DIRECT TESTIMONY ON REHEARING OF JAMES E. KEOWN ON BEHALF OF AMERITECH ILLINOIS

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is James E. Keown. My address is 1010 N. St. Mary's St., San Antonio, TX 78215.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am employed by SBC Management Services, Inc., a subsidiary of SBC Communications Inc. ("SBC"). My position is General Manager-Project Management – ATM/VTOA for Project Pronto.

Q. WHAT ARE YOUR RESPONSIBILITIES?

A. My current responsibilities include coordinating with SBC's Central Office engineering organization on issues related to Pronto, providing representation on technical issues related to Pronto and supporting other Pronto team members.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I have a Bachelor of Science - Electrical Engineering degree from the University of Arkansas in Fayetteville, Arkansas. Also, I have completed company training and external training related to switch operations, switch engineering and digital

transmission, and telecommunications policy. In addition, I am a Registered Professional Engineer in the State of Arkansas.

Q. PLEASE DESCRIBE YOUR WORK EXPERIENCE.

A. I have 23 years of service in SBC's affiliated companies. From 1977 through 1997, I held numerous positions with Southwestern Bell Telephone Company ("SWBT"). My responsibilities included transmission engineering, special service design engineering, transmission equipment engineering, transmission facility design, plug in coordinator, Network Operations Center manager and Director of customer interface centers. In 1997, I moved to Operations staff responsible for network reliability issues and new product introduction, and outside plant staff support. I assumed my present duties in August, 1999.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE REGULATORY COMMISSIONS?

A. Yes. I have previously filed testimony and/or appeared before the state utility commission in California.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?

A. I filed an affidavit regarding Project Pronto in connection with Ameritech Illinois' request for rehearing in this proceeding.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the Project Pronto issues subject to rehearing in this proceeding.

Q. CAN YOU SUMMARIZE YOUR TESTIMONY?

A. My testimony will be centered around the operational and technical issues associated with CLEC ownership and/or collocation of the Project Pronto NGDLC line card. My testimony also supports the testimony of Mr. John Lube as it relates to this rehearing proceeding.

Q. PLEASE DESCRIBE THE PRONTO ARCHITECTURE.

A. Project Pronto will use Next Generation Digital Loop Carrier (NGDLC) systems to provide a Broadband architecture in the loop plant. The NGDLCs will be used as neighborhood gateways. Copper pairs will be hardwired from the back plane of the NGDLC remote terminal (RT) equipment to the Serving Area Interfaces (SAI). From the SAIs, copper distribution pairs serve the end customers. The time division multiplex (TDM) voice or POTs type traffic will be transported on one OC3 fiber facility from the RT to the central office. The DSL signals will be transported to the central office on a separate OC3c fiber facility. At the central office, the POTS OC3 facility will terminate in a central office terminal (COT) and the OC3c fiber facility for the DSL signals will terminate in an optical concentration device (OCD).

Q. WHICH OF THESE PRONTO COMPONENTS REPRESENT NEW TECHNOLOGY?

A. The NGDLC and the OCD are added components. Mr. Lube explains these two components in detail in his testimony.

Q. WHAT VENDORS WILL AMERITECH ILLINOIS BE USING FOR ITS REMOTE TERMINAL EQUIPMENT?

A. Ameritech Illinois will primarily be using the Alcatel Litespan product. In addition, there might be low population density locations that may use the Advance Fibre Communications, Inc. UMC 1000 Product. The Litespan has two models, the Litespan 2000 and the Litespan 2012. Less than 10% of Ameritech Illinois' RTs will be Litespan 2012s and less than 3% will be UMC 1000, with the remaining sites being Litespan 2000.

Q. WHAT ARE THE DIFFERENCES BETWEEN THE LITESPAN 2000 AND THE LITESPAN 2012?

A. The main difference is in the common control area of the equipment. The Litespan 2000 has an OC3 fiber facility for transporting the TDM (*i.e.*, POTs) traffic and a separate OC3c fiber facility for transporting the DSL signals back to the central office. The Litespan 2012, however, has an OC12 fiber facility (*i.e.*, 4 OC3s) transport capability back to the central office. However, within this OC12 signal, the Litespan 2012 uses an OC3 for the TDM traffic and an OC3c for the DSL signals. The remaining OC3s can be used to drop DS3 or STS-1 services for other high capacity end user services.

Q. PLEASE DESCRIBE WHAT COMPONENTS ARE USED IN THE PROVISIONING OF DSL SERVICE USING THE PRONTO ARCHITECTURE.

A. Starting from the end user customer, there is a copper distribution pair that extends from the customer's home to the Serving Area Interface (SAI). At the SAI, the distribution pair is cross-connected to the copper feeder pair that goes back to the NGDLC RT or neighborhood gateway. An ADSL Digital Line Unit (ADLU) card is plugged into the RT and splits the voice and data signals from the customer's location. The voice signal is routed over the back plane of the RT to common equipment where it is multiplexed on the TDM OC3 back to the central office and terminated in the COT. The DSL signals are also routed to common equipment where it is converted to an ATM signal format and multiplexed on the separate OC3c facility and transported back to the central office and terminated on the OCD.

Q. SHOULD THIS COMMISSION ALLOW CLECS TO OWN OR DESIGNATE AND COLLOCATE THE ADLU LINE CARD?

A. No.

Q. WHY SHOULD THIS COMMISSION NOT ALLOW CLECS TO OWN OR DESIGNATE AND COLLOCATE THE LINE CARD?

A. There are a number of reasons why this Commission should not allow the CLECs to own or designate and collocate Project Pronto NGDLC RT line cards. There are serious operational and technical issues that would adversely affect how Ameritech Illinois could provision service over Pronto if CLECs were permitted

such ownership or designation. Mr. Lube also addresses other reasons why Ameritech Illinois should not be required to allow CLECs to own or designate and collocate Project Pronto line cards.

Q. WHAT ARE SOME OF THE OPERATIONAL ISSUES THAT WOULD EXIST WITH CLEC OWNERSHIP OR DESIGNATION AND COLLOCATION OF THE LINE CARD?

A. There are several operational issues that would exist with CLEC ownership or control of the line card. One of the most serious operational problems that would be caused by CLECs owning or controlling ADLU line cards is the premature exhaust of the NGDLC system itself. This can be manifested in physical capacity limitation as well as bandwidth capacity limitations. In addition, there are a number of provisioning and maintenance of service issues that would result if the CLECs were permitted to own or control the ADLU.

Q. CAN YOU EXPLAIN IN MORE DETAIL HOW THE PHYSICAL CAPACITY OF THE NGDLCS WOULD BE ADVERSELY IMPACTED?

A. The adverse impact on the physical capacity of the NGDLCs if CLECs were permitted to own or control and collocate the line cards can be explained as follows:

- The NGDLC RT equipment has a limited number of slots to hold line cards. For the Alcatel Litespan equipment, each channel bank used for DSL has 56 slots. The largest cabinet configuration for the Litespan contains 3 channel banks in a fully equipped system. That equates to 168 slots. Each slot has 4

ports, which equates to 672 DSL-capable ports.

- As explained above, each of the line card slots in the RT can serve four individual customer lines. As a consequence, each line card slot has four copper feeder pairs hardwired to it. If a CLEC were permitted to collocate its own line card (or a line card that it designates) and did not use all four of the copper pairs that are wired to the line card slot, this would result in low utilization and higher cost for these pairs. In addition, this could limit the number of feeder pairs available for POTS customers, as well as limit the number of CLECs that could be served by Pronto NGDLCs.
- The ADLU line card serves multiple end-user customers. Unless CLECs used all of the ports on each of their collocated line cards (an unlikely scenario), inefficient utilization would result. This again would result in additional cost and poor utilization of the NGDLC RT equipment, hastening the exhaust of the equipment to the detriment of all CLECs and the ILEC. The results would be a very underutilized Project Pronto NGDLC RT. This under-utilization would create a need for additional capital investments to deploy more NGDLC RTs and could result in delays in delivering service to end-user customers by Ameritech Illinois as well as by the CLECs.

Q. CAN YOU ELABORATE FURTHER ON THE ISSUE REGARDING NGDLC RT UTILIZATION?

A. Yes. Card-by-card ownership or control by different carriers is not appropriate because each line card contains multiple ports (*i.e.*, can serve multiple end user services). Sharing of the ports on a single line card among multiple CLECs is not

practical (and unlikely) if different CLECs own or control their own line cards. If each of many CLECs owned or controlled its own multi-port line cards, and therefore had exclusive use of all the ports on the line card, but only had one customer in that specific geographic area, then the other port capacity of those line cards would be unused. Attachment JEK-1 shows a typical OSP splicing arrangement for a Litespan channel bank arrangement (CBA). The important point to note on the drawing is that every slot *does not* have an appearance at each SAI served by the RT.

Q. DO YOU HAVE AN EXAMPLE OF HOW THIS UNDER UTILIZATION MIGHT ADVERSELY IMPACT THE NGDLC RT?

A. Yes. See Attachment JEK-2. Attachment JEK-2 compares the maximum number of unused line cards ports that would exist under Ameritech Illinois ownership of the line cards, versus CLEC ownership or control of the line cards. Assuming 5 SAIs per RT and 3 different types of line cards, Ameritech Illinois ownership of the line cards would result in a maximum of 45 unutilized ports. In contrast, if 5 different CLECs were collocating line cards to provide DSL service throughout the serving area of that RT, the maximum amount of unutilized ports would be 225. Attachment JEK-2 also demonstrates that, for the largest cabinet configuration for the Litespan NGDLC RT equipment, even if every port of every slot is fully utilized except the last slot per card type, per SAI, per CLEC, the resulting utilization under Ameritech Illinois ownership of the line cards would be over 93%, compared to less than 67% if the assumed 5 CLECs owned or controlled and collocated line cards. This under-utilization problem would only

be exacerbated as more CLECs owned or controlled and collocated line cards and the variety of those line cards increased.

Q. CAN YOU DESCRIBE THE ADVERSE IMPACT ON PROVISIONING SERVICE IF THE CLEC(S) WERE TO OWN OR DESIGNATE AND COLLOCATE LINE CARDS?

A. Provisioning of DSL service would be adversely affected in the following ways:

- Provisioning intervals for the DSL service would be longer if CLECs were permitted to own and collocate NGDLC line cards. In this situation, the typical provisioning steps would be:
    1. The CLEC would first identify the end-user customer(s) to be served.
    2. The CLEC would request "loop qualification" information to determine what facilities were available to serve that end-user customer.
    3. If a Project Pronto NGDLC was the available serving facility, a collocation application would have to be filed for "slot" space.
    4. The CLEC would then place an order to ship a line card to Ameritech Illinois.
    5. Ameritech Illinois would receive the line card from the CLEC.
    6. Ameritech Illinois would then confirm receipt of the line card with the CLEC.
    7. Ameritech Illinois would then dispatch a technician to the RT and install the line card for the CLEC.

8. Ameritech Illinois would confirm installation of the line card with the CLEC.

9. The CLEC would then place a service order to establish service to the end-user customer.

10. Because Ameritech Illinois' provisioning systems as they exist today would not have knowledge of what line cards were owned or controlled by what CLECs, the service order would have to be handled manually to ensure proper assignment of the DSL service to the CLEC's slot and port.

Once the proper facilities were assigned and the service order completed, confirmation would then be sent back to the CLEC that DSL service can be provisioned to the end-user.

These same steps would exist where the CLEC designated and virtually collocated the line card, except that Ameritech Illinois, rather than the CLEC, would have to order the line card from the manufacturer.

Q. ARE THERE OTHER OPERATIONAL PROBLEMS THAT WOULD EXIST IF CLECS WERE PERMITTED TO OWN OR DESIGNATE AND COLLOCATE LINE CARDS?

A. Yes. In addition to the provisioning problems that I just described, there likely would be problems associated with maintenance of service.

Q. CAN YOU ELABORATE FURTHER ON THE LIKELY MAINTENANCE PROBLEMS?

A. Yes. CLEC ownership or control of line cards would present another challenge in the repair process. In the case of the ADLU line card used in the Alcatel Litespan

equipment, and indeed in the case of most NGDLCs, ADSL service is provided. With ADSL, if the CLEC provides only the data service, Ameritech Illinois would be the POTS provider. Service problems can occur either in the voice path or the data path. If the ADLU line card needs to be changed, the CLEC would have to provide a maintenance spare to change out the defective line card. Tracking these maintenance spares would place undue responsibility on Ameritech Illinois. This would become particularly onerous if multiple CLECs with various types of line card were allowed to own or designate and collocate them in Ameritech Illinois' NGDLCs. Technicians would be required to identify the owner or designator of the line card, determine whether that owner or designator had provided a spare, locate that spare, or place a call or order to the owner or designator to provide a spare. This likely would increase the mean time to repair on both the POTS side and the data side of the end-user's customer service, which would mean longer out-of-service conditions, greater customer dissatisfaction, and even complaints to this Commission.

This problem would only be exacerbated if multiple CLECs with multiple types of line cards were allowed to own or designate and collocate line cards in Ameritech Illinois' NGDLCs. To manage the shipping and handling of the volume of line cards from thousands of possible locations for multiple CLECs would be a massive and unreasonable burden to place on Ameritech Illinois.

Q. WHAT WOULD BE THE DIFFERENCE IF THE CLECS COLLOCATED THEIR OWN STAND-ALONE DSLAMS AT THE RTS?

A. There are major differences between CLECs collocating their DSLAMs at an RT and "collocating" a line card in Ameritech Illinois' NGDLCs. When each company owns its own equipment, each is responsible for managing the capacity of its own equipment. In addition, the owner of the equipment can manage its slots and ports. The owner of the equipment also can pre-equip its equipment to support whatever services it intends to provide, thereby improving its service provisioning flows and intervals. As for maintenance, again each carrier can decide its own maintenance strategy. Service problems of one carrier will be less likely to interfere with service of the other.

Q. ARE THERE OTHER TECHNICAL ISSUES ASSOCIATED WITH CLEC OWNERSHIP OR DESIGNATION AND COLLOCATION OF LINE CARDS?

A. Yes. First, it must be understood that the entire NGDLC system must work together to provide the DSL and voice services. The line cards alone will not provide the total functionality of any service. There has to be system-level, shelf-level and card-level software working together to provide service. In addition, all the hardware (*e.g.*, line cards and common cards), when combined with the software, has to work together in order to deliver the expected functionality or service. As a result, even if a CLEC bought or designated a line card from the vendor that manufactured the NGDLC, there is no guarantee that the card will deliver the service expected by the CLEC. Without the correct version of system software, the capability sought by the CLEC may not be available on the NGDLC RT. Since the line card is only a sub-component of the NGDLC system, it has to

match the common software of the overall system in order to deliver the desired service.

Q. IN MR. LUBE'S TESTIMONY, HE STATES THAT ONE REASON CLECS WANT TO OWN OR DESIGNATE THE CARD IS TO USE OTHER CAPABILITIES OF THE NGDLC SYSTEMS. ONE OF THESE CAPABILITIES IS ATM QUALITY OF SERVICE. CAN YOU BRIEFLY EXPLAIN WHAT ATM QUALITY OF SERVICES (QoS) ARE?

A. Yes. The most common ATM QoSs are Constant Bit Rate (CBR), Variable Bit Rate, both real time and near real time (VBR-rt, VBR-nrt), and Unspecified Bit Rate (UBR). UBR is a best effort allocation of bandwidth. All customers have an equal chance at the resources in the NGDLC with UBR QoS. UBR also provides the most efficient use of the shared bandwidth of the NGDLC RT. In addition, since Pronto was designed for the mass market and targeted towards high speed internet access, UBR is ideally suited for that type of application. CBR and VBR QoS provide a guaranteed level of service (*i.e.*, bandwidth). That is, with bandwidth allocation in the ATM network, CBR and VBR services are allocated specific levels of bandwidth at the expense of UBR customers.

Q. CAN YOU GIVE A SIMPLE EXAMPLE OF WHAT THE DIFFERENCES ARE BETWEEN CBR AND UBR TRAFFIC?

A. Yes. The OC3c fiber facility can be analogized to a five lane interstate highway. With UBR traffic, all lanes of the highway are available to all drivers. They can enter the highway and use any lane to travel to their destinations. With CBR traffic, the same five lane highway would have lanes dedicated to only certain cars. The amount of traffic that has to travel the highway does not change, but,

for example, if two lanes are given to one driver, the other traffic is restricted from those lanes and must use the remaining three lanes.

Q. WHAT QoS IS AMERITECH ILLINOIS OFFERING OVER PROJECT PRONTO?

A. Ameritech Illinois is currently offering UBR quality of service over the Project Pronto infrastructure.

Q. WHAT WOULD THE IMPACT BE OF IMPLEMENTING CBR AND VBR QoS ON PRONTO?

A. There are a number of adverse impacts these QoSs would have on the shared architecture used in Pronto. The first and most serious adverse impact would be on the shared fiber between the RT and the OCD. With CBR and VBR QoS, the facility carrying the DSL signal can exhaust the bandwidth capacity of the OC3c before the ports exhaust. This could lead to a negative service impact on those customers using UBR.

Q. CAN YOU GIVE A BRIEF EXAMPLE OF HOW THIS "BANDWIDTH" EXHAUST MIGHT OCCUR WITH CBR AND VBR QoSs?

A. Yes. The OC3c between the RT and the OCD has 155 megahertz of bandwidth. With UBR QoS, approximately 3000 customers can obtain DSL (ADSL) service over an OC3c without negatively impacting the service of any customer. Since the largest cabinet configuration being deployed by Ameritech Illinois in its RTs will have a maximum of 672 DSL customers, the OC3c has enough capacity to handle the DSL signals. However, with CBR or VBR, each customer is

guaranteed a specified amount of bandwidth on the facility. If each CBR or VBR customer is "given" 1.5 megahertz of bandwidth, only 100 customers would be able to share the OC3c facility. This means only 15% of the capacity of the facility, as compared to the capacity available on a UBR QoS basis, would be used.

Q. CAN THE CAPACITY OF THE FIBER BE INCREASED BY CHANGING THE ADLU LINE CARD IN THE LITESPAN EQUIPMENT?

A. No. First, there is no optical interface on the line card. The line card splits the DSL signal from the voice signal coming off the feeder pair. It multiplexes the DSL signal on the highspeed backplane of the NGDLC RT channel bank to a common card that converts the DSL signal into the OC3c optical signal. In the Litespan equipment, the OC3 facility carrying TDM traffic is separate from the OC3c carrying the DSL signals.

Q. WOULD CHANGING THE COMMON CARD THAT CONVERTS THE DSL SIGNALS FROM ELECTRICAL TO OPTICAL INCREASE THE DSL BANDWIDTH OF THE SYSTEM?

A. No. This card only has one output, that being an OC3c. Changing this card will not increase the available DSL bandwidth.

Q. CAN CHANGING THIS COMMON CARD OUT IN THE LITESPAN PROVIDE WAVE DIVISION MULTIPLEXING (WDM) OR DENSE WAVE DIVISION MULTIPLEXING (DWDM)?

A. No. WDM and DWDM require external equipment. WDM uses a passive device to allow two different wavelengths of light to travel down the same fiber.

DWDM is similar to WDM except multiple wavelengths can travel down the same fiber. In either case, two points should be noted. First, the optical signal for the TDM traffic and DSL signals are generated on separate pieces of common equipment in the Litespan system. The only way for the two signals to be combined is with external WDM or DWDM equipment. Some have described this a "line sharing" arrangement, however, this scenario is more closely related to multiplexing multiple OC3s into an OC-XX signal. The second point to note is that the capacity of the OC3c for the DSL signal is not increased by providing this external WDM functionality.

Q. WOULD THIS ANSWER BE THE SAME FOR BOTH THE LITESPAN 2000 AND THE LITESPAN 2012?

A. Yes. As I stated earlier, the only difference between the Litespan 2000 and the 2012 is the transport facility between the RT and the central office.

Q. CAN THE LITESPAN EQUIPMENT HAVE MORE THAN ONE OC3c BETWEEN THE RT AND THE CENTRAL OFFICE?

A. Yes. The three DSL channel banks in the Litespan are "chained" onto one OC3c. Each channel bank is capable of supporting one OC3c each. This would be accomplished by unchaining the channel banks from the OC3c.

Q. WHAT WOULD BE THE IMPACTS OF UNCHAINING THE OC3c FROM THE DSL CHANNEL BANKS?

A. First, unchaining the OC3c from the channel banks would require using more of the available fibers at the RT sites. This would result in fewer available fibers for those CLECs that might want to collocate their stand-alone equipment the RT site. Second, another problem is that each of these additional OC3c fiber facilities must terminate on the OCD in the central office. These additional facilities would cause the ports on the OCD to exhaust faster and would require the deployment of additional OCDs. For example, if there are 20 RTs in a wire center, chained OC3cs would require 20 OC3c ports. If all the channel banks were unchained in a typical 3 DSL channel bank per RT configuration, 60 OC3c ports would be needed and needed on the OCD. This triples the number of ports ~~that~~ would require additional OCDs to be purchased and installed. The additional OCDs and fibers would add unnecessary and inefficient cost to the services provisioned over the Litespan architecture.

As I stated earlier, if CLECs could offer each customer 1.5 MB CBR or VBR service, each OC3c would have the capacity to carry only about 100 customers per channel bank. This means that, even if two additional OC3s and OCDs were added, less than 50% of the available DSL ports at the RT would be utilized.

Q. WOULD THE OPERATIONAL AND TECHNICAL PROBLEMS YOU DESCRIBE APPLY IF CLECS WERE PERMITTED TO DESIGNATE AND "VIRTUALLY COLLOCATE" THE NGDLC LINE CARDS THAT AMERITECH ILLINOIS INSTALLS?

A. Yes.

Q. A NUMBER OF CLECS HAVE ASSERTED A NEED FOR VARIOUS "FLAVORS" OF DSL AS A REASON FOR THEIR DESIRE TO OWN OR DESIGNATE THE LINE CARD. WHAT "FLAVOR" OF DSL DOES THE LITESPAN TECHNOLOGY SUPPORT TODAY?

A. Currently, the Litespan system deployed by Ameritech Illinois supports ADSL and a TDM version of HDSL.

Q. WHAT FUTURE TYPES OF xDSL SERVICES DO YOU EXPECT THE PRONTO ARCHITECTURE TO BE CAPABLE OF PROVIDING?

A. In the future, Alcatel is expected to offer HDSL-2 (TDM), g.SHDSL and G.Lite DMT (See Attachment JEK-3). In addition, IDSL can be offered today using the ISDN protocol. IDSL, however is not an ATM-based xDSL service and is transported over the TDM fiber facilities (*i.e.*, the voice OC3).

Q. CAN THE CLECS GET VARIOUS "FLAVORS" OF DSL BY USING ONE VENDOR'S LINE CARD IN ANOTHER VENDOR'S NGDLC?

A. No.

Q. WHAT INFORMATION DO YOU HAVE THAT SUPPORTS YOUR ANSWER?

A. In Attachment JEK-3, Alcatel states:

> "Only line cards supplied by Alcatel for Litespan or provided under license can be installed and used in Litespan systems. As noted above, these are software-controlled systems. The software enables the service delivery and maintenance functions. The software is copyright protected and distributed only under restricted license provisions that prohibit use or modification by others. In addition, each line card is designed to mechanical and electrical specifications that ensure they do not interfere with other services or the performance of the system. Accordingly, the installation of other line cards is precluded by contract warranty provisions designed to ensure reliable service and system performance."

In addition, in their comments filed in response to a pending FCC FNPRM proceeding, Alcatel states:

> "As a line card manufacturer, Alcatel recognizes that it would not be feasible or practical to develop line cards that could be used in a multiplicity of other systems, even if there were no backplane or software access restraints. There must be several dozen (or more) system and

> software vintages in the country. The combination of mechanical and software requirements that would have to be met would be overwhelming. Likewise, it would be just as difficult for other manufacturers to develop line cards for the many vintages of Alcatel's systems and software releases (if the software were even accessible) along with others."[1]

Nortel Network filed similar comments in the same FCC FNPRM proceeding.

Specifically, Nortel stated:

> "The DLC market has evolved without industry standards having been developed to allow interchangeability of line cards. Moreover, Nortel Networks is not aware of any effort underway to attempt to develop such industry standards. Without standards, it would be virtually impossible to use different manufacturers' line cards in a single DLC. Finally, given the vast differences in technologies used by different manufacturers and the rapidly evolving nature of those technologies, it would be very difficult, if not impossible, to develop industry standards without thereby stifling technological development."[2]

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY ON REHEARING?

A. Yes.

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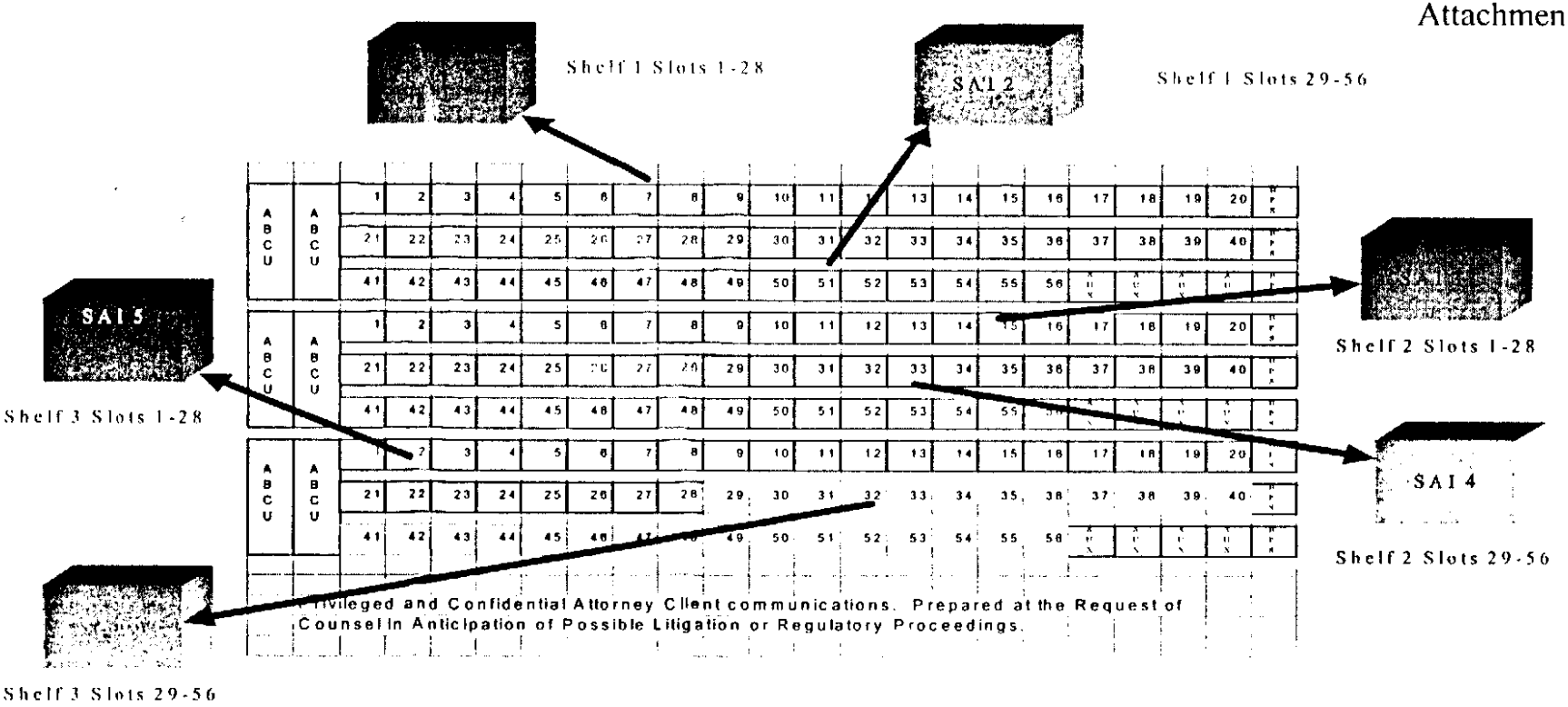
[1] Alcatel's comments in FNPRM CC Dockets 98-147 and 96-98; filed October 12, 2000.
[2] Comments of Nortel Networks Inc., filed in CC Docket Nos. 98-147 and 96-98; filed October 12, 2000, page 4.

Attachment JEK-1



SHELF SERVING AREA INTERFACE ASSIGNMENT

Attachment JEK-2

MAXIMUM NUMBER OF UNUTILIZED LINE CARD PORTS

ILEC Owns the Line Cards

Assume:

5 SAIs per RT
3 different card types

1 card/card type X 3 card types/SAI X 5 SAIs X 3 ports/card = 45 ports

CLECs Own the Line Cards

Assume:

5 different CLECs
5 SAIs per RT
3 different card types

5 cards/card type X 3 card types/SAI X 5 SAIs X 3 ports/card = 225 ports

CLEC LINE CARD OWNERSHIP
WORST-CASE RT DATA UTILIZATION
(ALL DATA SLOTS OCCUPIED)

Assumptions:

- Data channel banks in the RT = 3
- Data slots in the RT = 3 banks X 56 slots/bank = 168
- Data ports in the RT = 168 slots X 4 ports/slot = 672
- All slots in the RT filled with line cards *
- 5 SAIs served by the RT
- 3 card types utilized in the RT
- 5 CLECs providing DSL services
- Each CLEC providing each type of DSL service via each SAI

	Slots Used	Ports Used	Ports Available
Last card of each type, for each SAI, for each CLEC	5 X 5 X 3 = 75	75 X 1 = 75	75 X 4 = 300
Remaining slots	168 – 75 = 93	93 X 4 = 372	93 X 4 = 372
Total	75 + 93 = 168	75 + 372 = 447	300 + 372 = 672
% Utilization	----	447 ÷ 672 = 66.5%	----

* All data slots may not be utilized. Therefore, this is a worst-case analysis of the % utilization if all slots are utilized and the CLECs own the line cards.

ILEC LINE CARD OWNERSHIP
WORST-CASE RT DATA UTILIZATION
(ALL DATA SLOTS OCCUPIED)

Assumptions:

- Data channel banks in the RT = 3
- Data slots in the RT = 3 banks X 56 slots/bank = 168
- Data ports in the RT = 168 slots X 4 ports/slot = 672
- All slots in the RT filled with line cards
- 5 SAIs served by the RT
- 3 card types utilized in the RT
- Any number of CLECs providing DSL services
- CLECs share same card types to same SAIs

	Slots Used	Ports Used	Ports Available
Last card of each type, for each SAI	5 X 3 = 15	15 X 1 = 15	15 X 4 = 60
Remaining slots	168 – 15 = 153	153 X 4 = 612	153 X 4 = 612
Total	15 + 153 = 168	15 + 612 = 627	60 + 612 = 672
% Utilization	----	627 ÷ 672 = 93.3%	----

* All data slots may not be utilized. Therefore, this is a worst-case analysis of the % utilization if all slots are utilized and the CLECs share ILEC-owned line cards.

September 7, 2000

TO: James Keown, SBC
FROM: Darrell Mansur, Alcatel USA

SUBJECT: Alcatel USA input regarding ICC decision.

James:

Here is our input to the three questions you asked:

1. What are the capabilities of the ADLU cards?

   The most important response we can make here is that the ADLU cards, in themselves, have no capabilities. The service delivery capabilities are products of the combination of the line cards, the system and the software. The "system" includes (among other elements):
   - The remote terminal channel bank assemblies that house the line cards and the optional ATM Bank Control Units ("ABCUs) required for ADSL service
   - The common control assembly ("CCA") for the RT
   - Integrated SONET ADM transport modules
   - Associated CCA and transport modules in the central office terminal, and
   - Central office network interfaces.

   The software includes the system software (identified with a release number) and AMS element management system software, both of which are propriety, protected by copyright, and provided under restricted use licenses.

   Given that, the ADSL capabilities supported by Litespan® include the following:
   - ATM transport, with a single OC-3c (STS-3c) network port supporting up to 32 channel banks and up to 1,024 permanent virtual circuits ("PVCs").
   - Standard DMT transceivers supporting full rate ADSL from 32 Kb/s to 8.192 Mb/s downstream and from 32 Kb/s to 960 Kb/s upstream, in 32 Kb/s increments.
   - Rate-adaptive operation, enabling a wide range of services over a wide variety of loop configurations.
   - CBR and UBR classes of service, with multiple traffic queues and cell schedulers.
   - Combination ADSL + POTS ADLUs support line sharing, line splitting or standalone ADSL service. Each ADLU supports two ADSL and POTS lines.
   - Software controlled management of security, configuration, provisioning, surveillance and fault isolation functions. Uses same element management system (AMS) that is used for the ASAM.
   - Uses same chipset as the Alcatel 1000ASAMs.

   For purposes of identifying what is required to support a single line card, and the services delivered by that card, it should be noted that the single OC-3c network

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interface used for ATM transport of the ADSL traffic can only be connected to one service provider. Delivering individual ADSL lines to different providers requires the intervention of an electronic cross-connect function, such as that supported with an Optical Cross-connect Device ("OCD").

2. What other types of xDSL are supported by Litespan?

   Litespan® currently supports TDM-based HDSL services. The ISDN-BRI channel units can also be used to deliver IDSL services. Current development plans include the addition of G.Lite DMT, TDM-based HDSL2, ATM-based HDSL2 and G.sHDSL. We do not support SDSL or other proprietary DSL schemes.

3. What are the issues around the installation of non-Litespan® line cards?

   Only line cards supplied by Alcatel for Litespan or provided under license can be installed and used in Litespan systems. As noted above, these are software-controlled systems. The software enables the service delivery and maintenance functions. The software is copyright protected and distributed only under restricted license provisions that prohibit use or modification by others. In addition, each line card is designed to mechanical and electrical specifications that ensure they do not interfere with other services or the performance of the system. Accordingly, the installation of other line cards is precluded by contract warranty provisions designed to ensure reliable service and system performance.

I hope this meets your needs.

Sincerely,

Darrell Mansur, Sr. Marketing Manager
Alcatel USA, Wireline Access Business Unit
1420 McDowell Blvd. North, Petaluma, CA, 94954
(707) 792-5713