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November 13, 2000

Mr. K. David Waddell, Executive Secretary
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

RE: Docket No. 00-00544, Generic Docket to establish UNE prices for line sharing per FCC 99-355, and riser cable and terminating wire as ordered in TRA docket 98-00123.
Sprint Prefiled Testimony

Dear Mr. Waddell:

Pursuant to the revised procedural schedule issued in this case, enclosed for filing are an original and thirteen copies of the direct pre-filed testimony and exhibits of Mr. Daniel Gordan on behalf of United Telephone-Southeast, Inc. and Sprint Communications Company L.P.

Please contact me if you have any questions.

Sincerely,

James B Wright

James B. Wright

Enclosure

cc: Dennis Wagner
Laura Sykora
Kaye Odum
Tom Sokol
Parties of Record (w/enclosure)

CERTIFICATE OF SERVICE
Line Sharing UNE (Docket No. 00-00544)

The undersigned certifies that on November 13, 2000, the foregoing pre-filed testimony of Sprint was served upon the following parties of record by fax or by placing a copy of the same in the United States Mail postage prepaid and addressed as follows:

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UNITED TELEPHONE-SOUTHEAST, INC.

AND

SPRINT COMMUNICATIONS COMPANY L.P.

DIRECT TESTIMONY

OF

DANIEL R. GORDON

BEFORE THE

TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 00-00544

NOVEMBER 13, 2000

UNITED TELEPHONE-SOUTHEAST, INC.
AND
SPRINT COMMUNICATIONS COMPANY L.P.

DIRECT TESTIMONY
OF
DANIEL R. GORDON

BEFORE THE TENNESSEE REGULATORY AUTHORITY
DOCKET NO. 00-00544
NOVEMBER 13, 2000

Q. Please state your name, employer, current position and business address.

A. My name is Daniel R. Gordon. I am employed by Sprint/United Management Company as Manager-Network Services Costing. My business address is 6360 Sprint Parkway, Overland Park, Kansas 66251. I am testifying in this proceeding on behalf of United Telephone-Southeast, Inc. and Sprint Communications Company L.P. (collectively, "Sprint").

Q. Please describe your qualifications.

A. I received a Bachelor of Arts degree from Westminster College in Fulton, Missouri in 1991 with a major in Business Administration. In 1995, I received a Master of Science degree in Agricultural Economics from the University of Missouri – Columbia. I have also received training in telecommunications through various industry sources and completed numerous training courses within Sprint.

From 1995 to 1997, I was employed as a Research Analyst for the Missouri Department of Social Services. In 1997, I joined the Telecommunications Department of the Missouri Public Service Commission (MoPSC). While at the MoPSC I worked on various regulatory issues including NPA number exhaust, Local Number Portability, Universal Service Funding, and mediation and arbitration of the costs of unbundled network elements. I also worked as part of the MoPSC Arbitration Advisory Staff on matters related to telecommunications.

In 1998, I took a position with the local telecommunications division of Sprint as a Regulatory Analyst. While in that position I was responsible for Sprint's compliance with regulations in Minnesota, Nebraska, and Wyoming. In mid 1999, I assumed my current position in Cost Support, where I am responsible for the cost support of USF issues, outside plant including all types of loops, and line sharing. I am also responsible for understanding the cost study processes of other ILECs.

Q. What is the purpose of your direct testimony?

A. The purpose of my testimony is to support United Telephone-Southeast, Inc.'s cost studies dated August 17, 2000 and September 29, 2000, attached as Gordon Exhibits I and II, respectively. These studies collectively form Sprint's line sharing cost study that I am supporting. My testimony will discuss how Sprint's line sharing cost study complies with the FCC's Third Report and Order in CC Docket 98-147 and Fourth Report and Order in Docket No. 96-98, FCC 99-355,

(rel. December 9, 1999) (hereinafter, "FCC Order 99-355"). In addition, I will point out areas where all ILECs should be treated equally when developing cost studies for line sharing.

Q. What is Line Sharing?

A. Line sharing obligates an incumbent LEC to provide nondiscriminatory access to the high frequency portion of a loop to any requesting telecommunications carrier for the provision of a telecommunications service. Paragraph 26 of FCC Order 99-355 states, "We define the high frequency spectrum network element to be the frequency range above the voiceband on a copper loop facility used to carry analog circuit-switched voiceband transmissions."

Q. Please describe how line sharing works.

A. Line sharing is essentially two services using the same twisted pair. Regular voice band transmission occurs on a twisted copper pair usually between 300Hz and 4KHz; however, voice communication may be heard, if there are no frequency limiting devices on the loop, within the 20Hz to 20,000Hz range. Data technologies use various transmission ranges. For example, HDSL uses the 0Hz to 329KHz frequency range and ADSL uses 20KHz to 1,104KHz range. Since HDSL is within the same frequency spectrum of the loop as voice transmission, line sharing is not technically feasible with that technology. Line sharing is, however, feasible with ADSL. ADSL is provided via a Digital Subscriber Line Access Multiplexer (DSLAM), which accesses the higher frequency portion of

the loop and multiplexes the data into that frequency range. Because ADSL was originally designed to work in conjunction with voice on a clear path, ADSL does not use the audible frequencies below 20KHz. Thus, two services – voice and data – can be provided on one loop facility.

Q. Is an incumbent local exchange carrier's provisioning of ADSL a form of line sharing?

A. Yes. When an incumbent local exchange carrier (ILEC) provides ADSL service to its customers, that incumbent is line sharing by providing voice service and high speed data service on one loop facility. Providing two services at one time on one loop facility is done by splitting the voice from the data via a plain old telephone service (POTS) splitter. A POTS splitter is a low frequency filter that separates the voice frequencies from the high frequency data service. The data frequency band is connected to the DSLAM and the voice frequency band is connected to the voice switch. The diagrams provided in the cost study depict how the equipment is connected within a central office.

Q. Is it possible for more than one telecommunications carrier to provide these services on one loop facility at one time?

A. Yes. With the exception of additional equipment, it is no different when two carriers provide the different services as when the ILEC provides voice ADSL. The FCC found line sharing to be technically feasible in FCC Order 99-355.

Thus, the line can be shared not only between voice and data, but also between carriers.

It is important to note, however, that the line should only be shared between an ILEC and a CLEC. The ILEC retains the voice frequency and the CLEC obtains the higher, data frequency. FCC Order 99-355 at page B-2 states, "An incumbent LEC shall only provide a requesting carrier with access to the high frequency portion of the loop if the incumbent LEC is providing, and continues to provide, analog circuit-switched voiceband services on the particular loop for which the requesting carrier seeks access."

Q. What did FCC Order 99-355 provide regarding cost?

A. The Order described how line sharing is technically feasible as an Unbundled Network Element (UNE). The order described five areas in which costs could be incurred related to line sharing: 1) Loops; 2) OSS; 3) Cross-connects; 4) POTS Splitters; and 5) Line conditioning. Sprint's position on each of these areas will be explained below. In addition, CLECs incur costs through providing DSLAMs and POTS splitters.

Q. What is Sprint's position regarding the cost of the loop?

A. Sprint does not believe that line sharing creates incremental loop costs. Paragraph 140 of FCC Order 99-355 states, "We find it reasonable to presume that the costs attributed by LECs in the interstate tariff filings to the high-frequency portion of

the loop cover the incremental costs of providing xDSL on a loop already in use for voice services." In other words, if an ILEC found costs directly related to the loop as a cost of providing ADSL and the ILEC specified those loop costs in its DSL cost studies filed with the FCC, then the cost of the loop can be passed on to the CLECs.

Sprint structured its interstate DSL cost study so that the ADSL service is a value added service on top of voice service. As a result, no cost of the loop is passed on to the CLEC. Sprint believes if an ILEC customer currently subscribes to voice, then the ILEC recovers its loop costs through the retail rate of the service, access charges, and any subsidies that the ILEC might receive.

If the TRA were to depart from the FCC's view of loop costs for line sharing, Sprint believes that the TRA should treat all ILECs equally. Consequently, if one ILEC receives the right to charge for the loop in a line sharing arrangement, Sprint believes all ILECs should be allowed loop cost recovery and the right to file revised line sharing rates.

Q. What is Sprint's position regarding OSS cost recovery for line sharing?

A. Paragraph 144 of FCC Order 99-355 states:

> We find that incumbent LECs should recover in their line sharing charges those reasonable incremental costs of OSS modification that are caused by the obligation to provide line sharing as an

> unbundled network element... We also reaffirm the conclusions in the *Local Competition First Report and Order*, that the states may require incumbent LECs in an arbitrated agreement to recover such nonrecurring costs as these incremental OSS modification costs through recurring charges over a reasonable period of time; and that non-recurring charges must be imposed in an equitable manner among entrants.

To permit line sharing, to manage the anticipated volume of line sharing orders, and to track repair and maintenance, Sprint is modifying its OSS to accommodate line sharing. Because of the effort to make the modifications to Sprint's nationwide OSS, Sprint has chosen to spread the costs over a five-year period and over the anticipated demand for line sharing for all Sprint's ILEC companies. Sprint has reviewed its system modification needs related to line sharing and determined that Sprint must invest about $2.1 million, which translates into a UNE cost of $0.83 per shared line per month. See Gordon Exhibit II, pages 1-3. Once the costs of the OSS modifications have been recovered, this charge will be eliminated. The costs will also be tracked to determine if more or less investment will be required and any difference will be passed to the CLEC. Sprint will also track the volume of line sharing orders and ensure that the volume is consistent with the demand forecast CLECs provided to Sprint.

No costs related to Sprint's retail DSL offering are recovered in the rate for OSS modifications. Sprint has reviewed the OSS modifications line sharing requires and is not including any costs in the line sharing OSS rate other than those directly related to line sharing. Sprint believes that all ILECs providing the line sharing UNE should pass to the CLEC only those direct OSS costs related to line sharing. Thus, no other costs related to the ILECs own DSL offerings or modifications for other UNEs should be included in the line sharing OSS cost recovery requirements.

Q. Are there other costs related to loops that Sprint expects to incur for providing the line sharing UNE?

A. Yes, there is a cost associated with loop qualification also known as loop make-up. To be capable of line sharing the loop must be free of devices that interfere with xDSL services. The copper portion of a line sharing capable loop must be less than 18,000 feet in length, must be free of load coils, must have bridged taps no longer than 2,500 feet, and must be free of any repeaters. Loop qualification or loop make-up provides the CLEC information necessary for it to determine if a loop meets its business requirements. Loop qualification is the process of identifying the existence of interfering devices, determining loop length and whether the loop is served by a fiber fed digital loop carrier system. Sprint's loop qualification process provides the same information to the CLEC that Sprint uses to determine the capability of loops to provide DSL services to its own end users. The result is that the CLEC can make an independent decision about providing

xDSL service on a specific loop as opposed to Sprint making the decision. Sprint's non-recurring rate for loop qualification is $30.49 per loop. See Gordon Exhibit I, page 5. In the event that the copper portion of the loop is less than 18,000 feet and contains any of the interfering devices, the loop may be conditioned – at the CLEC's option - so that it is capable of supporting xDSL services.

There is also a non-recurring service order charge that recovers the ILEC's cost of processing industry standard Local Service Requests (LSRs). CLECs may choose to use either a manual service order or an electronic service order. Sprint's manual service order charge is $22.54; the electronic service order charge is $3.06. See Gordon Exhibit II, pages 7-8.

Q. What is Sprint's position regarding POTS splitter provisioning?

A. Paragraph 146 of FCC Order 99-355 states, "We concluded *supra,* that incumbent LECS must either provide splitters or allow competitive LECs to purchase comparable splitters as part of this new unbundled network element." This allows ILECs to chose to provide splitters to CLECs or allows CLECs to install POTS splitters.

Sprint chooses not to provide the POTS splitter to CLECs in its local service area in Tennessee. Sprint believes that CLECs have a better ability to meet their customer demand than does Sprint. In the event that an ILEC chooses to provide

POTS splitters to the CLEC, the ILEC should charge no more than the cost it incurs to purchase, install, and maintain the splitters.

Q. Since Sprint chooses not to provide POTS splitters to CLECs, how does Sprint propose CLECs obtain the line sharing UNE in Sprint's local territory?

A. Collocation is a requirement for line sharing and Sprint works with CLECs that desire to collocate in Sprint central offices. As a part of collocation and line sharing, Sprint provides cross-connections to the collocation area and completes the jumper connections at the Main Distribution Frame (MDF) required by line sharing. As such, Sprint provides CLECs two alternatives for connecting their DSLAMs and POTS splitters to Sprint's central office equipment. Diagrams of these alternatives, known as the "2 jumper scenario" and the "3 jumper scenario" are found in the cost study dated August 17, 2000. See Gordon Exhibit I, pages 25-26. The costs for these non-recurring charges are the result of running multiple jumpers from various blocks on the MDF. Jumpers are required from the CLEC splitter block to the block for the field pairs, from the block for Sprint's switch and the block for voice. An extra jumper may be required if the CLEC has a block dedicated to its DSLAMs. In both cases, one jumper must be removed that connects the block for Sprint's field pairs to the block for its switch.

Q. What other alternatives does Sprint provide?

A. Sprint also provides a common area where CLECs may locate their POTS splitters. Sprint has developed costs based upon the CLECs' need for space in a relay rack for such an arrangement. The CLECs are responsible for providing splitter shelves and splitter cards. Sprint may then install and maintain the equipment.

No costs for splitters will be charged to CLECs in either alternative. However, non-recurring charges for the jumpers and monthly recurring charges for rack space and cross-connects will be levied. The non-recurring charges for the 2 and 3 jumper scenarios are $19.54 and $25.41, respectively. See Gordon Exhibit I, page 27. In the event the CLEC wishes to provide its POTS splitters in a common area, Sprint's charge is $18.37 per month per shelf in a relay rack. See Gordon Exhibit I, page 7.

Q. What is Sprint's position regarding costs of cross-connects?

A. As a part of the collocation cost study process, Sprint developed prices for cross-connects. Cross-connects connect various pieces of equipment within a central office and are sold in bundles of 100 pairs. To provide line sharing to CLECs, Sprint found that other types of cross-connects may be needed. To provide line sharing, at least four cross-connects are required, one of which connects the MDF to the Sprint switch. The cost of cross-connecting the MDF to the Sprint switch is not passed on to the CLEC; however, the remaining cross-connections are the result of line sharing and are passed on to the CLEC. The other cross-connects

run from the MDF to the DSLAM and splitter equipment in the CLEC collocation area.

Q. Please describe the cross-connect alternatives Sprint offers.

A. Sprint offers three types of cross-connects to meet the needs of CLECs. The first type of cross-connect runs from the MDF to the CLEC collocation area. This cable is 165 feet long and is used when the CLEC locates its splitter and DSLAM equipment in the collocation area. The cost recovers the cable and connecting blocks on the MDF.

The second type of cross-connect is used when the CLEC's splitter is located in a common area. The cross-connect to the common area splitter is 95 feet in length. The splitter is then directly connected to the CLEC's collocation area. This second cross-connect is shorter because of the proximity of the common area equipment bays to the MDF. The charge recovers the cost of the cable and two connecting blocks. In this scenario, Sprint connects both ends of the cross-connect cabling: at the MDF and at the common location.

The third type of cross-connect Sprint offers is also used in the common area arrangement and is 95 feet long. This arrangement is used when there is a need to connect the splitters back to the MDF instead of directly to the CLEC collocation area as in the second alternative.

Q. What is Sprint's position regarding loop conditioning?

A. Paragraph 87 of FCC Order 99-355 states, "Finally, consistent with our conclusion in the *Local Competition Third Report and Order*, we conclude that incumbent LECs should be able to charge for conditioning loops when competitors request the high frequency portion of the loop. The conditioning charges for shared lines, however, should never exceed the charges incumbent LECs are permitted to recover for similar conditioning on stand-alone loops for xDSL services." Paragraph 152 of FCC Order 99-355 states, "...we see no reason to depart from the use of the TELRIC-based methodology adopted in the *Local Competition First Report and Order* for this new unbundled network element." In other words, for ILECs to provide the line sharing UNE to CLECs, loops may need to be conditioned. The ILEC must develop its costs using TELRIC methodology.

Q. What is loop conditioning?

A. Loop conditioning or line conditioning is the process that may be used in conjunction with loop qualification for the provisioning of an xDSL capable loop. After the receipt of loop make-up data, it is the CLEC's option to request loop conditioning. This includes the necessary work in the outside plant needed to provide a facility that will allow for transmission of high-speed digital service, such as DSL. This work may include the removal of multiple load coils,[1] repeaters[2] and/or bridged taps.[3]

[1] Load coils are placed at regular intervals on copper cable pairs that are 18,000 feet or longer. Their purpose is to improve the transmission quality for voice grade services on these longer pairs by reducing

Load Coils

Digital services, such as xDSL, will not work on a pair that has load coils. Load coils will block the transmission of digital services, including xDSL-based services for both copper fed and next generation digital loop carrier (NGDLC) provisioned, xDSL capable loops. This is one of the reasons that forward-looking networks are designed with loops that are short enough to avoid the need for load coils.

Generally, the load coil is not actually removed, it is just disconnected from the cable pair until all load coils in the case are no longer working. This involves snipping off the four wires that connect the coil to the cable pair and then reconnecting the two ends of the cable pair. This may involve removing a connector that splices 25 pairs at a time, pulling out the load coil wires and replacing the connector.

The actual work time involved in disconnecting the load coils is no more than a minute or two, but set-up time can be significant, particularly when working in

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the signal loss caused by the capacitance of the telephone cable. Copper pairs that are less than 18,000 feet long do not have to be loaded in order to provide voice grade services.

[2] A repeater is generally used to amplify a signal over a copper loop. Without such amplification, the signal will decay over distance. The type of repeaters that are found in cable plant are not used for voice grade circuits; instead, they are installed to support digital services over the voice network. Nevertheless, the existence of a repeater will interfere with xDSL signals.

[3] Bridged tap is any piece of the cable pair that is not in the direct path between the customer and the switching device. In the embedded network, there may be insufficient distribution pairs to permanently assign pairs to each address. A pair may be made accessible so that it could potentially be used at several

manholes. This is why an efficient ILEC will unload multiple pairs at one time when working on loops under 18,000 feet in length, instead of unloading only the pair required for the current order. Basic local telephone service provided on loops longer than 18,000 feet in length require that load coils be present to provide adequate service. In the event that load coils must be removed on loops longer than 18,000 feet in length, only the loop in question will be conditioned; no others will be conditioned at the same time. In the event that the CLEC stops sharing the loop, the load coil must be returned to provide voice service.

Bridged Taps

Because bridged taps interfere with digital service, conditioning requires their removal. However, no plant is actually removed. The two wires of the cable pair are simply cut off and capped. In splices in larger cables, this may require removing a connector, pulling out the bridged pair, and replacing the connector. Sprint's position is that excessive bridged taps can be removed the majority of the time at the customer's serving terminal (where the customer's drop wire connects to the distribution cable).

Loop Conditioning Costs

Loop conditioning costs should be based upon current costs incurred by an efficient provider. For load coil removal on loops over 18,000 feet, and all bridged tap and repeater removals, the costs should be determined on a per

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different addresses if it were needed. This is called "multiple" plant. Bridged tap is an issue because it degrades the quality of any type of signal. This issue is magnified when xDSL is placed on a loop.

location basis, dependent upon the type of outside plant (Underground, Aerial or Buried) facilities work required to provision the UNE order.

For instance, it is more time consuming to perform loop conditioning activities in underground manholes than it is to perform the same procedures within aerial or buried outside plant (OSP) facilities. Unlike the aerial and buried OSP environments, a single technician cannot perform (loop conditioning) work activities underground; a minimum of two laborers are required for safety reasons.

An efficient service provider's cost methodology would assume that in both aerial and buried plant facilities, the majority of cable pair access locations would involve quick and easy access to the cable pairs via "ready access" splice enclosures. The utilization of such enclosures is common industry practice – even in buried plant environments as these cable pair access locations are normally brought above ground into a pedestal.

Perhaps most importantly, non-recurring charges (NRCs) for load coil removal on loops under 18,000 feet in length require different cost study approaches. Copper cables typically consist of groups of 25 cable pairs bound together. For example, a 100 pair copper cable will have four groups of 25 cable pairs. The cables are bound in groups for organization and to make work easier on the cable. Since cables are organized by groups of 25, the cables that require loading will be loaded in groups of 25 pairs at a time. Load coils typically have capacities in 25

pair increments. Because cable pairs are generally loaded in groups of 25, and are not needed at all on loops less than 18,000 feet in length, separate costs should be determined based upon a more efficient load coil removal process. Sprint considers it to be reasonable to spread the fixed costs of accessing the cable pairs across all the pairs that would be unloaded in a 25 pair binder group. The incremental labor costs associated with unloading 24 more cable pairs should be added to a single engineering and travel charge and then divided by 25 to determine the cost per pair for the entire binder group.

Q. Please summarize your testimony.

A. United offers the line sharing UNE as required by the FCC. Line sharing involves two carriers providing two services at one time: the ILEC provides the voice service while the CLEC provides the high-speed data service through ADSL. To provide the line sharing UNE, United complies with FCC 99-355 through proposing no cost of the loop, providing various means of interconnecting the CLEC high-speed data equipment to United's facilities, modifying its OSS to process line sharing orders, and providing loop conditioning. United's costs in Gordon Exhibits I and II were developed using TELRIC methods. Sprint believes all ILECs should develop their cost studies using the same TELRIC assumptions. Sprint believes the TRA should apply its decisions equally to all ILECs.

Q. Does this conclude your direct testimony?

A. Yes, it does.