in the above docket are the original and fifteen (15) copies of Sprint PCS' Rebuttal Testimony of Bridger M. Mitchell, Michael R. Hunsucker, Randy G. Farrar, and Anthony Sabatino.

Please acknowledge receipt and filing of the above by stamping the duplicate copy of this letter and returning the same to this writer.

Thank you for your assistance in this matter.

Yours truly,

John P. Fons

Enclosures

cc: All parties of record

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true copy of the foregoing has been furnished by U.S. Mail, hand delivery(*), or overnight delivery (**) this 13th day of December, 2000, to the following:

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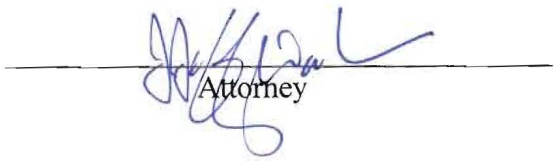


Attorney

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY

OF

ANTHONY SABATINO

Q. Please state your name, occupation and business address.

A. My name is Anthony Sabatino. I am currently employed as Chief Technolgy Officer for Alamosa PCS, an affiliate of Sprint Spectrum L.P. d/b/a Sprint PCS. My business address is 4000 West 114th Suite 180 Leawood , Kansas 66211.

Q. Are you the same Anthony Sabatino who presented direct testimony in this case?

A. Yes, I am.

Q. What is the purpose of your rebuttal testimony?

A. My rebuttal testimony will address the panel testimony of Jamshed K. Madan, Michael D. Dirmeier and David C. Newton (hereinafter referred to collectively as the "Panel"). Specifically, I will address the apparent misunderstanding of the Panel with respect to the operation of wireless networks and the management of capacity on such networks.

Q. In what way does the Panel demonstrate a misunderstanding

of the operation of wireless networks and the management of capacity on such networks?

A. In numerous places the Panel incorrectly describes the manner in which CMRS networks are designed and operated. For example, on page 8, lines 8-11 the Panel states:

> Evidently when they build a cell site, they have a Base Transceiver System ("BTS") that starts with only one channel. As demand increases, they add more channels until they reach a maximum of three, when they have to split the cell site.

First, the panel confuses two terms as used by Sprint PCS: "channel" and "carrier." A "channel" is the code assigned to each voice conversation occurring on a BTS. A "carrier" refers to the radio frequency band, or spectrum, across which the voice traffic is transmitted. A single carrier (2.5 MHz of spectrum) can accommodate approximately 15 channels or voice conversations per sector. Cell sites are generally divided into three sectors and can thus handle approximately 45 simultaneous conversations. The number of active voice conversations is limited by, system interference, soft handoff, transmit and receive power levels, and total usage. All of these

factors impact the capacity of the BTS. In our system, the voice capacity of the BTS is typically 15 conversations per sector for each carrier. This is done by taking the carrier signal and decoding the CDMA signal.

Second, the panel demonstrates a basic misunderstanding regarding the manner in which capacity is handled. As I previously described in my Direct Testimony, page 11, lines 14-17, capacity constraints can be dealt with in two primary ways. A CMRS provider can add additional capacity by adding another carrier (use additional spectrum) or the CMRS provider can add additional cell sites (cell splitting). Adding carriers is rarely the first choice in dealing with capacity constraints.

Q. Why is adding a carrier not the first choice for adding capacity?

A. First, spectrum is an expensive and limited resource that must not be used up any more quickly than absolutely necessary. Second, there are additional costs and service issues that arise when a second, third or fourth carrier is added.

Q. What are the additional costs associated with adding carriers?

A. When a carrier (additional spectrum) is added to the network, it cannot be added only to the cell site whose capacity is exhausted. The new frequency must also be added to all of those cell sites that surround the hot spot in order to permit handoffs to occur as the mobile travels across the network. Accordingly, there are costs associated not only with adding electronics to the capacity constrained BTS (the electronics associated with a cell site) but to all of the surrounding BTSs as well. In addition, software must also be installed in the cell sites on the edge of the new frequency to control the mobile transition from one frequency to another. The attached Exhibit No. AS-3 shows how a second carrier is added to a network.

Q. What are the service issues associated with adding a second carrier?

A. When two carriers are being used, a handset may be required to convert from one frequency to another during a call. Because the handset must literally stop transmitting in the first frequency and begin transmitting in the second, a "hard handoff" must occur. Hard handoffs cause brief holes in the transmission and cause greater radio management challenges in maintaining the call. This is one of the disadvantages of the old analog "cellular"

technology that relies upon a division of frequency into "cells." An annoying example of this effect is when a cellular user attempts to leave their telephone number on your voice mail, and there is a brief pause in the voice transmission that inevitably cuts off one of the numbers. Through the use of CDMA soft handoff techniques, Sprint PCS establishes the new connection before breaking the existing connection, so long as the call does not have to change carriers. In a hard handoff the network controls the handoff from one carrier frequency to another and monitors the successful closure of this handoff.

Q. Are the Panel members correct to conclude that a cell site has only exceeded its initial capacity when a second carrier has been added?

A. No. As I have previously described, the first means of resolving a capacity constrained BTS is generally to split the cell site. Cell sites are usually split for capacity reasons at least once before a second carrier is added.

Q. Is the Panel correct when it states that there are a maximum of three carriers?

A. No. A carrier is 2.5 MHz of spectrum, 1.25 MHz for the forward link and 1.25 MHz for the reverse link. Only three carriers can fit within a 10 MHz license because

guard bands are required to protect the adjacent frequencies from interference. If a licensee has reached the capacity of its 10 MHz license, it must either resort to cell splitting (an avenue that has probably already been exhausted if three carriers are in use) or purchase additional spectrum. The Panel is incorrect to assume that the network itself is limited to three carriers. In many of its dense urban markets, Sprint PCS has fourth and fifth carriers in place. Sprint PCS is able to deploy additional carriers because it has purchased more than 10MHz of spectrum in these markets. In the markets which are the subject of this proceeding, Miami, Tampa and Jacksonville, Sprint PCS owns a 30 MHz, a 10MHz and a 10MHz license, respectively.

The attached Exhibit AS-4 is an example of the three carrier spectrum for a 10 MHz market.

In Florida, Sprint PCS has both 30 MHz and 10 MHz licenses. The attached Exhibit AS-5 is a representation of our channel schemes as defined in our IS-95 standards.

Q. At page 9, line 13-14, the Panel states that "once [Sprint PCS] has spectrum, it has it forever. It doesn't go away, get used up or otherwise diminish." Is the panel's

description correct?

A. No. First, Sprint PCS was granted a ten-year license. Although Sprint PCS certainly has an expectation of renewal, we do not know that we will have the spectrum for more than ten years or whether additional costs will be imposed to retain the spectrum. Second, as described above, spectrum is a very limited resource that is "used up" as minutes of use increase on the network. Once it is exhausted, Sprint PCS has no option but to purchase additional spectrum.

Q. The Panel observes that Sprint PCS costs per minute of use are decreasing over the years 2000 through 2002. They then conclude that Sprint PCS network must not be optimally configured. Are they correct?

A. No. The Sprint PCS network has been designed to accommodate expected usage in the most efficient manner possible. Sprint PCS has had no regulatory incentive to "gold plate" its network or to over build capacity.

Q. On page 11, lines 21-22, the Panel suggests that the 1,035 cell sites with only one carrier and those 154 with only two carriers "clearly . . . have considerably more capacity than is actually needed." Are they correct?

A. No. Again, the Panel demonstrates a fundamental lack of

understanding regarding the concept of capacity. The fact that a cell site has only one carrier says nothing about whether it is near or at its capacity. As I stated above, Sprint PCS will attempt to limit the areas in which additional frequency is used to resolve capacity problems. The current distribution of first, second and third-carrier base stations is a reflection of Sprint PCS' efficient engineering design and its careful distribution of capacity.

Consider a simple RF model that uses a cell site that covers a uniform area of 25 square miles. If we then take 154 cells sites and consider a simple geometric spacing this equates to 3,850 square miles of coverage. The capacity of 154 cells sites (three sector) would be able to support 6,930 customers. This is slightly under 1.8 customers per square mile. The key is that capacity is only one limit in the picture. RF signals need to provide a reliable and consistent signal in a wireless network. This further complicates the needs for a complete and precise system and cell site placement design incorporating both in-building and terrain factors that impact wireless system penetrations. Finally, each cell site must be engineered to accommodate its own busy hour usage.

Q. The Panel further suggests that most of Sprint PCS' cell sites exist only for purposes of geographic coverage to meet the FCC build out requirements. Are they correct?

A. The Panel is incorrect on several levels. First, the FCC requires licensees to cover a specific percentage of the population, not any particular geographic coverage area. 47 C.F.R. §24.203 provides:

> Licensees of 30 MHz blocks must serve . . . at least one-third of the population in their license area within five years of being licensed and two-thirds of the population in their licensed area within 10 years of being licensed.

47 C.F.R. §24.203(a).

> Licensees of 10 MHz blocks . . . must serve . . . one-quarter of the population in their licensed area within five years of being licensed.

47 C.F.R. §24.203(b).

Sprint PCS met both of these build out requirements well

in advance of the deadline and has already filed its compliance report with the FCC pursuant to 47 C.F.R. §24.203(c). Sprint PCS was able to meet its build out requirements early, not because it was willing to waste investment capital on excess capacity, but precisely because there has been such a tremendous demand for wireless services across the State of Florida. Sprint PCS has struggled to construct capacity fast enough to meet the continually expanding demand.

Second, the Panel is incorrect to assume that a cell site, even in more rural areas, is designed with significant excess capacity. Where usage is lower, a cell site can be designed to cover larger territories, thus efficiently deploying capacity. No cell site on the Sprint PCS system incurs no use and exists purely for geographic coverage. While some small number of cell sites may not be expected to exhaust capacity in the next three years, this does not mean they are not traffic sensitive, any more than BellSouth's rural switches are not traffic sensitive because they will not be exhausted over the near term.

Third, even if the Panel's assumption that geographic coverage was an appropriate manner in which to determine which cell sites should be included in a cost study was

correct, the number of cell sites required to cover the existing Sprint PCS footprint would be a small percentage of the total number now in operation. A cell site using a 250-foot tower, operating at maximum power, and not engineered to deal with multiple callers, i.e., a dedicated facility, could cover a diameter of 16 miles. Sprint PCS current geographic coverage is approximately 26,588 square miles. Simple math shows that only 132 cell sites would be "coverage" sites as defined by BellSouth. No system would ever be engineered in this manner, however, because it would not have sufficient capacity to meet the minutes of use generated by multiple end users.

Finally, BellSouth's entire geographic argument is premised on the incorrect assumption that rural cell sites are not capacity constrained. Even in rural areas, capacity can become an issue if a concentration of users develops, for example in a traffic accident. Unlike landline networks, the point of congestion on a mobile network shifts constantly.

Q. The Panel states that the BSC is not part of the Switch. Are they correct?

A. No. The Panel attempts to rely on a title used in a Nortel document to suggest that the BSC is not part of the

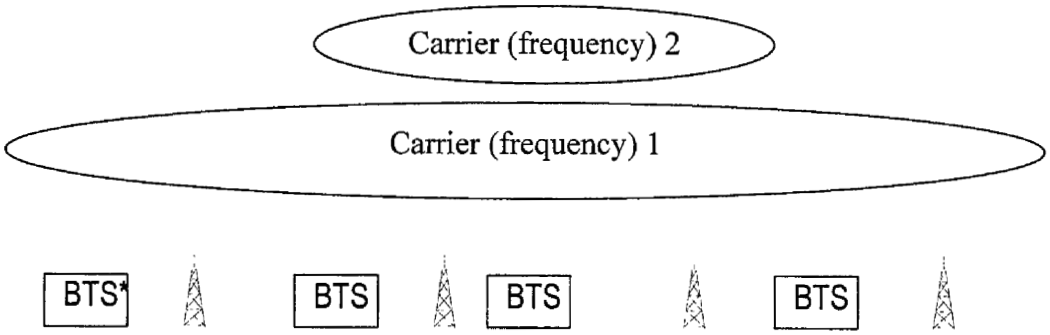
switch, without addressing the functions the BSC serves. As I described in my direct testimony, the BSC provides multiple functions, many of which are traditionally part of the landline switch, and many of which are unique to mobile networks. In other technologies, such as Lucent, the functions of the BSC are completely integrated into the MTX and do not even exist in a stand-alone format.

As described more fully in my Direct Testimony, page 6, line 23 through page 8, line 20, the BSC performs call processing, voice coding, soft handoff functions, backhaul interface and some power control. Described more simply, the BSC establishes the initial resources necessary to connect a call to a cell site, switches calls between cell sites as a mobile unit travels across the network and performs the voice coding necessary to efficiently transmit data across the network. The BSC is a shared facility with a limited capacity and is traffic sensitive.

Q. Does this conclude your testimony?

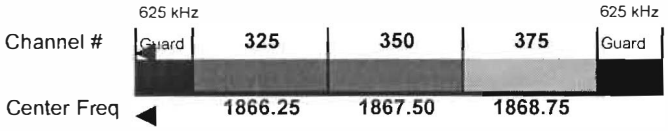
A. Yes.

Addition of Carriers



Base Station Transceiver Subsystem

D Block Mobile Frequencies

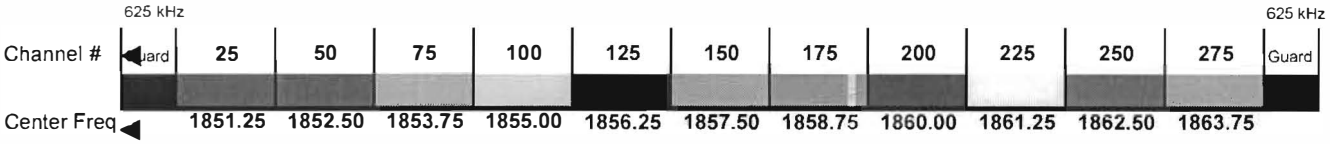


D Block Base Station Frequencies

Sprint PCS
Exhibit AS-5

PCS A Block

Mobile Frequencies



Base Station Frequencies