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November 30, 2001

Ms. Magalie R. Salas
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Dear Ms. Salas:

Re: Sprint PCS and AT&T Petitions for Declaratory Ruling on CMRS Access Charge Issues - - WT Docket No. 01-316

The United States Telecom Association ("USTA")[1] submits these comments in response to the Commission's November 8, 2001 Public Notice in the above-referenced proceeding. In addition, USTA respectfully requests that the Commission incorporate the attached comments filed by USTA in related proceedings on intercarrier compensation into the record in this proceeding.

USTA filed comments on June 1, 2000 and reply comments on June 13, 2000 in response to the Commission's review of the Sprint PCS Petition to recover costs for terminating calls that originate on ILEC networks beyond the cost recovery permitted under the Commission's reciprocal compensation regulations applicable to wireless carriers. USTA commented that if the Commission were to grant the relief sought by Sprint PCS it would have far-reaching consequences on cost-recovery mechanisms and create unnecessary complications regarding intercarrier compensation arrangements. As USTA commented "What is clear is that an efficient intercarrier compensation mechanism must not distort: (i) the value consumers place on originating or receiving calls, (ii) the economic costs to the carrier of transmitting the call, and, most important,

[1] USTA is the nation's preeminent telecom trade association representing a diverse membership of over 1,200 telecommunications companies, including ILECs and CLECs, that provide competitive telecommunications products and services including voice, data and video services over wireline and wireless networks domestically and in international markets worldwide.

(iii) the market price paid by the cost-causer."[2]

In the Commission's intercarrier compensation proceeding, USTA filed comments on August 21, 2001which explained USTA's support for an intercarrier compensation policy which "accommodate[s] technological and market forces in such a way that investment in the industry will thrive."[3] Under conditions discussed by USTA in its filings, an appropriate intercarrier compensation policy would include elements necessary for the adoption of a reasonable bill and keep mechanism. USTA commented that if adopted "The bill and keep policy itself should apply to all carriers, networks and technologies for the interconnection of switched services, including interstate switched access, intrastate switched access, reciprocal compensation, intracompany settlements, wireless and paging."[4] A properly structured bill and keep policy would "avoid the creation of new uneconomic, arbitrage opportunities and unfair competitive advantages."[5]

USTA respectfully requests that Commission resolution of the issues raised in this proceeding be consistent with USTA's comments referenced in this filing and more fully discussed in the attachments.

Sincerely,

Keith Townsend

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[2] *USTA Reply Comments* at 1-2, Charles L. Jackson and William E. Taylor, *Reciprocal Compensation for CMRS Providers* at 3, June 13, 2000 (attachment to USTA's June 13, 2000 Reply Comments), CC Docket Nos. 96-98, 95-185 and WT Docket No. 97-207.

[3] *USTA Comments* at 2, CC Docket No. 01-92.

[4] *USTA Comments* at 27, CC Docket No. 01-92.

[5] *USTA Reply Comments* at 22, CC Docket No. 01-92 (November 5, 2001).

Director Legal & Regulatory Affairs
& Senior Counsel

Attachments

cc: Gregory R. Vadas, Policy Division, Wireless Bureau
Steve Morris, Competitive Pricing Division, Common Carrier Bureau

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

In the Matter of	)	
	)	CC Docket Nos. 96-98, 95-185
Reciprocal Compensation for CMRS Providers	)	WT Docket No. 97-207
	)	

COMMENTS
OF THE
UNITED STATES TELECOM ASSOCIATION

The United States Telecom Association ("USTA") hereby files its comments in response to the Commission's *Public Notice*[6] referencing the request for clarification filed by Sprint PCS regarding reciprocal compensation for CMRS providers.

Sprint PCS argues that CMRS providers should receive reciprocal compensation based upon their specific traffic sensitive costs. Sprint PCS states that "CMRS carriers provide local telecommunications services similar to those furnished by landline local exchange carriers, except that the services are mobile and are supported by radio spectrum rather than copper loops. As a result, CMRS networks are vastly different than landline networks: they use different technologies with different engineering economics, and accordingly, have fundamentally different cost structures."[7] Sprint PCS contends that the "Commission never performed … additional cost analysis for mobile networks,

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[6] Public Notice DA 00-1050, released May 11, 2000.

[7] Sprint PCS *A Legal Framework for CMRS Call Termination Cost-Based Compensation* at 1 (February 2, 2000).

which use mobile switching centers, cell cites and spectrum instead of tandem switches, end offices, and copper loops"[8] used by wireline providers of telecommunications services. In addition, Sprint PCS asserts that the "Commission has never ruled, much less 'made clear,' that mobile telephony providers are limited to recovering their switching costs and may not recover their other traffic sensitive costs of call termination."[9] According to Sprint PCS, the Commission must provide guidance to state Commissions by specifying that CMRS providers are entitled to receive reciprocal compensation when using traffic sensitive elements of their mobile network to switch or terminate local traffic to mobile customers that originates on another carrier's network. Sprint PCS identifies these traffic sensitive elements as CMRS mobile switching centers, base stations controllers, cell sites or base transceiver stations, transport to cell cites, and wireless radio spectrum used in switching and terminating local calls to mobile customers.[10]

USTA believes that neither Sprint PCS nor any other CMRS provider is entitled to receive additional reciprocal compensation for network components that are functionally equivalent to a wireline carrier's loop when they are used to terminate traffic to mobile customers that originates on other carrier's networks. The Commission's prior rulings establish that Sprint PCS is not entitled to additional reciprocal compensation.

I. PUBLIC POLICY ISSUES

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[8] Sprint PCS Letter at 2 (February 2, 2000).

[9] *Id*. at 4.

[10] *Id*. at 3.

Notably absent from Sprint's petition is any estimate of the reciprocal compensation rate that would result from its proposal. Although USTA is not in a position to offer an estimate at this time, USTA suspects that the resulting rate would be far in excess of, and completely out of step with, reciprocal compensation rates for wireline traffic and with local rate structures for wireline traffic.[11] In this respect, Sprint's proposed modifications to the reciprocal compensation rules for wireless traffic, are not only at odds with the Commission's existing pricing rules, but raise broader public policy issues that the Commission must address as a threshold matter. Specifically, if the Commission were to conclude that CMRS is a fundamentally different technology than wireline service, for reciprocal compensation purposes, it would first have to consider how reciprocal compensation regimes should be structured when different technologies, with dramatically different cost structures, are used at the originating and terminating end of a call. Hypothetically, does it make sense, for example, to impose a compensation rate ten (10) times higher than the rate of the other carrier involved in the transaction? What impact would that have on local rates and local rate structures? Should wireless carriers recover any, much less all of their traffic-sensitive costs through reciprocal compensation, given that they are already paid by their end users for terminating traffic? These are critical issues that cannot be swept under the rug.

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[11] These issues are, of course, also raised in the context of inter-carrier compensation for dial-up Internet traffic. To the extent reciprocal compensation requirements are extended to interstate Internet traffic, the reciprocal compensation payments made by the originating carrier can exceed the revenues it receives from its end users.

II. THE COMMISSION'S PRIOR ORDERS CONSIDERED AND REJECTED THE CURRENT RECIPROCAL COMPENSATION ARGUMENTS RAISED BY SPRINT PCS

The Commission's local competition Order addressing reciprocal compensation issues noted that CTIA, Sprint Spectrum and APC made arguments that CMRS providers should be treated differently than other services "because of different traffic flows and different termination costs."[12] These arguments were rejected some four years ago.

Sprint PCS claims that state commissions "have encountered some difficulty" in applying the Act and the Commission's rules. In the examples cited by Sprint, state commissions have acted in accordance with Section 51.701(c) and (d) by treating "equivalent facilities" in a consistent manner and by maintaining parity between wireline carriers and CMRS providers in determining what constitutes additional costs in which reciprocal compensation may apply. State commissions need no additional guidance to apply the Commission's rules applicable to reciprocal compensation received by CMRS providers. Asymmetrical reciprocal compensation is justified only when the cost of the connecting carrier exceeds the cost of the incumbent LEC. Sprint PCS should make its

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[12] *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* at ¶¶1011, 1015 (1996).

case for additional reciprocal compensation before state commissions by providing cost studies necessary for the states to make an appropriate determination.

III. SPRINT HAS FORGOTTEN ITS PAST

Sprint PCS argues that the Commission did not adequately consider the issues it now raises. Sprint PCS is simply incorrect. Affiliated companies of Sprint PCS raised these issues four years ago. The Commission was well aware of these arguments when it adopted its current reciprocal compensation regulations in 1996.

In 1996, Sprint Spectrum and American Personal Communications ("APC"), predecessors to Sprint PCS, filed comments in both the local competition proceeding and the LEC-CMRS interconnection proceeding.[13] In the local competition proceeding, Sprint Spectrum and APC argued in favor of bill and keep as the preferred means of satisfying the reciprocal compensation obligations of the 1996 Act. According to its thinking in 1996, Sprint Spectrum and APC argued that "The Commission clearly can find that bill and keep is a reasonable means … of mutual compensation, regardless of whether such a system is voluntary. Consequently, the Commission or a state may adopt bill and keep consistent with the 1996 Telecommunications Act."[14] As Sprint Spectrum and APC explained their support for bill and keep in the local competition proceeding:

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[13] Joint Comments of Sprint Spectrum and American Personal Communications, CC Docket No 96-98 (May 16, 1996), Reply Comments (May 30, 1996); Joint Comments of Sprint Spectrum and American Personal Communications, CC Docket No. 95-185 (March 4, 1996), Reply Comments (March 25, 1996). Jonathan M. Chambers, the author of the Sprint PCS current filing under review, was listed on the 1996 filings in CC Docket Nos. 96-98 and 95-185 as Vice President of Public Affairs for Sprint Spectrum.

[14] Joint Reply Comments of Sprint Spectrum and APC at 24, CC Docket No. 95-185 (March 25, 1996).

> As we outlined in comments submitted in response to the *CMRS Notice*, Sprint Spectrum and APC strongly support the use of bill and keep … since its serves as a sound proxy for the actual costs involved. Four major policy objectives support bill and keep: (1) it can be implemented quickly….; (2) it is simple and easy to administer, thereby conserving both industry and Commission resources; (3) it promotes the goal of an open, competitive market by facilitating co-carrier relationships; and (4) it is fair to CMRS providers ….[15]

In joint reply comments, Sprint Spectrum and APC stated that "APC's own experience … demonstrated that CMRS providers – particularly PCS providers – have the potential to achieve traffic balance with LECs. Accordingly, bill and keep is a fair and appropriate proxy for a policy of mutual, reciprocal trade of traffic between CMRS providers and LECs."[16]

Sprint Spectrum and APC also commented on two additional issues: (1) CMRS technology versus wireline technology; and (2) the nature of the traffic between CMRS providers and wireline providers for purposes of reciprocal compensation arrangements. In joint comments filed in the local competition proceeding regarding the CMRS technology, Sprint Spectrum and APC stated:

> A distinction between CMRS providers and wired competitors is based not on the technology they use to provide service to customers but on the service offered by CMRS providers and the jurisdiction created over them by the Communications Act …. Thus, Section 332(c)'s provision of different regulatory treatment for CMRS providers is a product of Congress' evaluation of the interstate characteristics of the service, not the technology, provided by CMRS providers"[17]

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[15] Joint Comments of Sprint Spectrum and APC at 12, CC Docket No. 96-98 (May 16, 1996).

[16] Joint Reply Comments of Sprint Spectrum and APC at 12-13, CC Docket No. 96-98 (May 30, 1996).

[17] Joint Comments of Sprint Spectrum and APC at 3, CC Docket No. 96-98 (May 16, 1996).

> Establishing specific policies for LEC-CMRS interconnection does not reflect any favoritism to the technology utilized by CMRS providers to serve their customers. Rather, honoring the explicit mandates of the 1996 Act and Section 332 simply implements the existing statutory scheme. The Commission cannot ignore this statutory distinction."[18]

According to its legal memorandum filed February 2, 2000, Sprint PCS argues that "CMRS carriers provide local telecommunications services similar to those furnished by landline local exchange carriers ("LECs"), except that the services are mobile and are supported by radio spectrum rather than cooper loops. As a result, CMRS networks are vastly different than landline networks: they use different technologies with different engineering economics, and accordingly, have fundamentally different cost structures."[19] Sprint PCS asserts that "In the end, it is a futile exercise to attempt to compare 'equivalent facilities' between particular network components utilized in landline and CMRS networks, given that fixed and mobile carriers use such different technologies with different engineering economics.[20] Yet Sprint PCS predecessor companies did engage in such a "futile exercise" four years ago. APC filed separate comments in the LEC-CMRS interconnection proceeding. These filings are clearly at odds with its successor company Sprint PCS arguments raised in this proceeding regarding the operational nature of CMRS networks and wireline networks. Contrary to its arguments in this proceeding that CMRS networks are uniquely different from wireline networks in

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[18] *Id*. at 4.

[19] Sprint PCS *A Legal Framework for CMRS Call Termination Cost-based Compensation* at 1 (February 2, 2000).

[20] Sprint PCS Letter at 3 (February 2, 2000).

transporting and terminating calls, APC argued four years ago that its PCS network was the functional equivalent of an ILEC network in the manner in which calls were originated and terminated. In Comments filed in 1996, APC stated:

> APC is the nation's first operational broadband PCS provider. It is submitting these Comments in order to share its real world experience with the Commission and establish factual predicates that will help the Commission develop an economically efficient reciprocal compensation policy…. ***APC's network performs the same functions as a LEC network in terminating calls***.[21]

APC explained at length, through text and a diagram, how its network was the functional equivalent of Bell Atlantic's network.

> When a call to an APC subscriber is originated on Bell Atlantic's network, it is carried from a Bell tandem to APC's gateway mobile switching center ("MSC") over two-way trunks connecting the two switches (entrance facilities). The gateway MSC functions as a tandem switch, concentrating and distributing traffic to the switch serving the CMRS customer at that moment ("the MSC"). These switches then send the call to one of several Base Station Controllers ("BSC") over trunks that are equivalent to LEC transport. Each BSC, in turn, handles calls to and from mobile units within range of the base stations controlled by the BSC. The BSC to base station trunk can be considered either transport or part of the end user "common line." Finally, the air link between base station and handset is equivalent to the local loop. These network elements are depicted in the diagram on the next page.[22]

Regarding traffic flows between wireless and wireline networks, APC stated four years ago that traffic flow to its network versus that flowing to wireline carriers was relatively even with 42 percent of calls "landline-originating, mobile terminating,"

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[21] APC Comments at 2, CC Docket No. 95-185 (March 4, 1996).

[22] *Id*. at 8, CC Docket No. 95-185 (March 4, 1996).

compared with 58 percent of calls "mobile-originating, landline-terminating."[23] APC also stated that it expected that the majority of cellular/LEC calls terminating on the ILEC network would even-out once the Commission "establishes a compensation mechanism that recognizes CMRS providers and LECs as peers and removes economic obstacles to land-mobile calling…."[24] In addition, APC stated that it "expects that most or all broadband PCS providers will experience similar traffic flows, given the tremendous success of APC's service. In addition, cellular carriers will face substantial competitive pressures to modify their service to respond to PCS, which should likewise cause cellular/LEC traffic flows to even out."[25] APC reasoned that "the Commission cannot reasonably expect traffic flows to be truly even until there is true parity between CMRS providers and LECs - - including reciprocal compensation and number portability. That is, even traffic flows are a consequence of, not a precondition to, the adoption of bill and keep compensation."[26] As APC concluded "each carrier would bear its own cost of terminating calls. As a result, each carrier would be motivated to lower those costs as much as possible, since it could not be assured of forcing its competitor to subsidize

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[23] *Id*. at 9.

[24] *Id*. at 9, note 15. Air links, or spectrum, is thus the equivalent of the local loop. In its comments filed in the local competition proceeding, CTIA argued that "CMRS use significantly different technologies to provide service to end-users than LECs and other CLECs. The difference … produces important distinctions warranting separate treatment. Two factual distinctions are particularly important: different traffic flows and different traffic termination costs. There currently exists an imbalance in traffic volumes between LEC to cellular and cellular to LEC traffic. This is due, in part, to the technical structure of cellular networks." *See* CTIA Comments at 7, CC Docket No. 96-98 (May 16, 1996). It is clear that Sprint PCS, and the CMRS industry, cannot argue that the Commission did not weigh these same arguments some four years ago in two separate proceedings, before adopting its current reciprocal compensation regulations.

[25] *Id*. at 9, note 16.

[26] *Id*. at 11.

inefficiencies."[27] APC described its proposal as its "zero-cost compensation model" … [w]here CMRS and LEC networks perform the same functions in terminating calls … share the cost of entrance facilities … and recover its own costs of originating and terminating calls."[28]

By its filing, Sprint PCS is attempting to use reciprocal compensation to extract illegal subsidies from ILECs. The Commission should put an end to this game by denying the relief sought by Sprint PCS.

The Commission's current reciprocal compensation rules need no further clarification.

USTA is unaware of any filing from individual state commissions stating any confusion over how to apply the Commission's reciprocal compensation regulations to CMRS providers. The Sprint PCS filing is nothing more than a solution in search of a problem. Sprint PCS is attempting to use the Commission's process to further game the reciprocal compensation regime adopted by the Commission. The arguments raised by Sprint PCS in this proceeding are radically different from those it raised doing business as Sprint Spectrum and APC four years ago. The Commission should deny this attempt by Sprint PCS to use the Commission's process to gain a competitive advantage over wireline

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[27] *Id*. at 13.

[28] *Id*. at 11. PCIA supported APC's zero-cost compensation model when it urged that "the Commission …adopt [a] plan for terminating compensation by LECs and broadband providers that consists of zero-cost termination of traffic by both parties (*i.e.*, each party bears its own transport, switching, and local loop costs), and shared cost of the trunks interconnecting the mobile and LEC switches." PCIA Comments at 8, CC Docket No. 95-185 (March 4, 1996).

carriers by requiring ILECs and their customers to subsidize the CMRS industry through the payment of illegal reciprocal compensation.

Respectfully submitted,

UNITED STATES TELECOM ASSOCIATION

/s/ *Keith Townsend*

June 1, 2000 ***By***_____

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Before the
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	)	
In the Matter of	)	
	)	CC Docket Nos. 96-98, 95-185
	)	WT Docket No. 97-207
Reciprocal Compensation for	)	
CMRS Providers	)	

REPLY COMMENTS
OF THE
UNITED STATES TELECOM ASSOCIATION

The United States Telecom Association ("USTA") hereby files its reply comments.

Attached to USTA's reply comments is an analysis by Charles L. Jackson and William E. Taylor ("Jackson & Taylor") entitled *Reciprocal Compensation for CMRS Providers*. The Jackson and Taylor whitepaper rebuts the arguments raised by Sprint PCS and its consultants in support of asymmetrical cost recovery for CMRS providers through reciprocal compensation arrangements.

Sprint PCS provides no basis for granting the relief it seeks. The comments filed in response to the Sprint PCS filing make clear that the Commission's current symmetrical reciprocal compensation regulations provide Sprint PCS and CMRS providers with appropriate compensation. In addition, the Commission's regulations permit asymmetrical reciprocal compensation payments to any competitive carrier when the requesting carrier provides a forward-looking cost study to any state commission which then determinates if additional cost recover is warranted. There is no evidence

presented by Sprint PCS, or any other party to this proceeding, that state commissions have failed to apply the Commission's reciprocal compensation regulations. What is clear is that "an efficient intercarrier compensation mechanism must not distort: (i) the value consumers place on originating or receiving calls, (ii) the economic costs to the carrier of transmitting the call, and, most important, (iii) the market price paid by the cost-causer."[29]

Sprint PCS argues that a CMRS provider should be permitted to recover the cost of its network, including the cost of acquiring spectrum, by charging ILECs asymmetrical reciprocal compensation rates when terminating traffic that originates on another network. Sprint PCS argues that the Commission should declare that its network and spectrum acquisition costs are "additional cost" as defined in the Commission's reciprocal compensation regulations, which may be recovered through reciprocal compensation payments from wireline carriers.

As several commenters noted, the Sprint PCS reciprocal compensation proposal is contrary to existing reciprocal compensation regulations and inconsistent with sound public policy. Section 252(d)(2)(A)(i) and (ii) of the 1996 Act requires that a carrier's reciprocal compensation rates are based upon "a reasonable approximation of the additional costs of terminating" calls "associated with the transport and termination … of calls that originate on the network facilities of the other carrier."[30] BellSouth correctly explains that the Commission's *Local Competition Order* concluded that "only that

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[29] Charles L. Jackson and William E. Taylor, *Reciprocal Compensation for CMRS Providers* at 3, June 13, 2000.

[30] 47 U.S.C. §252(d)(2)(A)(i) and (ii).

portion of the forward-looking, economic cost of end-office switching that is recovered on a usage sensitive basis constitutes an 'additional cost' to be recovered through termination charges."[31] As US WEST argues, the *Local Competition Order* acknowledged the substantial benefits in terms of "administrative efficiency, equalizing carrier bargaining power, and avoiding gaming" of using ILEC cost as proxies for interconnected carriers when the Commission "directed states to establish presumptive symmetrical rates based on the incumbent LEC's costs for transport and termination of traffic."[32] The Commission also established regulations in Section 51.711(b) whereby "[a] state commission may establish asymmetrical rates for transport and termination of local telecommunications traffic only if the carrier other than the incumbent LEC proves to the state commission on the basis of a cost study … that the forward-looking costs … exceed the costs incurred by the incumbent LEC" to justify a higher rate.[33] Consistent with the 1996 Act, and the Commission's regulations, Sprint PCS may recover only costs for transport and terminating calls that originate on another carrier's network, whether based upon ILEC costs or decisions by state commissions that additional costs associated with end-office switching are warranted after Sprint PCS submits a forward-looking cost study that identifies "additional costs" of end-office switching that is recoverable on a

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[31] BellSouth Comments at 2.

[32] US WEST Comments at 6.

[33] 47 C.F.R. §51.711(b).

usage sensitive basis.[34] Should Sprint PCS or any competitive carrier disagree with the decision of any state commission on reciprocal compensation payment arrangements, the proper forum for review established by the 1996 Act is federal district court, not the Commission.[35]

If the Commission were to grant the relief sought by Sprint PCS it would have far-reaching consequences on cost-recovery mechanisms and create unnecessary complications regarding intercarrier compensation arrangements as USTA,[36] ILECs,[37] and AT&T[38] argue. Even if the arguments raised by Sprint PCS in favor of additional

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[34] GTE Comments at 4 ("Sprint simply must submit a forward-looking cost study that identifies its costs").

[35] 47 U.S.C. §252(e)(6).

[36] USTA Comments at 3 ("Sprint's proposed modifications to the reciprocal compensation rules for wireless traffic, are not only at odds with the Commission's existing pricing rules, but raise broader public policy issues that the Commission must address as a threshold matter. Specifically, if the Commission were to conclude that CMRS is a fundamentally different technology than wireline service, for reciprocal compensation purposes, it would first have to consider how reciprocal compensation regimes should be structured when different technologies, with dramatically different cost structures, are used at the originating and terminating end of a call.").

[37] BellSouth Comments at 5 ("By contrast, the customer of the CMRS provider would be relieved of responsibility to cover the cost of the loop-equivalent facilities in the CMRS network. These costs are currently recovered in the CMRS provider's contracts with their end-users. Allowing CMRS providers to recover these costs from the ILECs and/or ILEC customers would result in either double recovery or an unearned competitive advantage for the CMRS provider. There is no sound policy reason to tilt the competitive playing field … in favor of CMRS providers.").

[38] AT&T Comments at 6-7 ("[T]he charges Sprint proposes for reciprocal compensation would necessarily have far-reaching effects on every other compensation, cost recovery, and subsidy regime developed by the Commission. If the Commission decides that carriers with higher cost are permitted to charge higher termination rates for

cost recovery through asymmetrical reciprocal compensation payments had merit, the Commission is not the proper forum for further review. There is no evidence Sprint PCS has availed itself of existing regulations in state proceedings. Sprint PCS has apparently failed to file a forward-looking cost study of its own with any state commission, or indeed in this docket, in support of asymmetrical cost recover through reciprocal compensation arrangements. Therefore, the Commission should deny the request of Sprint PCS.

Although the Commission believes that Sprint PCS deserves to be heard on this matter even though it has failed to demonstrate compliance with current reciprocal compensation regulations, Jackson and Taylor establish that Sprint PCS is not entitled to the relief it seeks. As Jackson and Taylor demonstrate "Symmetric rates that are based on the costs of an efficient firm provide proper economic signals to market participants, thus ensuring that competitive distortions do not arise…. Sprint's proposal conflicts with this basic premise and would result in losses in economic efficiency and require extensive cost regulation of a fledging competitive industry."[39] Jackson and Taylor show that economic efficiency is achieved if additional costs incurred to provide wireless services

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local calls, it may well be forced to rethink its decisions on access charges, universal service, UNEs, number portability, and virtually all other cost recovery mechanisms it has put in place…. Every carrier that uses a technology different from the wireline standard, or incorporates different elements into its network would seize the opportunity to calculate compensation based on costs specific to its own situation. At a point in which the Commission should be attempting to make consistent the myriad of pricing schemes now being used, it should refrain from considering changes to the regime that should be used as a model for all the rest.").

[39] Jackson and Taylor at 1.

are recovered from the cost-causer.[40] As Jackson and Taylor explain, there are competitive benefits of applying symmetrical rates for reciprocal compensation arrangements: "Basing compensation on symmetrical rates and having the additional costs recovered from the cost-causing agent provides both carriers with optimal incentives to deploy innovative technology and provide higher quality service. Moreover, it also ensures that only those services that consumers sufficiently value will be provided by market participants." [41] Jackson and Taylor also dispute the conclusions reached by Sprint PCS that technological differences in networks require asymmetrical rates. Jackson and Taylor demonstrate that contrary to claims made by Sprint PCS, "the majority of costs in a modern wireless system are NTS [non-traffic sensitive] costs."[42]

Sprint PCS has failed to present any evidence of having made a case for asymmetrical cost recovery through reciprocal compensation in any state proceeding. In addition, CTIA provides no corroborative evidence supporting the arguments of Sprint PCS that state commissions need Commission guidance.[43] PCIA merely argues that state commission decisions in California and Washington, which respond to requests from paging carriers for asymmetrical reciprocal compensation, were incorrectly

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[40] *Id*. at 11.

[41] *Id*.

[42] *Id*. at 28.

[43] CTIA Comments at 3 ("As shown by Sprint PCS, certain states have apparently ignored the Commission's Rules which permit carriers to offer their own cost-based studies.").

decided.[44] Conspicuously absent are any comments from state commissions or NARUC in support of Sprint PCS that the Commission provide further guidance on how state commissions should determine additional compensation payments for CMRS providers. State commissions are not in need of Commission clarification on how to interpret and apply current reciprocal compensation regulations. The Commission's regulations provide state commissions with guidance on how to determine reciprocal compensation for CMRS providers. As Sprint PCS acknowledges, California and Washington state commissions have made rulings on requests by paging carriers for additional reciprocal compensation. It is time for the Commission to require competitive carriers to comply with existing regulations, and not abuse the Commission's regulatory process to subvert prior Commission orders and regulations. Similarly, it is time for the Commission to require every competitive carrier who seeks redress from the Commission to provide evidence that they have first exhausted their state commission remedies and federal court review of any state commission decision prior to filing claims for relief with the Commission. Otherwise, filings such as that made by Sprint PCS, undermine the requirements of the 1996 Act, Commission regulations, and the due process rights of ILECs. On procedural and substantive grounds, the Commission should deny the request of Sprint PCS.

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[44] PCIA Comments at 6 ("The Sprint PCS Request indicates that state commissions have had difficulty applying the FCC's cost-based compensation principles to wireline networks, and cites state proceedings involving paging carriers in California and Washington as evidence of this fact.").

Respectfully submitted,

UNITED STATES TELECOM ASSOCIATION

/s/ ***Keith Townsend***

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Reciprocal Compensation for CMRS Providers
June 13, 2000

by

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Introduction and Summary

In a recent white paper prepared on behalf of Sprint, Bridger Mitchell and Padmanabhan Srinagesh (MS) describe a methodology for calculating the *additional costs* of terminating interconnected local calls on Personal Communications Services (PCS) networks.[45] MS argue that the application of forward-looking principles to PCS networks raises significant issues of implementation that were not considered by the Commission in its analysis of wireline networks. Specifically, they conclude that based on the Commission's rules, forward-looking traffic sensitive costs can be recovered in charges for transport and termination and, more importantly, <u>all</u> PCS network components, with the exception of handsets, are additional costs as defined by the Commission.

Apart from the proper level and nature of PCS network costs—which are important in their own right—the Commission's Public Notice raises fundamental economic issues. As the FCC points out in the *Local Competition Order*, efficiency considerations generally favor symmetric *reciprocal compensation* for interconnecting carriers based on the forward-looking cost (TELRIC) of an efficient firm.[46] As the FCC states (¶1086):

> A symmetric compensation rule gives the competing carriers correct incentives to minimize its own costs of termination because its termination revenues do not vary directly with changes in its own costs.

Symmetric rates that are based on the costs of an efficient firm provide proper economic signals to market participants, thus ensuring that competitive distortions do not arise. Symmetric rates avoid the cost-plus nature of regulation with respect to entrants' costs—with all its attendant economic distortions—that pervaded the industry prior to price cap regulation. Sprint's proposal conflicts with this basic premise and would result in losses

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[45] Bridger M. Mitchell and Padmanabhan Srinagesh, Transport and Termination Costs in PCS Networks: An Economic Analysis, April 4 2000, CC Docket Nos. 95-185, 96-98, and 97-207, referred to as (MS).

[46] *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd 15499,16025, ("*Local Competition Order*").

in economic efficiency and require extensive cost regulation of a fledging competitive industry.[47]

While the FCC rules permit *asymmetric* rates based upon a cost study in accordance with TELRIC principles, the *Local Competition Order* is silent on the nature of that study: i.e., on the legitimate economic reasons why an entrant's efficiently incurred costs might be higher than those of an efficient firm and thus require asymmetric rates. We disagree with Sprint's contention that differences in technology or service quality[48] justify asymmetric rates. In general, differences in technology or service quality do not generate legitimate differences in costs for the purpose of setting asymmetric compensation rates. Apart from distorting carriers' incentives to minimize costs, under asymmetric compensation, a wireline LEC that sends a call to a (higher-cost) PCS provider does not save in avoided costs what it incurs in reciprocal compensation payments. It is precisely this proposition—i.e., that carriers compensate each other based on the avoided costs of a fully efficient firm—that should govern reciprocal compensation and that enhances economic welfare.

Compensating carriers for transport and termination of calls that have different technological characteristics or provide different service qualities than that supplied by the originating carrier at the same rate as those of a fully efficient firm using least-cost technology to supply the same service as the originating carrier <u>will not</u> discourage these carriers from deploying their networks. Sprint's PCS service provides a fundamentally different type of service than wireline networks—specifically, it offers end users mobility which is valued differently than services from traditional wireline networks. Economic efficiency is achieved if the additional costs incurred to provide this different type of

[47] "Symmetric" reciprocal compensation rates mean that the CLEC and ILEC pay each other the same rates when one terminates traffic on the network of the other. Some ILECs argue that if they are required to pay reciprocal compensation for ISP-bound traffic, the rate should be lower for such traffic (because per-minute costs associated with longer holding times are lower, for instance) than for ordinary voice traffic. Such rates are still "symmetric" because both LECs charge each other the same rate for ISP-bound traffic and the same (higher) rate for ordinary voice traffic. The observation here (for CMRS/wireline interactions) that different technologies or different service characteristics should not warrant *asymmetric* reciprocal compensation rates is fully consistent with the proposal to charge different *symmetric* reciprocal compensation rates for traffic having different cost characteristics.

[48] The phrase "service quality" here and elsewhere describes calls having different and desirable characteristics (i.e., mobility).

service are recovered from the cost-causing agent. Therefore, an efficient intercarrier compensation mechanism must not distort: (i) the value consumers place on originating or receiving calls, (ii) the economic costs to the carrier of transmitting the call, and, most important, (iii) the market price paid by the cost-causer.

The success or failure of PCS providers and the success or failure of different types of PCS services should depend solely on how customers value those firms and services in the marketplace, not on the type of intercarrier compensation between network providers. To the extent that some PCS services are provided that would not be provided but for the existence of asymmetric rates, economic efficiency is reduced. The FCC and State Commissions, having already experienced the economic distortions and rent-seeking behavior associated with reciprocal compensation for ISP traffic, should avoid setting in place an intercarrier compensation system for wireless traffic that would distort local exchange competition, support higher cost carriers, and create incentives to generate uneconomic traffic.

In addition, from a practical perspective, we dispute MS's depiction of the PCS network and its implication that technological differences require asymmetric rates. MS's description of the technological differences between the wireline and wireless world—and the nature of the cost differences that result—contain numerous errors. It is insufficient to examine solely whether a facility is shared or dedicated—as MS do—in determining the *additional* costs to transport and terminate traffic that the facility imposes. There are many costs that MS identify as primarily traffic sensitive (TS) that are indeed not TS. MS describe a simple model of the cost structure of wireless—handsets are non-traffic sensitive (NTS), everything else is TS. It would be hard to be more wrong. Handsets have significant TS costs (not borne by the carrier). The infrastructure network has massive NTS costs: as we describe below, a simple model indicates that the vast majority of the infrastructure costs are NTS costs.

While the recommendations put forth by MS appear to be straightforward and simple to implement, the opposite is the case. Because of the added economic and engineering complexities of PCS networks—which are for the most part overlooked by MS—the correct solution is more complex. The end result is that following Sprint's

recommendation will open the door to far more extensive cost-based regulation of a thriving competitive industry that is at the forefront of the information age and is poised to provide immense value to consumers through the burgeoning market for such broadband services as wireless web browsing. Additional regulation of the wireless industry will not improve economic efficiency and is not consistent with the public interest. A better solution would be to establish reciprocal compensation based on symmetrical rates and, to the extent carriers such as Sprint PCS desire to provide a different quality of service, permit them to recover those additional costs from the cost causer through some other rate mechanism thus ensuring that only those services that consumers value and are willing to pay for are provided.

Economic Efficiency Considerations in Wireline-PCS Local Interconnection

Section 252(d)(2) of the Telecommunications Act of 1996 requires that prices for the "transmission and routing of telephone exchange service and exchange access" be compensatory:

> such terms and conditions [must] provide for the mutual and reciprocal recovery by each carrier of costs associated with the transport and termination on each carrier's network facilities of calls that originate on the network facilities of the other carrier…

and based on incremental costs:

> such terms and conditions [must be] determine[d] on the basis of a reasonable approximation of the additional costs of terminating such calls. [emphasis supplied]

In addition, Section 252(d)(1) provides that interconnection rates should be based on the cost of providing interconnection, should be nondiscriminatory, and may include a reasonable profit. To implement this requirement, the FCC, in its *Local Competition Order*, applied the interconnection provisions of the Act only to traffic within a local exchange[49] and determined that the cost principle for determining the price of

[49] 47 CFR 51.305 (b) limits application to carriers providing "telephone exchange service," which is defined in 47 CFR 153 (47) as service within a telephone exchange. The rules for pricing reciprocal compensation for transport and termination of local telecommunications traffic are found in Subpart H of

interconnection should be its version of total service long-run incremental cost, TELRIC, as described in 47 CFR 51.503 and 505.

Economic efficiency is best achieved through symmetric reciprocal compensation rates.

In general, the FCC established symmetrical rates for reciprocal compensation based on the incumbent LEC's incremental costs (§ 51.705(a)). It permits the state commission to establish asymmetrical rates for transport and termination of local telecommunications service only if:

> the carrier other than the incumbent LEC (or the smaller of two incumbent LECs) proves to the state commission on the basis of a cost study using the forward-looking economic cost based pricing methodology described in §§ 51.505 and 51.511 of this part, that the forward-looking costs for a network efficiently configured and operated by the carrier other than the incumbent LEC…exceed the costs incurred by the incumbent LEC…, and, consequently, that such that a higher rate is justified. [§ 51.711(b)]

In its discussion of symmetrical rates, the FCC observes that symmetric compensation gives the CLEC correct incentives to minimize its cost of termination [*Local Competition Order* ¶ 1086] and will give CLECs "reasonable opportunities" to enter the local exchange market [¶ 1088]. Indeed, basing reciprocal compensation on the costs of the most efficient supplier is precisely what would occur in unregulated, competitive markets, in which prices of services are driven towards the cost of the most efficient supplier, not the cost incurred by any particular entrant. The principal problem with permitting higher-cost firms to charge higher interconnection rates would be an immediate reduction in economic welfare because service would be provided by a firm whose costs exceeded those of an efficient firm. This loss in welfare is classified by economists as a "first-order" reduction in economic efficiency because scarce resources are wasted on every unit of output supplied by the higher-cost firm.[50] In competitive,

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Section 51, which restricts reciprocal compensation to "telecommunications traffic…that originates and terminates within a local service area established by the state commission…" (§51.701(b)(1).

[50] In contrast, efficiency losses from pricing services above incremental cost are classified as second-order welfare losses because efficiency is only lost on the units of demand repressed by the excess of price above

unregulated markets, entry by suppliers whose costs exceed those of incumbent firms would generally not occur, and customers would not have to pay the higher market price that would be necessary to sustain entry by the higher-cost firm.

Moreover, Sprint's proposal would require detailed cost regulation of wireless costs similar to the cost-plus type of regulation that dominated the industry prior to price cap regulation. This would require state regulators to determine the efficiently-incurred wireless investments needed to provide service, the forward-looking return on capital required and other forward-looking expenses. Wireless technology and costs are changing rapidly, and a TELRIC study based on Sprint PCS's current equipment and practices would have to be repeated frequently to reflect the on-going, changing costs of a currently-efficient carrier.

Asymmetric prices also violate a basic premise underlying intercarrier compensation: namely, that carriers' cost savings roughly offset their reciprocal compensation payments. With symmetric reciprocal compensation rates between carriers providing the same service, each carrier saves in avoided costs what it pays out in reciprocal compensation. Even if traffic is unbalanced, in this situation, neither carrier receives a windfall or loses money because it is obliged to terminate calls originating from other networks. Under *asymmetric* reciprocal compensation, however, a wireline ILEC that sends a call to a (higher-cost) PCS provider would save less in avoided costs than it would receive from reciprocal compensation payments.

Exceptions for Asymmetric Rates

While the FCC permits firms to petition for asymmetric rates, the FCC is silent on the nature of the legitimate differences between ILECs and entrants that would justify asymmetric rates. The Telecommunications Act requires that charges recover:

> costs associated with the transport and termination on <u>each</u> carrier's network facilities of calls that originate on the network facilities of the other carrier [§ 252(d)(2)(I), emphasis added]

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cost, i.e., on the units of demand which customers would have been willing to consume at a price equal to the cost of supplying those units of demand.

which suggests that carriers should be compensated for their costs. However, the FCC is careful to warn state commissions [*Local Competition Order* ¶ 1089] that the asymmetrical costs in question must be those of "efficiently configured and operated systems" calculated giving "full and fair effect to [its] economic costing methodology". Apparent differences between the TELRICs of entrants and ILECs which stem from different assumptions about traffic volumes, depreciation lives, fill factors or costs of capital should not be treated as real differences: to be consistent with the FCC's TELRIC concept, the forward-looking economic cost of terminating traffic should be measured using the parameters of an efficient firm. For example, small firms that cannot achieve scale economies must compete at a cost disadvantage in competitive markets, and nothing in a competitive market permits a firm with a higher cost of capital to sell its wares at a higher price than a firm having a lower cost of capital. Why should ILEC subscribers pay more to terminate calls with a high-cost carrier, even if the cost differences are due to size or risk?

In theory then, how could the forward-looking economic cost of an efficient supplier be different for an entrant and an ILEC, particularly if they must be calculated using the FCC's TELRIC methodology? While the FCC provides little guidance on this issue, one possible answer is that an entrant may choose to serve a limited geographic area or a particular set of customers, whereas the ILEC's costs are averaged over all customers. In that case, an entrant having costs that are different than the ILEC's average termination cost is not necessarily inefficient. Therefore, legitimate reasons why an entrants' TELRIC differs from an ILEC's TELRIC include geographic or customer-type specialization by CLEC—as long as its costs of serving that segment are no higher (for those segments) than those of the ILEC which are averaged into its single TELRIC.

Differences in costs due to differences in technology should not <u>necessarily</u> be reflected in TELRIC.

In the FCC's definitions in the *Local Competition Order*, TELRIC is the idealized cost of an efficient supplier. Both in the *Order* and in economic theory, that cost concept is independent of the actual experience of the firm: what is measured is the expected response of an <u>efficient</u> firm to a change in demand equal to the total market demand, not

what the response of any incumbent firm actually is. Firms whose costs of purchasing, installing and maintaining equipment are higher than necessary should not be rewarded through reciprocal compensation at any higher level than a competitive market would reward them, which would be at the cost of an efficient firm to provide those functions.

Similarly, if two firms provide the same service using different technologies, a competitive market would not compensate them at different rates simply because the costs of their technologies differ. Choice of technology is no different from any other economic choice a firm makes, and TELRIC calculations should not automatically ratify a firm's technological choices and insulate it from application of an efficiency standard. For example, an ILEC that can serve rural areas more cheaply with wireless technology (fixed or mobile) should use wireless costs in its mix of services for its TELRIC calculation. Symmetrically, if it would have been cheaper for a wireless CMRS provider to transport and terminate calls using wireline technology, then the TELRIC for the wireless carrier to terminate the same quality of call as the ILEC originated should be the wireline TELRIC. That is, if the forward-looking cost to transport and terminate a call is higher for an efficient CMRS provider because its technology generates a higher-quality service, that additional cost should not be recovered in reciprocal compensation, as discussed below. If the efficient, forward-looking cost of an efficient CMRS provider is <u>lower</u> because it provides a lower quality service, the FCC requires the CMRS provider to supply a TELRIC study and to recover no more than the TELRIC of the particular service it supplies:

This treatment of reciprocal compensation is reflected in §51.711(c) of the Commission's rules:

> Pending further proceedings before the Commission, a state commission shall establish the rates the licensees in the Paging and Radiotelephone Service…, Narrowband Personal Communications Services, …, and Paging Operations in the Private Land Mobile Radio Services…may assess upon other carriers for the transport and termination of local telecommunications traffic based on the forward-looking costs that such licensees incur in providing such services, pursuant to Secs. 51.515 and 51.511.

The Commission's reasoning is set out in ¶1092-1093 of the *Interconnection Order*:

> Paging is typically a significantly different service than wireline or wireless voice service and uses different types and amounts of equipment and facilities…Using incumbent LEC's costs for termination of traffic as a proxy for paging providers' costs, when the LECs' costs are likely higher than paging providers' cost, might create uneconomic incentives for paging providers to generate traffic simply in order to receive termination compensation…we direct states…to establish rates for the termination of traffic by paging providers based on the forward-looking economic costs of such termination to the paging provider…

Differences in service qualities should not generate differences in costs for setting asymmetric compensation rates

There is another important economic issue that arises when one examines the proper intercarrier compensation mechanism between wireline and CMRS providers. When two carriers interconnect and provide fundamentally different service qualities or characteristics—thus increasing the efficiently-incurred termination costs of the carrier providing a higher quality service—reciprocal compensation is inefficient and would not likely be the type of compensation mechanism that arises between two networks in undistorted competitive markets. If a carrier chooses to provide a higher quality service it should not be compensated for terminating a call that originated on a standard-quality network—for which customers are paying standard quality prices—at the cost of a higher-quality call. Interconnection between wireline and CMRS providers is one such example of a standard-quality network (wireline) interconnecting with a higher-quality network (CMRS).

While transport and termination services provided by either the wireline or CMRS provider are similar in function—i.e., using network elements to ensure that the call gets delivered from the point of interconnection to the end user—there is a significant difference that affects the optimal level of intercarrier compensation. A call on a wireline network is fundamentally different in many respects than a call on a CMRS network. From the customer's perspective, all calls are not the same and a minute is not a minute. For example, there are differences in quality and characteristics that include technical characteristics (e.g., noise and bandwidth) speed (e.g., normal, store-and-forward), and information content (e.g., notification, audio, video). These differences must be taken

into account when determining the optimal level of intercarrier compensation between two networks.

Reciprocal compensation spreads the cost of terminating traffic on both networks over all users. When both networks provide similar type services—and thus generate similar efficiently-incurred costs—reciprocal compensation is efficient. However, when subscribers originate traffic having expensive qualities or characteristics—as is the case when a wireline customer places a call to a CMRS provider—reciprocal compensation is inefficient because customers do not face higher prices to reflect the higher cost they impose on the combined networks. When prices fail to reflect costs, economic distortions arise. An example illustrates this point.

Imagine a climber ascending Mt. McKinley in Alaska—or any mountain range in the United States—and having a mobile handset with service provided by a CMRS provider. In the extreme, the climber is on top of Mt. McKinley and uses Inmarsat, Globalstar, Iridium or like service. Clearly, the service provided by these carriers is different from the service provided by the wireline carrier. Before it fell into bankruptcy, the costs of terminating the average call on Iridium were much higher than the costs of terminating the average call on the wireline network. Under such conditions, is reciprocal compensation based on asymmetric rates—i.e., Iridium would have been permitted to charge higher termination rates than the wireline network—optimal and does it provide correct economic signals to market participants?

The answer is a clear no. The climber is paying Iridium because it is important for some people to be able to receive or send calls from anywhere on the face of the earth, e.g., on the top of Mt. McKinley. Some people value the ability to receive or send calls anywhere on the face of the earth more than the economic costs incurred to provide this service. Since these consumers are willing to pay at least the economic costs, economic efficiency is increased whenever they are able to purchase the service. Moreover, there are some callers that originate calls to Iridium's subscriber that place a high enough value on the call that they also would be willing to pay the economic costs of the call—again, economic efficiency is increased. But, just as important, there are customers who do not value the ability of receiving or sending calls anywhere on the

earth more than the economic costs incurred to provide the service. Likewise, there are callers who do not place a high enough value on calling a friend on Mt. McKinley and are not willing to pay the economic costs of such a call. Intercarrier compensation for transport and termination of such calls must not distort these decisions.

Reciprocal compensation based on asymmetric rates distorts market outcomes because ILEC subscribers who place calls to friends on the top of Mt. McKinley do not face a price that fully reflects the cost to transport and terminate the call. More calls are made by such customers than is socially optimal. And since reciprocal compensation spreads the cost of terminating traffic on both networks over all users, ILEC customers who do not cause any of the costs of terminating the traffic on the higher cost network are made to pay for a portion of those costs. In addition, to the extent that reciprocal compensation with asymmetric rates permits Iridium subscribers to pay lower subscription and usage rates than would otherwise be the case, too many calls are placed and resources are used inefficiently. Fundamentally, the danger of reciprocal compensation based on asymmetric rates for higher quality networks is that such a compensation mechanism may support technologies or services that would not be able to survive if left to market forces.

What then is the best form of intercarrier compensation between two networks of different quality service? Economic efficiency is increased if the additional costs incurred to provide higher quality service are recovered from the cost-causing agent. Basing compensation on symmetrical rates and having the additional costs recovered from the cost-causing agent provides both carriers with optimal incentives to deploy innovative technology and provide higher quality service. Moreover, it also ensures that only those services that consumers sufficiently value will be provided by market participants.

Engineering and Network Characteristics of Wireless Systems

If it were determined (unwisely, in our view) to permit wireless carriers to charge asymmetric reciprocal compensation rates for transport and termination based on their costs, we would then be compelled to understand their costs of handling "additional

traffic." The authors of the Charles River Associates study (CRA) present their view of the cost structure of wireless telephone systems clearly. For example their Figure 1 shows that they regard everything except the handset and traffic sensitive.

CRA's

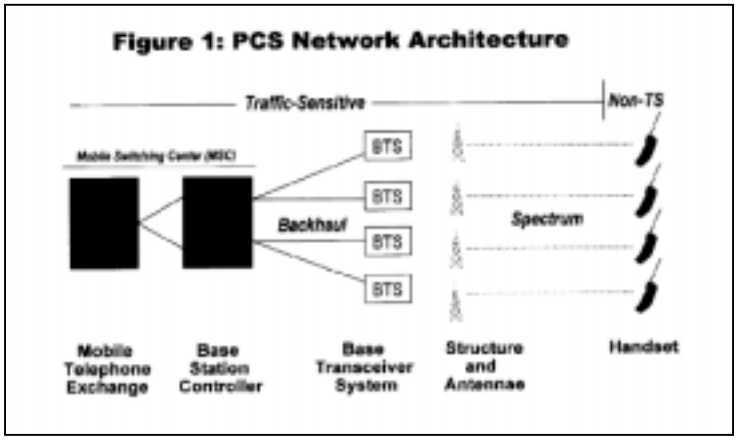

Figure 1

Figure 1

Similarly, they state,

> Analyzing each component of a PCS network, we conclude that the costs of all components, excepting those of PCS handsets, are additional costs as defined by the Commission.

There are profound flaws in the CRA analysis. This section has three parts. First, we address the services offered by modern wireless systems, such as Sprint PCS, and establish that call termination is just one of many services that is provided over the wireless network. Second, we discuss the basic functions of a wireless network and show that much of the network infrastructure is required in order to provide the option of placing and receiving telephone calls or Internet access. Third, we look in more detail at the various elements of a wireless system, identify the extent to which the costs of each subsystem are caused by additional usage, and provide an estimate of the fraction of the costs of a modern wireless network, such as Sprint's, that are due to usage rather than to other activities. We follow CRA's partitioning of the costs into the carrier's network (hereinafter infrastructure), radio licenses or radio spectrum (spectrum) and subscriber units (handsets).

Wireless Services

Wireless carriers provide a variety of services, including voice telephone service, short message services, Internet access, automobile services, and data communications. The same fundamental infrastructure is used for providing all of these services.

For example, in recent press releases, Sprint has said,

> Sprint PCS Wireless Web offers customers instant access to news, weather, shopping, stocks, sports, email and other select Internet information directly on the minibrowser of their Internet-ready Sprint PCS Phone.[51]

and,

> Sprint PCS, Barnes & Noble Form Mobile Shopping Pact—Sprint PCS and Barnes & Noble.com today announced the nationwide availability of Barnes & Noble.com Internet shopping services on the Sprint PCS Wireless Web. Sprint PCS, the nation's largest and fastest-growing 100 percent digital nationwide wireless network, is now providing customers with another choice for nationwide access to two-way Internet shopping via the Sprint PCS Wireless Web with one of the world's largest Web sites, Barnes & Noble.com.[52]

For an extra $2.95 per month, Sprint also offers a service, called Roadside Rescue, that provides battery service, towing, gasoline, and other help with automobile failures on the highway. In describing how to use Roadside Rescue, Sprint says,[53]

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[51] Sprint Press Release, *Sprint Launches Advanced Wireless Service—Including the Sprint PCS Wireless Web— in Charleston, SC***.** CHARLESTON, SC, May 19, 2000.

[52] Kansas City, MO., May 2, 2000.

Just dial **#ROAD** from your Sprint PCS Phone. Or dial a toll-free number from any other phone.

As long as your Sprint PCS Phone is with the vehicle that needs help, service costs are covered.

Figure 2 Sprint Promotional Materials on Roadside Services

Wireless telephone services can be divided into two major components or elements—providing the **option** to use the service and actual **usage**. Many consumers buy wireless telephones and subscribe to wireless service in order to gain access to calling at many locations. Being able to call 911, AAA or a tow-service in the case of a highway emergency is one example of such an option demand. A person buying wireless service for such emergencies desires the option of calling at many locations where he or she is likely to travel. The subscriber's home neighborhood is one such location—but so too are remote highway locations, miles from the nearest pay telephone.

Similarly, advocates for victims of domestic violence support the provision of wireless phones to abuse victims to give them the option to call. The Wireless Foundation states,

> "The national Donate a Phone campaign collects wireless phones to benefit victims of domestic violence. In the hands of a victim, *these phones are a lifeline, enabling them to call for assistance when faced with an emergency situation*." [54]

GM offers its OnStar service based on the installation of a GPS receiver and a wireless phone in automobiles. GM says,

> Current OnStar services include automatic notification of air bag deployment, stolen vehicle tracking, OnStar MED-NET, AccidentAssist, emergency services, roadside assistance with location, remote door unlock, route support, OnStar concierge, and convenience services such as location of hotels, restaurants, gas stations and other points of interest.[55]

The value of OnStar services such as remote door unlocking and automatic notification of air bag deployment depend on the widespread coverage by the wireless

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[53] http://s3.sprintpcs.com/services/ie.asp?target=header_learn.html

[54] http://www.wirelessfoundation.org/12give/ (emphasis added). See also the website for the National Coalition Against Domestic Violence at http://www.ncadv.org.

[55] See http://general.motors.xs2.net/news/events/sema99/onstar.htm.

systems providing the communications infrastructure to the OnStar system. In a service such as OnStar or for customers who buy a wireless phone only for emergency calling, consumers depend on the ability to place calls in many locations. However, such customers are not likely to actually place calls in those locations.

Wireless Voice Services

The simplest wireless phone service is rendered to users who pick up their handset, dial the operator and charge a call on a credit card. This arrangement does not require that the user have a preexisting account with the wireless carrier (although it does require does require a credit card account). There are no monthly subscription fees. We are aware of suggestions that, for emergency purposes, one should keep an old cellular phone in the trunk of each car, just as one keeps tools, flares and a flashlight. A limitation of this arrangement is that the user does not have a telephone number and can't receive calls. In addition, usage costs are high because of the substantial transaction costs.

More common is wireless services where the user subscribers to wireless service, calls can be dialed with reduced transactions cost (e.g., without a manual credit check), and incoming calls are delivered to the handset. In order to provide such presubscribed services and to permit customers to travel around the country and receive service far from their home locations, wireless service require substantial underlying facilities. For example, the wireless system keeps information on every handset in a database called the Home Location Register (HLR). Data on all handsets from distant systems that have roamed into a system's service area are kept in a Visitor Location Register. An Authentication Center assists with checking to see that handsets are not clones or otherwise fraudulent.

Overview of a Wireless Telephone Call

Modern wireless networks are systems of enormous complexity and subtle beauty. Consider the process of placing a telephone call in a modern IS-95B network such as that run by Sprint. The process begins when the consumer turns on his or her handset. Upon power-up the handset searches for a wireless system. It begins by searching for a CDMA Pilot Channel and acquiring the signal of that channel. Once the

handset finds a Pilot Channel and acquires it, the handset then finds the Synch Channel corresponding to that Pilot Channel and obtains system configuration and timing information from the Synch Channel. If the system configuration information is for a wireless system that the handset is authorized to use, the handset then begins the registration process. If the handset recognizes that it is not authorized to use the wireless system, it begins searching for another Pilot Channel.

After recognizing that it can proceed to registration, the handset sends a message to the base station on one of the cell's Access Channels alerting the wireless system to the presence of the mobile unit.[56] The handset and the wireless system then have a brief dialog during which the wireless system verifies that the handset is permitted to use the system and records in one of the Location Registers which cell is serving the handset. The system transmits to the handset various parameters, such as how far the handset can travel before it must reregister. The handset stores these parameters and then goes to sleep. The handset then wakes up at prescheduled times and listens on the Paging Channel to see if there are any incoming messages for the handset. If the user pushes the power off button on the handset, before the handset turns itself off, it notifies the wireless system that the handset will powering off. This is another form of registration—really of deregistration. After getting such notification from the handset, the system updates the entries in the Location Registers. Similarly, if the handset travels into new cells or if sufficient time passes, the handset will register again. Thus, the information in the Location Registers can be kept up-to-date and properly reflect the status of each handset.

Once the handset has registered, it is ready to handle traffic. If the user now dials a number on the handset and pushes send, the handset will use an Access Channel to notify the wireless system that the handset wishes to call that number. The system and the handset will then exchange a series of messages and user communications will be established over Traffic Channels.

The process for an incoming call is similar. When a call comes in to the mobile switch, it interrogates the proper Location Register to determine which cell is serving the

[56] The Access Channel is a subdivision of the upstream (mobile-to-base) or reverse radio channel. Information about the Access Channels is broadcast to all handsets by the base station using the Synch Channel.

handset. It then sends a message to the handset over the Paging Channel from that cell. The handset receives the message, engages in a short dialog with the mobile switch, and begins the process of notifying the user of an incoming call (i.e., the handset rings and displays caller ID information). If the user answers the call, communications are established.

Defining the Cost Divisions

The first question that arises is, "What is the proper base to measure the added costs of carrying traffic?" CRA considers the base to be no network at all. Then, they assign all costs of the network to traffic. Their theory appears to be that if there were no traffic there would be no network, so the network is traffic sensitive. However, this is incorrect as a matter of both engineering and economics. As discussed above, some nontelephony uses of wireless networks—for example the OnStar notification of the fact of airbag deployment and the geographic location of that deployment or browsing the web—require the same infrastructure as do telephone calls. Similarly, providing the option to call—the ability to place calls at many locations where one will never actually call—is an important service.

We consider two different levels of network operation or function. The first category of network activity, which we will call *option costs* (corresponding more or less to non-traffic sensitive [NTS] costs)—consists of all the costs that must be incurred in order to give a subscriber the capability or option of placing and receiving calls. We also consider a second category of network activity—which we call *usage costs* (corresponding to traffic sensitive costs)—consisting of all the added costs that are incurred when the network is actually carrying traffic. For example, the entry of information describing a subscriber's equipment (e.g., the electronic serial number [ESN], or equipment capabilities, passwords, phone numbers, etc.) into databases necessary to permit calling is a non-traffic sensitive cost. Just consider information about the telephone number used with the phone. That number must be entered into both the carrier's database and the subscriber unit. The costs of the data entry and of the data storage do not vary with usage. Rather, they are incurred in order to permit usage. These costs are similar to the costs of the loop or the line card in wireline telephone service in

that they must be incurred before the users phone can even ring—let alone carry a conversation. The table below lists some illustrative option costs and usage costs for both wireline and wireless telephony. Corresponding entries are paired for the two systems. This table is illustrative only, and many wireless costs are not considered.

TABLE 1
Comparing Cost Structures of Wired and Wireless Telephony

Wireless		Wireline	
Option Costs	Usage Costs	Option Costs	Usage Costs
Handset except for battery	Shortened battery life	CPE	Wear and tear on CPE caused by use
Pilot carrier transmitted by CDMA base Station		Loop	
Home Location Register		Per-subscriber entries in Class 5 switch	
	Capacity cells		Tandem switches
	Traffic trunks to LEC		Traffic trunks between central offices

Handset

Let us address the entries in the table as an introduction to a more detailed consideration of wireless system costs. As CRA recognizes, the wireless handset is necessary for wireless communications.[57] Handset usage, talking on telephone calls, imposes costs in the form of reduced battery life. Current technology compact, high energy-density batteries (such as Li-ion, or NMH) can only be recharged a finite number of times (typically a few hundred times). Conversational usage cuts battery life.

[57] CRA asserts that the handsets are NTS costs. Of course, strictly speaking, in the usual run of events the carrier does not even incur handset costs—because the handsets belong to the customer not the carrier. Handsets are NTS costs the same way a customer's suit (with its pocket essential for transporting and storing the handset) or purse (capable of storing the handset) are NTS costs. A more reasonable view of the world is to focus on the carrier's network and the costs of that network.

Consequently, usage increases battery costs, and handset costs are usage sensitive. For example, a $50 battery good for 200 charges with 1.5 hours of talk time per charge, would cost 0.3 cents per minute of conversational use. (See, e.g., http://www.cellular-battery.com/qualcomm/index.htm or http://www.kyocera-wireless.com/thin/accessories.html.)

The CRA assertion that handset costs are not traffic sensitive is incorrect. If one separates the nonbattery portion of the handset from the battery portion, then the CRA assertion is correct. The wireless handset (ignoring the battery) corresponds to the wireline telephone user's telephone instrument and inside wiring.

The Pilot Carrier

Sprint operates a CDMA system in the PCS bands in the United States. This system was originally standardized as ANSI-J-STD-008-1996 (now replaced by TIA IS-95B).[58] In our discussion we discuss the characteristics of wireless systems using examples drawn the CDMA technology.[59]

CDMA systems transmit multiple wideband radio signals in a single 1.25 MHz wide band of frequencies. The IS-95 design divides up the outbound signal from each base transmitter into 64 separate channels, each associated with a separate Walsh code (Walsh-0 through Walsh-63). Although not strictly correct, it can be helpful to think of each of these Walsh codes as a separate frequency or channel transmitted from the base station.[60] Each CMDA cell transmits a Pilot Carrier on Walsh-0. That pilot signal consists repeated transmissions of the Walsh-0 waveform with no information modulation. Mobile units use the pilot signal to find the base station and to synchronize their operation with the base station. Without the pilot channel, mobile units would be

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[58] These standards are not terse. J-STD-008 is more 3.25 inches thick when printed (double sided) on standard office copy paper. We estimate that it runs to about 800 sheets or 1,600 pages.

[59] Although the standards are the authoritative source for specifying the technology, other documents are more accessible. Two good references on CDMA are David J. Goodman, *Wireless Personal Communications Systems*, Addison-Wesley, Reading MA, 1997, and Andrew J. Viterbi, CDMA: *Principles of Spread Spectrum Communication*, Addison-Wesley, Reading MA, 1995.

[60] Mathematically speaking, the Walsh functions provide a set of nonsinusoidal but orthogonal basis functions for information transfer from each cell site.

unable to operate. But, the pilot channel does not carry any traffic—rather it acts more like a navigational beacon showing the handsets where to look for signals.

The pilot signal corresponds, at least in part, to the loop plant of a wireline carrier. The pilot signal is always there and is just the same whether the cell is carrying no calls, 1 call, 10 calls or 30 calls.

Home Location Register

Wireless systems maintain several databases that are needed to manage calling. One of these is the Home Location Register (HLR). A wireless systems' HLR contains the subscription information about each handset served by the system. For example, an HLR might contain an entry denoting that, when the handset is turned off or busy, calls should be forwarded to voice mailbox.[61] Or the HLR may contain information indicating that calling is restricted to certain classes of numbers. The need to store such information is not a traffic-sensitive function. Rather, such information is needed to provide the option of using service. The speed of the processor needed with the HLR may well be a function of usage. Each call generates inquiries to the HLR; more calls mean more processing at the HLR. However, other events, such as turning a handset on or off, also generate transactions at the HLR and require processor capability. HLR processor capacity is consumed even in the absence of any telephone conversations. For example, the HLR records whether the handset is currently turned on, and if turned on, which base station is serving it.

These features of the HLR are similar to features of the wireline class 5 switch. For example, a class 5 switch has a database with entries for each line. One of the entries in this database is a specification of the presubscribed interexchange carrier (PIC code) for that subscriber. Another possible entry database in the class 5 switch is the number to forward a call to if the subscriber's line is busy. As in the wireless case, these entries are needed to provide the option for service; their costs do not vary with the number of calls.

[61] http://www.nacn.com/industry/industry_faqitem5_frame.htm contains a discussion of support of IS-41 features across various vendors HLR products.

Coverage Cells versus Capacity Cells

Wireless systems have two types of cells—coverage cells and capacity cells. Cells serving some locations are installed in order to permit consumers traveling to or through that location to continue their conversations. For example, a highway may pass through a short canyon that blocks radio signals. A cell may be installed in order to provide service in the canyon so that calls made by people in cars passing through the canyon are not lost. The cell may never carry more than two or three calls and may only serve a typical call for a minute, but it is necessary to support mobile use of the service. Cells along highways outside of town, in low-density areas, and in resort areas are often such coverage cells. Sprint's PCS licenses contain an obligation to provide coverage to population in the license areas. See 47 CFR 24. Thus, coverage may also be provided to meet regulatory requirements as well as market requirements.

For example, Sprint provides wireless coverage in Hayden and Athol, Idaho.[62] See Figure 3 below which was taken from the Sprint PCS website. Hayden has a population of about 7,500 and Athol a population of only 500. Athol is a small town on State 95. Wireless subscribers may strongly value the option of placing and receiving calls there. But, given the limited population of Idaho's Athol, it seems unlikely that cells have been split there to increase

capacity.[63] Rather, it seems far more likely that the Sprint facilities there were installed to provide the option of calling.

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[62] http://s4.sprintpcs.com/learn/coverage_intro.asp.

[63] According to the U.S. Gazetter, Idaho's Athol is neither the biggest or smallest Athol in the U.S. (measuring by population).

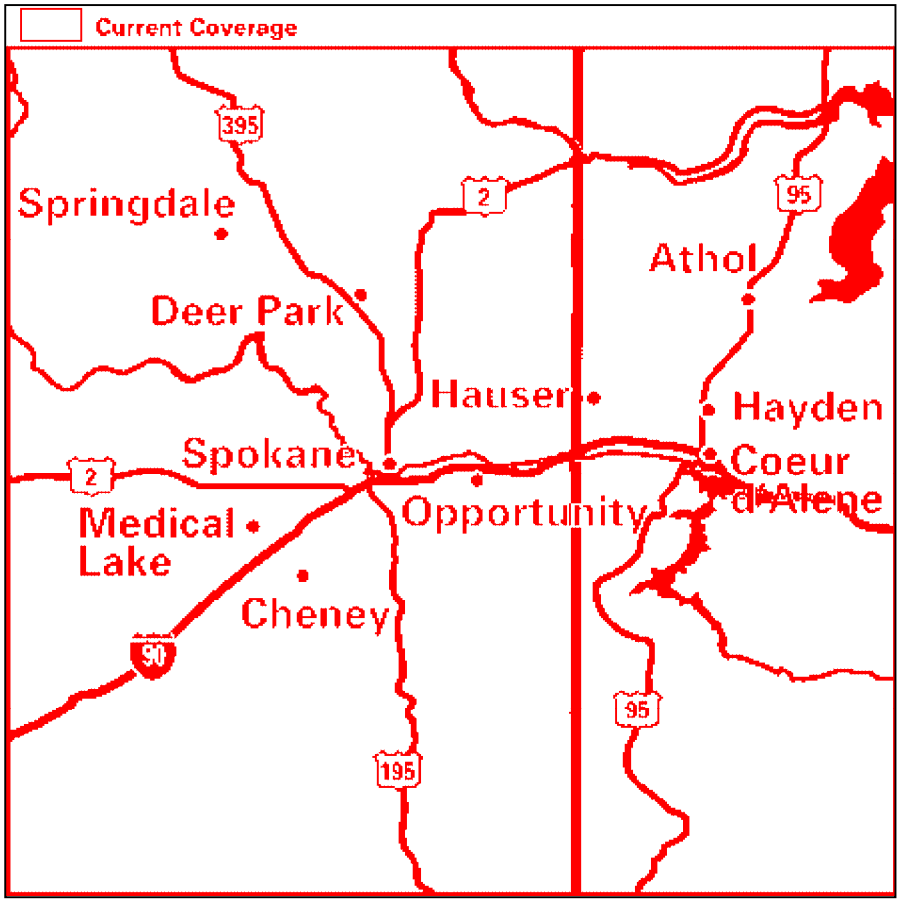

Figure 3 Sprint Coverage Near Spokane Washington and Coeur d'Alene Idaho.

In contrast, in urban areas peak-hour traffic may exceed the capacity of a minimal coverage cell. In that case, additional radio capacity can be added at the cell site to expand the capacity of the cell. Ultimately, all the possible radio channels available to a carrier are exhausted, and two or more smaller cells must replace the cell (a process called cell splitting). The additional costs incurred by adding radio capacity at a cell site or by cell splitting are purely costs associated with usage—even though a new cell also must have a pilot carrier and other features associated with permitting handsets to make and receive calls. We expect that cell splitting, for capacity reasons, will be rare in a network such as Sprint's.[64] Sprint has PCS licenses for both 30 MHz and 10 MHz blocks—with many of their licenses in major urban areas being 30 MHz licenses. A

[64] Cell splitting may occur to improve service quality or coverage. For example, if lost calls often occur on a stretch of highway between two cells, an intermediate cell may be added to provide improved coverage in the area where the calls are often lost.

single CDMA RF channel requires 2.5 MHz (1.25 MHz in each direction) and can carry about 40 conversations. Thus, 30 MHz can support at least 10 CDMA RF channels (there may be some loss of capacity due to requirements to protect adjacent bands) and one cell can support at least 400 active conversations. CDMA technology also permits reusing RF channels in multiple sectors from a base station. Typically, base stations support either 3 or 6 sectors. A 6-sector base station, using 10 CDMA RF channels in each sector could support 2,400 conversations. This is substantial capacity and shows how much growth is possible before cell splitting is required.

Traffic Trunks to the Wireline LEC

A cellular carrier will have trunks connecting its switching center to the switching center of the local wireline carrier. These trunks are sized to match peak-hour traffic. It is reasonable to allocate the costs of these trunks to usage. Such costs can be compared to the costs of wireline interoffice transport—which is also allocated to usage.

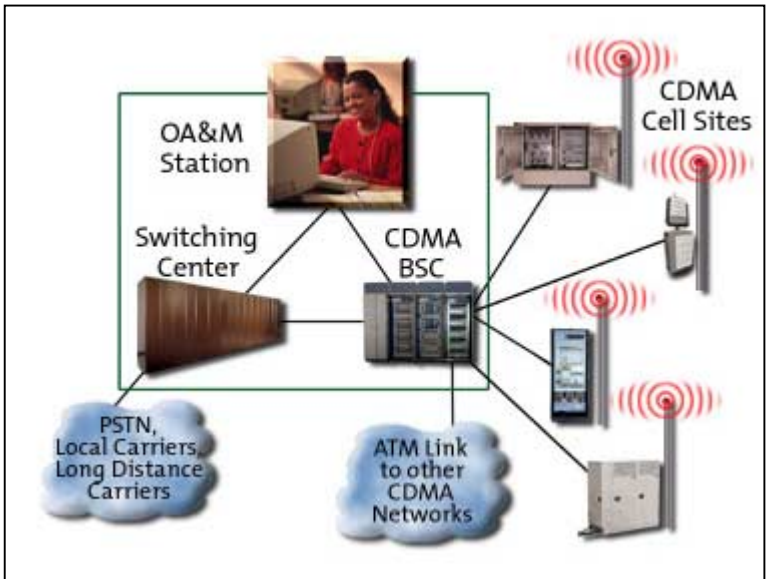

Figure 4 **CDMA System Diagram from Nortel**

Classification of Wireless Infrastructure Costs

With this introduction to the principles of classifying wireless system costs into option and usage costs, we will now turn to a detailed examination of the costs of a modern CDMA PCS system and the proper classification of those costs. The Figure above shows a diagram of a CDMA wireless system. We attempted to follow, as much as possible, the notation and usages from the CRA study. We divide the wireless system infrastructure into the following elements: Switching Center (SC), Base Station Controller(s) (BSC), Backhaul, Signalling, Base Transceiver System (BTS), and Structure and Antennas. Our discussion here is somewhat illustrative. For example, we collocate the wireless switch with the HLR and the authentication center at the switching center. Such collocation need not be the case. If the MSC and HLR are not collocated, then the cost of the communications link between the MSC and the HLR is incurred, at least in part, to provide the option for calling.

Switching Center

The switching center contains the Mobile Switching Center (MSC). In the analog cellular world, the MSC was known as the mobile telephone switching office (MTSO). Also located at the switching center are the Equipment Identity Register (EIR), the Home Location Register (HLR), the Visitor Location Register (VLR), and the Authentication Center (AC).

The MSC must be connected to other switches to exchange both voice traffic (traffic channels) and control information (signalling channels). The MSC is also connected to the BSCs, the HLR, and the VLR. The HLR is connected to both the MSC and the AC. The Figure above illustrates this architecture, which follows the reference model in IS-41. The MSC is the mobile switch. It controls the process of call setup,

routes traffic to the appropriate cells, and controls the process of taking down calls. It also maintains the HLR and VLR entries for handheld units.

Signalling system

The MSC is connected to other switches both wireless and wireline using Signalling System 7 (SS#7) in order to exchange control information. For example, when a handset attempts to register in a distant wireless system, that wireless system sends a message to the handset's home system, to obtain the information necessary to verify the validity of the handset identification information and other functions. Similarly, when an incoming call comes from a wireline carrier, the wireline carrier sends information about the call to the wireless carrier over the signalling system. Such communications between wireless systems are essential in limiting fraud.

BSC

The BSC provides many of the functions one normally associates with a base station.[65] For example, it is the entity that formats messages to handheld units directing them to change from one base station to another. The BSC manages handset registration, call setup, and handoff, among other functions.

Backhaul

The BSCs are connected to the BTSs (the radio equipment at the cells sites) through transmission systems. These transmission systems are called Backhaul Systems because they carry traffic back from the cell sites to the wireless network. Typically backhaul systems run from the cell sites to BSCs. Backhaul circuits carry the information used for registration of handheld and other control functions as well as the voice traffic to and from each cell.

Some backhaul costs must be incurred to support registration and other administrative functions. Typically, backhaul capacity comes in lumps such as the DS-1 service, available from many carriers, that provide a payload of 1.536 Mbit/sec. Microwave systems usually deliver more capacity than this. A typical low-capacity microwave system delivers about 6 Mbit/sec.

[65] For a description of a BSC, see http://www.ericsson.se/cdmasystems/bsc_home.shtml.

CDMA systems represent speech in a compressed form that occupies about 6,000 bits per second (on average) for an active speaker. Thus, a DS-1 with 1.5 Mbit/sec of capacity can carry about 250 conversations. For practical purposes, it is more appropriate to reserve capacity for the administrative functions and leave some headroom to accommodate statistical fluctuations in the capacity needed for each speech signal. But, it is reasonable to expect a DS-1 to support about 200 active conversations. Putting it another way, if a DS-1 must be installed to support service administration traffic between the cell site and the base station, its capacity will not be exhausted until the cell is capable of supporting more than 200 conversations.

BTS

The Base Transceiver System consists of radio amplifiers, a radio front end, control subsystems, and channel modulator/demodulator elements. For information on some specific BTS products see http://www.nortelnetworks.com/products/01/cdma/base_portfolio.html#rural, http://www.ericsson.se/cdmasystems/bsc_home.shtml, or http://www.motorola.com/NSS/Technology/CDMA.html.

A minimal BTS capability is required in each cell if the cell is to be able to transmit the pilot tone, register handsets, and perform other housekeeping tasks that are necessary before any calls can be completed.

Structure and Antennas

Typically, base stations require enclosures, connections to electrical power, a tower, antennas, and waveguide to carry the radio frequency signal between the BTS and the antennas. The registration function and other housekeeping functions cannot be performed without the structure and antennas. Consequently, these items are necessary to provide the option of communications. The cost of Structure and Antennas associated with coverage cells does not vary with usage. Hence, these costs are option costs.

Wireless Cost Classification in Summary

The table below displays the division of infrastructure costs between option costs and usage costs.

TABLE 2
Wireless Cost Classification

System Element	Option Cost	Usage Cost
Message Switching Center	Yes	Partially
Home Location Register	Yes	Partially
Visitor Location Register	Yes	Partially
Authentication Center	Yes	Partially
Equipment Identify Register	Yes	Partially
Signalling (SS#7)	Yes. SS#7 connectivity is used to support roaming services and intersystem handoff.	Partially. If SS#7 capacity has to be expanded over minimal levels to support the signalling needs of usage, then this incremental element is a usage cost.
Base Station Controller (BSC)	BSCs are necessary to support the option of calling.	Marginally
Backhaul	A minimal backhaul connection to each coverage cell or coverage cell equivalent is required in order to provide the option of calling.	Marginally. Any increase over the minimum level (e.g., the cost of more than one DS-1 to cells serving many voice channels) is a usage cost.
Base Tranceiver System (BTS)	A minimal BTS with forward pilot channel, forward synch channel, and a reverse access channel is require to permit handsets to register for service in each cell. In addition, if the equipment manufacturer provides traffic channels bundled with the required minimum capacity, then those bundled traffic channels are part of the option costs.	Any addition to BTS capacity required to carry traffic above that carried by the minimum configuration. Similarly, all the added costs created by cell splitting to meet traffic demands.
Structure and Antennas	Option costs if for coverage cells	Any added costs for Structure and Antennas needed because of cell splitting to meet traffic demands

A simple model with reasonable parameters shows that the majority of costs in a modern wireless system are NTS costs. Consider a wireless system with 10,000 cells.[66] Assume that 700 of these cells are coverage cells and that 300 of the cells have been expanded to provide capacity as well as coverage. Assume that the average cost of a coverage cell is $750,000 and that the cost of a capacity-expanded cell is $1,000,000—of which $500,000 is allocated to capacity expansion and $500,000 is allocated to coverage. Assume further that backhaul costs and MSC costs divide in the same ratio as cell-site costs. In this model, total costs are more than $8 billion of which 90% are option or NTS costs.[67]

Radio Spectrum Costs

Many wireless carriers, such as Sprint, obtained most or all of their licenses through the FCC's auctions or by purchase from entities that purchased licenses at these auctions.[68] CRA argues that the cost of these licenses is a TS cost. This view is flawed. The radio licenses are analogous to coverage cells—neither the voice services nor the other wireless services can be provided without the radio licenses. If a wireless operator is using the IS-95 technology used by Sprint, then that operator needs at least 2.5 MHz of spectrum just to provide the option of service. That is, the wireless operator cannot even turn on the Pilot Channel and accept registration traffic unless it has access to 2.5 MHz. In this case, the wireless equivalent of dial tone requires 2.5 MHz.

The FCC licensed PCS in two size blocks—10 MHz and 30 MHz. Thus, in order to be in the PCS business—to have the 2.5 MHz minimum—Sprint had to buy at least a 10 MHz license is needed. The cost of the 10 MHz license no more varies with usage than does the cost of a coverage cell. In contrast, there is a tradeoff between infrastructure costs and spectrum. In some circumstances, the wireless carrier's infrastructure costs will be lower if the carrier has access to more radio spectrum. This

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[66] Sprint reported in its 1999 SEC form 10K that it had approximately 14,400 cell sites under lease or option to lease at year-end 1999.

[67] Sprint has the data needed to provide a more refined version of this model. We note that the CRA authors did not use any quantitative information about the Sprint network in presenting their views.

[68] Two of Sprint's PCS licenses (Washington DC and Los Angeles) were granted through the FCC's Pioneers Preference policy.

economic tradeoff permits placing a value on the 30 MHz licenses. Consider a wireless system built in an urban area with a 30 MHz license. Compare the cost of that system to a hypothetical system providing the same capacity and coverage, but engineered to fit into only 10 MHz of spectrum. The added costs of the 10 MHz system over the costs of the 30 MHz system reflect the savings from the added spectrum.

We note that Dr. David Reed of the FCC's Office of Plans and Policy studied the costs of PCS systems and the cost savings associated with additional spectrum.[69] He generally concluded that PCS systems would not require more than about 20 MHz of spectrum. We doubt if there are many cells in the Sprint network where all 30 MHz are occupied by PCS signals. We expect that there are many cells in the Sprint network where only 2.5 MHz of spectrum is occupied by PCS signals.

Conclusions

The fundamental claim of the CRA authors is that wireless systems have a simple cost structure—handsets are NTS, everything else is TS. It would be hard to be more wrong. Handsets have significant TS costs (not borne by the carrier). The infrastructure network has massive NTS costs—a simple model indicates that the vast majority of the infrastructure costs are NTS costs. Sprint has bought a lot of radio spectrum—which it needs in order to offer the wireless equivalent of dial tone—and much of which will be used to provide wireless Internet access and other future services.

Moreover, efficiency considerations generally favor symmetric *reciprocal compensation* for interconnecting carriers based on the forward-looking cost (TELRIC) of an efficient firm. We disagree with Sprint's argument that differences in technology or service quality justify asymmetric rates. In general, differences in technology or service quality do not generate legitimate differences in costs for the purpose of setting asymmetric compensation rates. Compensating carriers that have different technological characteristics or provide different service qualities at the same rate as that of a fully-efficient firm using least-cost technology and providing an average service quality <u>will not</u> discourage these carriers from deploying their networks. Economic efficiency is

[69] See **Putting It All Together: The Cost Structure of Personal Communications Services,** by David P. Reed; November 1992. NTIS PB93 114882;

achieved if the additional costs incurred to provide this different type of service are recovered from the agent that causes those costs to be incurred.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Developing a Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	

COMMENTS OF THE UNITED STATES TELECOM ASSOCIATION

I. INTRODUCTION AND SUMMARY

The Federal Communications Commission (FCC) has initiated a fundamental reexamination of all currently regulated forms of intercarrier compensation with the intention of testing the concept of a unified system for the flows of payments among telecommunications carriers that result from the interconnection of telecommunications networks.[70] The NPRM also requests comments specifically on bill and keep as the new unified system. Any attempt to manage the evolution of the communications industry and to create policies that will make sense in the future poses a daunting challenge. Change is inevitable, yet the stakes are high. The choices made by regulators, service providers, manufacturers, investors, employees and consumers have significant ramifications, particularly for an industry undergoing such rapid evolution. The pace of change and the speed of the technological and market forces propelling it may well exceed the ability of many participants to anticipate, comprehend and react to the choices that are made. The status quo is impossible to preserve. Even in the current period of market uncertainty with the financial community closely scrutinizing investment in telecommunications, the FCC needs to make decisions regarding the future that will provide positive incentives for carriers to invest in their infrastructures, diminish outmoded regulatory structures and accommodate technological and market forces.

Changing the methods and revenue flows associated with current intercarrier compensation schemes, whether as a result of market forces or as a result of FCC action, will bring about a dramatic redistribution of traffic revenues and shifts of cost recovery responsibilities among carriers, consumers,

[70] Developing a Unified Intercarrier Compensation Regime, CC Docket No. 01-92, *Notice of Proposed Rulemaking* FCC 01-132 (rel. April 27, 2001).

services and locations. This will result in widespread consequences, many of which will be positive, although major and unwelcome dislocations may occur due to the sheer size and reach of the financial impact of the change. Therefore, it is expected that any change will occur over time. The most important thing the FCC can do is to establish the policies necessary to accommodate technological and market forces in such a way that investment in the industry will thrive. The FCC must also establish equitable transition mechanisms that provide a clear signal of its objectives as well as sufficient notice of the changes that it intends to implement so that all service providers, manufacturers, investors, employees and customers know what to expect and have the same opportunity to prepare. USTA's comments will address the drivers for change, concerns that future policy must address, the pros and cons of bill and keep and the conditions that would be necessary to provide an equitable transition to bill and keep.[71]

II. ISSUES RAISED BY EXISTING INTERCARRIER COMPENSATION MECHANISMS.

A. Regulatory Arbitrage and Outdated Regulatory Distinctions Are Driving the Need to Reexamine Current Regulation.

In order to maintain a seamless flow of communications, networks must interconnect with other networks. Currently, a regulatory patchwork of mechanisms exists to compensate certain carriers for the transport and termination of communications. Certain drivers are creating anomalies in the current systems that compel new FCC policies. These forces are causing regulated carriers to chafe as they rub against regulatory structures that no longer make sense given the changes in the industry. In some cases, they represent regulation created for an analog, circuit-switched environment that is evolving out of existence. In others, the drivers represent increasing market demand for new services and greater data communications capacity. The FCC must make the changes necessary to allow communications providers to react to these drivers in a manner that is efficient and that responds to customer needs.

As the NPRM explains, the current intercarrier compensation mechanisms are determined based on types of carriers, such as whether the carrier is a local exchange provider, an interexchange provider, a CMRS provider or an enhanced service provider; and on types of services, such as whether the service is

[71] The United States Telecom Association (USTA) is the nation's oldest trade association for the local exchange carrier (LEC) industry. USTA represents more than 1,200 telecommunications companies

classified as local, long distance, interstate, intrastate, intra- and interLATA, basic or enhanced. The FCC has promulgated interconnection rules based on these distinctions and the states have done so in the intrastate jurisdiction, although not always in concert with the Federal rules. The FCC's access charge rules govern compensation among local and interexchange carriers for the origination and termination of long distance services and its reciprocal compensation rules govern compensation among carriers for the transport and termination of local services. The FCC sets access charges for services deemed interstate and the state regulatory commissions set access charges for services deemed intrastate. Access charges also have different rate structures that do not always match the way the access service is provided. Technology is rendering these provider/service distinctions obsolete. The FCC has identified and correctly expressed its concern with regulatory arbitrage, which can be defined as exploitation of artificial profit making opportunities created by administrative rules rather than by market conditions. It is important to note that such regulatory arbitrage opportunities are created not only by current intercarrier compensation arrangements, but also by regulation asymmetrically applied to different carriers, technologies, service platforms and services. Rules that create artificial distinctions will create false signals to entrants and will provide uneconomic investment incentives.

The NPRM lists several current problems exacerbated by the existing interconnection regulations including various forms of regulatory arbitrage, terminating access monopolies, whether different types of networks require different interconnection rates, distortions in the structure and level of end user charges and distortions in an entity's subscription choices. Other arbitrage opportunities may exist as a result of interstate and intrastate distinctions that can provide incentives to distort usage measurements to reflect a more favorable regulatory environment.

Access charge arbitrage reflects the fact that interexchange carriers pay interstate and intrastate access charges to the LEC to cover the costs incurred by the LEC in providing originating, terminating and transport services associated with a toll call. An ISP that provides an information service, like Internet access, is exempt from the payment of access charges for the costs associated with the use of LEC facilities in the provision of Internet services. Thus, customers can avoid paying for their use of LEC facilities by using Internet telephony to place a long distance call. Recent developments in capital markets indicate that

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worldwide that provide a full array of voice, data and video services over wireline and wireless networks.

investors are becoming more sensitive to the difference between long-term economic opportunities and returns and those based on gaming regulatory structures. However, there remains a concern over inefficient investment driven by artificial incentives created by regulatory distortions of market structure, cost, rates, services and market signals.

Some of the arbitrage issues listed in the NPRM are addressed in various transition plans that have been adopted by the FCC. For example, the FCC has approved the CALLS plan to lower access charges and increase subscriber line charges (SLCs) for price cap LECs, a plan to transition CLEC access charges to a benchmark rate equal to that of the ILEC, and a plan to reduce reciprocal compensation payments for ISP bound traffic. Currently pending before the Commission is the Multi Association Group (MAG) plan to lower access charges and increase SLCs for rate of return LECs over a five year period. For some carriers, the existence of these transition mechanisms lessens the urgency of moving to a new intercarrier compensation regime at least until the transition plans have been completed. Other carriers view these plans as insufficient to fully address their needs. As will be discussed below, there may be other forces that compel a more immediate response in some cases and not in others, depending upon market conditions and the availability of certain technology in particular areas. Timing and transition issues are critical and will require further analysis.

B. The Evolution of Technology and Market Demand are Also Drivers for Change.

The need to alter current regulatory structures is also being driven by changes in technology and the market. The policies for the future should recognize that different technology platforms will compete for customers and that future interconnection policy must apply to all technology platforms and networks in the same manner. The effects of any regulatory change of the size and scope contemplated in this proceeding can be better anticipated in the context of a full understanding of the technological and market environment within which the changes will occur. It is imperative for the Commission to recognize and analyze current trends in technology, markets and business practices as they evolve. It is also critical for the FCC to recognize that the technological and market environment within which changes in intercarrier compensation decisions are made will also be substantially influenced by the resolution of other policy issues now under review and consideration.

The current compensation mechanisms were not designed to recover the costs required to provide the wide variety of services, platforms or bandwidth needs that will be demanded in the future. For data traffic alone, the traffic volumes are growing at rates ten to fifteen times faster than voice traffic. Most homes have the ability to access the Internet which is becoming the platform upon which convergence is occurring. By the year 2002, IP-based networks are projected to carry fifteen percent of the world's voice traffic and as many as five million subscribers in the U.S. will be placing a large percentage of these calls.[72] As the industry migrates to fast packet technology, the switch itself could be decentralized into different components at different locations. New network services are not usage sensitive and may not require the systems that are part of the public switched telephone network. The definitions that characterized telecommunications services in the past are not relevant for carriers who do not have a local service area or who do not need to distinguish toll traffic. A minute will simply be a minute or will be characterized under a flat rate that will not even account for traffic on a per minute basis. For example, broadband service will not be sensitive to the same units of measurement as the present switched service models. The end user connection may be referred to as a pipe instead of a loop. The standard unit could be capacity driven as bandwidth or bits. New units of measurement will wreak havoc on current rate structures, and customer understanding.

This is now a multi-network, multi-provider, multi-service, digital and broadband based world that at both a business and operating level is indifferent to old labels such as LEC, ILEC, CLEC, IXC, CMRS, CATV, ESP, ISP and LATA. Billions of dollars are being invested as communications companies of all types position themselves to offer a wide array of services and consumers can use traditional voice telephony, wireless cellular, wireless spread spectrum, traditional satellite, low earth orbit satellite, cable, digital subscriber line (DSL), or the Internet to communicate. Technology has evolved from circuit-switched to packet-switched networks. As computer processor power continues to grow rapidly, as software becomes more sophisticated and as people adjust to using computer networking more and more in their daily lives, there will continue to be an increase in the demand for bandwidth. The advances in bandwidth combined with the innovations in networking technology make geographical limitations less relevant. Data traveling along a packet-switched network does not encounter arbitrary local/long distance

[72] Shannon Pleasant, *IP Services: Market Overview*, Cahners In-Stat Group, Feb. 2000 at 6-8.

borders and cannot be classified as voice, fax, text or video. On the Internet, data crosses freely across government jurisdictions, political boundaries, continental frontiers and cultural barriers. It is only in the regulatory arena that these old labels are used. Integrated digital service offerings, such as those provided over the Internet, present fundamental problems to a regulatory framework dependent upon technological distinctions. Rather than concentrate on managing wireline interconnection and compensation for analog services, the FCC must contemplate a new intercarrier compensation regime that does not rely on these old labels.

With all the traditional lines of business in the communications industry blurring, it is not surprising that the fastest growing technology platforms are those that are not subject to regulations that specify geographic boundaries, that separately define services and that require specific pricing structures. They are platforms that deliver a bundle of digital services seamlessly with no distinctions, including voice, data, Internet access, video, music, and e-commerce. With these platforms, providers can price and package different bundles of services to accommodate different customer needs and to permit consumers to communicate anywhere in the country for a single nationwide rate.

The blurring of the legacy regulatory lines are anticipated most dramatically in IP Telephony. The Internet has become an integral part of the business and consumer environment. The Internet obliterates traditional service distinctions and definitions. Its pricing has evolved independently of regulatory constraints and it has the capacity to compete with the full array of service offerings from traditional networks. The prospect for growth of voice over Internet protocols (VOIP) is the most obvious driver of the future. The demand for broadband Internet access will require further expansion of the telecommunications environment. Internet service providers will continue to seek opportunities to increase revenue streams with the addition of new applications, thus further blurring the lines of different media. For example, Microsoft recently aired a television commercial in which a teenager, who has her telephone privileges taken away by her mother, jokes with a friend that her mother doesn't know she can have a voice conversation on her PC. Microsoft's new Window's XP operating system, scheduled to be commercially

available on October 25, 2001, will include both high quality telephone and directory features.[73] Microsoft will combine improved versions of current features such as online video meeting software and Internet voice chat into a more sophisticated version to be known as Passport. The company hopes to generate new subscription revenues and will offer Caller ID and voice mail as it begins to compete with traditional telecommunications companies. Microsoft could bundle telephone calling as a free feature of its operating system. Under current regulatory treatment, Microsoft is an ISP and is exempt from paying access charges if it uses the local telephone company network to complete a call. Microsoft is also exempt from contributing to universal service and bears no carrier of last resort responsibilities. AOL/Time Warner also has similar voice features, although it has not yet announced plans to improve or integrate those services. Revenue from Internet telephony is projected to grow over the next five years. Frost & Sullivan estimates that IP revenues will grow from about $1.2 billion in 2000 to over $66 billion in 2005.[74] IDC estimates that IP revenues will grow from a little over $1 billion in 2000 to roughly $61 billion in 2005.[75]

There are other examples of companies searching for cheap ways to offer voice services over high-speed connections. Broadview Networks announced that it would begin offering voice over DSL service on July 30, 2001.[76] Bundling voice and Internet services will increase competition with wireline companies and provide new options for consumers. Voice over DSL technology allows the bandwidth of a high speed Internet connection to be split into multiple virtual phone lines. Thus, a small business could have sufficient phone lines with sufficient bandwidth for Internet access for relatively low cost. AT&T has stated that it will use the DSL network it recently bought from Northpoint to offer voice services as it loses access to the cable network it originally bought for this purpose.

Wireless providers are continuing to build nationwide footprints, expand their digital offerings and develop innovative pricing plans.[77] There are six nationwide mobile telephony operators: AT&T Wireless,

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[73] John Markoff, *Microsoft is Ready to Supply a Phone In Every Computer,* The New York Times on the Web, June 12, 2001.

[74] *World VoIP Services Update* #6369-61, Frost and Sullivan, 2001.

[75] Elizabeth Farrand and Mark Winther, *IP Telephony Services: Market Forecast and Analysis 1999-2005,* International Data Corporation Report #23625, Dec. 2000.

[76] *Voice-over-DSL Getting New Lease on Life,* CNET Networks Inc., July 24, 2001.

[77] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, *Sixth Report,* FCC 01-192 (rel. Jul. 17, 2001) [Sixth Report].

Sprint PCS, Verizon Wireless, VoiceStream Wireless, Cingular Wireless and Nextel.[78] There are also a number of large regional companies, including Western Wireless, US Cellular, Dobson Communications and ALLTEL. At least two companies, AT&T Wireless and Nextel, are international and offer a pricing plan that allows customers to use their phones and the same phone number worldwide. By the end of 2000, the mobile telephony sector generated over $52.5 billion in revenues, increased subscribership to 109.5 million and produced a nationwide penetration rate of 39 percent.[79] Almost 91 percent of the total U.S. population have access to three or more different operators offering mobile telephone service in the counties in which they live. Since late 1999, seven major mobile telephone operators have begun offering mobile data services including wireless web, short messaging service and e-mail. Four of those seven reported 2.5 million mobile Internet users.[80] The cellular market continued to grow at double-digit rates in 2000 and the availability of digital cellular will continue to stimulate subscriber growth.

The Cellular Telecommunications and Internet Association estimates that five percent of mobile telephone users rely on their wireless phones as their only phones.[81] In some areas, wireless use has begun to erode wireline revenue due to technology substitution.[82] AT&T blamed its second quarter 2001 $149 million loss in part on customers switching from the traditional copper wire to wireless and Internet technologies to complete long distance calls.[83] In a survey performed for the Consumer Electronics Association, three in ten wireless phone users stated they would rather give up their home telephone than their wireless phone. Among users aged 18 to 34 years old, that figure rose to 45 percent.[84] Sprint recently announced that new and existing Sprint PCS customers who sign up for Sprint long distance will receive fifty minutes of free home long distance each month.[85] Twenty million mobile telephone customers have service plans that do not charge extra for long distance and one analyst believes that such plans are

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[78] *Id.* at 13.

[79] *Id.* at 5.

[80] *Id.*

[81] *Id.* at 32.

[82] Andrew Backover, *AT&T Loss reflects Long-Distance Shift Consumers Turn to Calling Cards, Wireless,* USA Today, Jan. 30, 2001 at B3.

[83] Christopher Stern, *Ailing AT&T Reports $149 Million Loss,* The Washington Post, Jul. 24, 2001, E12.

[84] *Sixth Report* at 32.

reducing wireline long distance minutes and revenues.[86] Several wireless carriers have begun offering service plans designed to compete directly with wireline local telephone service. An example noted by the FCC in the Sixth Report is Leap, offering service in the south and southwest portions of the country. It allows subscribers to make unlimited local calls and receive calls from anywhere in the world for one flat rate of $30 per month.[87] The ability to offer innovative pricing plans has played a large role in the growth in subscribership for cellular services. Likewise, when AOL changed from usage sensitive rates to a flat charge for unlimited usage in late 1996, the number of customers and the usage per customer rose dramatically and other competitors soon followed. Many believe that the reason Internet penetration is lower in Europe than in the U.S. is because local service access to the Internet is priced on a traffic-sensitive basis.[88]

High speed data service over fixed wireless and satellite is emerging as well. Third generation CMRS service will soon reach consumers. Several U.S. mobile telephone carriers have announced their 3G rollout plans and at least six carriers expect to begin deploying network technologies in 2001 and early 2002 that will allow for mobile Internet access speeds of up to 144 kbps.[89] The Commission recently awarded licenses to eight companies, including McCaw, Boeing, Globalstar and Iridium to provide mobile voice, data, Internet access and other new satellite communications services to all parts of the country, from urban areas to remote rural communities.[90] Indeed, Japan's NTT DoCoMo was so bullish on the potential of 3G services that it invested nearly $10 billion for a sixteen percent stake in AT&T Wireless.[91]

According to the National Cable Telecommunications Association (NCTA), the number of new cable modem, cable telephony and digital video subscribers increased markedly during the third quarter of

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[85] *Sprint Expands Sprint PCS Nationwide Long Distance to Include Free Home Long Distance Calling*, Sprint PCS Newswire, Jul. 9, 2001.

[86] Sixth Report at 33.

[87] *Id.*

[88] Patrick DeGraba, Bill and Keep at the Central Office as the Efficient Interconnection Regime, FCC OPP Working Paper Series, Dec. 2000.

[89] *Sixth Report* at 7.

[90] *FCC International Bureau Authorizes New Mobile Satellite Service systems in the 2GHz Band*, FCC News Release, Jul. 17, 2001.

[91] Peter S. Goodman, *DoCoMo in Translation*, The Washington Post, Dec. 1, 2000 at E1.

the year 2000.[92] Since launching high speed Web service in 1998, cable systems have signed up almost five million Internet customers.[93] Digital cable, with its widely expanded channel offerings has proved to be even more popular. In the past three years, the industry has signed up twelve million customers. With more than 96 million homes passed by cable, cable companies have a very significant potential base of subscribers for high-speed cable modems.[94] Cable companies have a substantial head start over the phone companies in providing broadband access to the home. This is crucial because consumers are not likely to switch technologies after purchasing and installing modems.[95] The number of cable modem subscribers is projected to increase from 2.6 million in 2000 to 10.8 million in 2004. Revenues are projected to grow from $1.3 billion in 2000 to $2.9 billion in 2004. Within the next year cable systems will be providing video on demand. This will allow customers to download movies and other programs without waiting for them to be scheduled. Speaking at the NARUC convention last month, Robert Sachs, President and CEO of NCTA stated that cable television companies would be making great strides with VOIP services during the next five years.[96] Cable companies are now serving 1.3 million residential phone customers utilizing traditional circuit switched technology. Mr. Sachs noted that many cable companies see VOIP as a logical next step in local telephone competition, which he believes will be fully realized within the next five years, most likely from facilities-based cable broadband networks rather than through resale or UNEs.

It is likely that networks in the future will be all digital, broadband, "always on," ubiquitous and intelligent.[97] In a recent Brookings Institution study, widespread deployment of broadband technology was estimated to have an economic benefit for U.S. consumers and producers of $500 billion a year or more.[98] The study estimates that universal deployment of broadband services will result in subscription fees from

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[92] National Cable Television Association, Press Release, November 13, 2000.

[93] Christopher Stern, *Cable's Long Reach*, The Washington Post, July 15, 2001 at H1.

[94] 2001 MultiMedia Telecommunications Market Review and Forecast, Telecommunications Industry Association at 137.

[95] *Id.*139-140.

[96] Telecommunications Reports Daily, Jul. 17, 2001.

[97] Richard Adler, *Telecommunications – 2011,* The New Global Telecommunications Industry & Consumers, 2001 Update – Competition Moves Forward, Pennsylvania State University Institute for Information Policy, rel. June 2001.

[98] Robert W. Crandall and Charles L. Jackson, *The $500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access,* Brookings Institution, Jul. 16, 2001.

computer or network equipment ranging from $249 billion to $389 billion annually. Economic benefits derived from shopping, entertainment, reduced commuting, telephone services and telemedicine will range from $272 billion to $520 billion annually. These estimates are predicated on regulatory and market conditions that do not currently exist and on broadband applications that do not exist or are not fully developed. However, in a period in which the U.S. economy remains flat, the potential influence of the communications industry on economic growth cannot be ignored. While the technological advancement that will make such networks possible will continue, the policies that the FCC adopts in this proceeding will impact the speed by which they develop and which players are provided with the incentives to develop them.

The FCC is aware of these changes. There have been many papers released by the FCC in the past several years regarding the growth in the deployment of broadband services and Internet transport access that recognize that the challenges for the future come from the convergence of technologies and the expanding use of the Internet protocol for the delivery of services traditionally offered over legacy technologies.[99] In its *Notice of Inquiry* on Section 706 of the Telecommunications Act of 1996, the Commission acknowledged that its regulatory system was uneven in its treatment of different technologies and that statutes and rules containing separate regimes for wireline and wireless, local and long distance, telecommunications, broadcast, cable, etc., may distort the performance of the market.[100]

The recent General Accounting Office report to Congress also recognizes the need for a regulatory change in how services are regulated by the FCC.[101] The GAO observed that "even with passage of the Telecommunications Act of 1996, communications law retains a 'stovepiped' – or compartmentalized – structure under which each traditional communications service is governed by particular laws…The capability of several networks to provide consumers with an identical service – physical transport to the

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[99] Oxman, *The FCC and the Unregulation of the Internet,* Office of Plans and Policy, Federal Communications Commission, OPP Working Paper No. 31, rel. Jul. 19, 1999. *See also*, Kende, *The Digital Handshake: Connecting Internet Backbones,* OPP Working Paper No. 32, rel. Sept. 2000; Werbach, *Digital Tornado: The Internet and Telecommunications Policy,* OPP Working Paper No. 29, rel. Mar. 1997 and Esbin, *Internet Over Cable: Defining the Future in Terms of the Past,* OPP Working Paper No. 30, rel. Aug. 1998.

[100] *Notice of Inquiry,* CC Docket No. 98-146 (rel. Aug. 7, 1998).

[101] *Technological and Regulatory Factors Affecting Consumer Choice of Internet Providers,* Report to the Subcommittee on Anti-trust, Business Rights and Competition, Committee on the Judiciary, U.S. Senate (rel. Oct. 2000).

Internet – has resulted in a regulatory conundrum. Should the various communications providers be held to the same rules when providing the same service?"[102]

Given the evolving technology, markets will be dramatically more competitive than in the past. Market rivalries will be far more widespread, intense, focused and involve more customer options. Market forces will be much more capable of serving the public interest than regulation. Several technology platforms will be available and will likely secure sufficient funding to provide expanding and intensifying competition in markets for local broadband telecommunications services. Despite current uncertainty in financial markets, investment in the industry should continue to grow and diversify, thereby compounding competition. Commission statistics and the business press document industry consolidation as well as the increasing financial size and strength of competitors. Competition may also be uneven, as new entrants will continue to target high margin markets.

New policies are needed. Policies for the future should not handicap particular technologies or providers. The FCC must determine if bill and keep is appropriate to address these forces.

C. Concerns Highlighted by the Changing Environment Should be Addressed by New FCC Policies Aimed Toward the Future.

The forces described above, regulatory arbitrage, technology and market demands, have also raised concerns as to how important issues can be addressed in a bill and keep compensation arrangement. The FCC must consider the consequences of shifting cost recovery responsibilities among carriers, consumers, services and locations. Appropriate recovery of costs is critical for carriers to maintain and increase infrastructure investment to meet market demand. Carriers that rely on revenues received from current compensation arrangements that could be displaced in the future must have an equal opportunity to recover their costs from alternate sources. Given that end user recovery is contemplated under bill and keep, carriers that currently are subject to price regulation must have flexibility to implement capacity and package pricing similar to the pricing options described above. In areas where end user recovery would result in prices that are not affordable and reasonably comparable, universal service support will be required and the appropriate mechanisms must be in place. The current universal service support mechanisms will not provide sufficient support for high cost areas under bill and keep.

[102] *Id.* at 7, 33.

Rural carriers in the U.S. have relatively high loop costs because of the lack of economies of scale and density.[103] Compared to non-rural carriers, the customer base of rural carriers generally includes fewer high volume users. Rural carriers frequently have substantially fewer lines per switch than do non-rural carriers providing fewer customers to support high fixed network costs. Total investment in plant per loop and plant specific and operations expenses are substantially higher for rural carriers. Given these particular challenges, any new policies and mechanisms adopted by the FCC must accommodate the market and operational circumstances faced by telecommunications carriers serving high cost areas. Changes in universal service must occur contemporaneously with changes in compensation arrangements to ensure that the requirements of the Act are met and customers in high cost areas are served.

In addition, the FCC must address the fact that competition and technology develop in different ways at different times in different markets. For example, the growth of the Internet has been uneven. The top seven metropolitan areas host 62 percent of the nation's Internet backbone capacity and the top 21 metropolitan areas contain 87.5 percent of the nation's backbone capacity.[104] Rural areas may not have the ability to host major Internet destination sites because those types of sites require tremendous amounts of bandwidth that may not exist in rural areas. While market forces will drive deployment, the FCC must continue its efforts to ensure that consumers in all regions of the nation have access to advanced telecommunications capability in a reasonable and timely fashion.[105]

Timing of any change in compensation arrangements is critical to ensure that carriers maintain revenues necessary to serve their customers and attract new ones. As noted above, an equitable transition is required so that all carriers know the "end game" and have adequate notice so that they can prepare and avoid displacements. For example, rate of return companies have not implemented access reform measures and it is uncertain when the pending MAG plan will be adopted and what new requirements the FCC will include in the final plan. An appropriate, equitable transition must be adopted.

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[103] *The Rural Difference,* Rural Task Force White Paper 2, Jan. 2000.

[104] Robert Gibson, *Technology and Change,* The New Global Telecommunications Industry & Consumers 2001 Update – Competition Moves Forward, Penn State University Institute for Information Policy, June 2001.

[105] Deployment of Advanced Telecommunications Capability: Second Report, Federal Communications Commission, Aug. 2000.

With new technologies driving the marketplace with a variety of platforms and new pricing structures, it is likely that new traffic consumption patterns may occur and there is concern regarding the ability to recover the costs necessary to change current network structures. Existing operations, maintenance, provisioning, billing, application services and customer access will undergo significant changes. For example, if LECs move to a flat rate price structure for toll service, it is likely that customer calling habits will change. There may be significant stimulation of the toll business that historically has been based on usage. With usage no longer the underlying principle for pricing and traffic consumption significantly increased, the costs to provide service could also increase significantly. The additional facilities needed to handle increased toll traffic would be enormous. The magnitude of these changes in customer consumption patterns would be reflected in additional costs to address the need for additional network capacity build-out and supporting activities. New support systems, additional personnel with enhanced skills and comprehensive network planning models will be needed and all mediums must be considered. Quality of service concerns to ensure satisfactory and nondiscriminatory interconnection must be addressed.

Finally, for those ILECs currently under regulatory restraints, the FCC must reexamine traditional, legacy rules that may not make sense in the converged telecommunications environment of the future. As competition intensifies, efficiency gains from changing current compensation schemes will be diluted to the extent that regulatory handicapping and platform discrimination is not stripped everywhere from the FCC's rules. Efficiency gains from an economically rational compensation plan will be limited to the extent that other regulatory policies are not concurrently brought into line. It is neither advisable nor sustainable to continue to perpetuate the disparities in regulatory control of market conduct as they now exist between different technological platforms. Most of these differences are historical artifacts derived from dissimilar business origins and evolutionary paths. For example, with respect to cable providers, the FCC has adopted *voluntary* competitive carrier non-discriminatory access commitments for cable modem services, including data and Internet access. Conversely, the FCC regulates the ILECs' provision of DSL services for data and Internet access as telephone exchange or exchange access subject to the unbundling obligations of Section 251 of the Act. DSL services and cable modem services are functionally equivalent services provided by

carriers that have historically been regulated under different provisions of the Communications Act of 1934. FCC policies should treat functionally equivalent services the same, regardless of the provider.

III. THE APPROPRIATE OBJECTIVES OF A UNIFIED INTERCARRIER COMPENSATION POLICY

In order to ensure that the transition to a new intercarrier compensation policy is executed

in an equitable manner, the FCC must be explicit regarding its objectives. It is important for all parties to have an opportunity to determine if the policy ultimately enacted satisfies the objectives for developing the policy in the first place. All parties must have the opportunity to prepare by taking the steps necessary to implement those changes. The following objectives are designed to address the external drivers discussed above that will require all industry participants to make choices in the future.

- ***Minimize regulatory intervention*: Regulated carriers need flexibility to develop business plans to adapt to new policies and to address technology and market forces as well as an equal opportunity to recover costs. Regulatory arbitrage opportunities must be eliminated so that no participant can gain an advantage by gaming regulatory requirements. The need for regulatory intervention should also be minimal to avoid undermining individual parties' opportunities to bargain and to reduce regulatory costs.**

- ***Coordinate state and Federal policies:* The NPRM recognized the critical importance of balancing the responsibilities shared with state regulatory agencies. Successful and timely resolution of jurisdictional issues is**

critical to the success of any major change to the current compensation mechanisms. Achieving these objectives are contingent on consistent state actions, particularly with regard to the redistribution of cost recovery responsibility that will accompany bill and keep.

- ***Ensure competitive neutrality*: No participants should be disadvantaged in addressing market forces because they have to absorb costs that are imposed by others, thereby affecting their ability to compete.**

- ***Ensure technological neutrality*: Any new policy should not advantage or disadvantage a particular technology and should permit the seamless transfer of information over interconnecting networks.**

- ***Maintain universal service*: Explicit, specific, predictable, sufficient and competitively neutral universal service mechanisms must be maintained contemporaneously with the implementation of any new compensation policies. All providers of any type of communications services using any technology should contribute to universal service.**

- ***Provide incentives for investment and innovation:* Cost recovery mechanisms should provide appropriate incentives and opportunities for carriers to invest in their network infrastructure throughout the Nation.**

- ***Ensure quality of service*: Interconnection responsibilities must be established and enforced in a nondiscriminatory manner to provide for seamless network transfers of information as well as to avoid inefficient investment decisions.**

In general, any new intercarrier compensation policies adopted by the FCC should foster

economic decision-making by carriers, manufacturers, investors and consumers that will encourage networks to interconnect and thereby facilitate universal service by providing seamless and ubiquitous networking at affordable prices. As households, businesses, schools, hospitals and other entities are connected to each other, the greater the value of the networks themselves. Intercarrier compensation policies should rely to the extent possible on market and technology forces and should be self-administering. Reliance on market and technology forces will avoid the current arbitrary, regulatory regime necessary for regulators to allocate costs. Any new policies should apply to all types of services, networks, and providers to avoid regulatory arbitrage opportunities and to encourage competitive neutrality. Regulatory intervention should only occur where such forces do not offer affordable options. If regulators are ultimately forced to intervene, prices should be set at a level that fosters the continued investment in network infrastructure. If prices are not affordable and reasonably comparable, universal service support must be available. Market-oriented policies along with targeted, explicit, sufficient, predictable and competitively neutral universal service support will be key elements in policies that make sense for the future.

IV. POLICY CONSIDERATIONS FOR A BILL AND KEEP REGIME

A. Some Pros and Cons of Bill and Keep

Converting from the current calling party's network pays (CPNP) regime to bill and keep

could prove to be beneficial for the industry, although there could also be major and unwelcome dislocations due to the sheer size and scope of the change. Bill and keep represents a drastic change from the current CPNP system, but it does provide greater opportunities to achieve economic efficiency. While the current system relieves the called party from sharing in most of the costs of communications, it is true that the called party has made an economic decision to be on a network and to receive calls. Under bill and keep, the called party would share in the costs of that decision. Bill and keep reflects principles of cost causation and is consistent with the FCC's policy to reflect that principle by moving a greater responsibility for cost recovery to the end user customer. This will be beneficial in two ways. First, consumers will be encouraged to make better choices if they bear the direct economic impact of those decisions rather than having the impact spread to other customers through pricing plans of other carriers, a characteristic of the CPNP system. Second, if carriers must recover costs from end user customers rather than other carriers, bill and keep may encourage carriers to compete for those customers thus encouraging carriers to strengthen retail relationships, bringing more of the benefits of competition directly to customers.

Bill and keep also will encourage reliance on market-oriented solutions rather than regulation. It should eliminate the regulatory intervention required to estimate interconnection costs as well as any artificial usage-based costs that are incurred due to regulatory requirements. By replacing carrier access charges with end user recovery, bill and keep eliminates the access charge arbitrage issue. By replacing terminating charges with end user recovery, the reciprocal compensation and terminating access monopoly problems are eliminated. Bill and keep could also allow LECs to manage the erosion of access charge revenues that may result due to competition and technology. It would minimize speculation as to any alleged anti-competitive price squeeze since carriers would not have the opportunity to leverage access prices to keep competitors out of the market. The elimination of regulatory arbitrage encourages efficient investment since market signals are permitted to govern behavior rather than administrative rules.

However, the FCC should also consider the issue surrounding terminating access monopolies in a broader context. The FCC has yet to recognize the competitive opportunities presented by other networks and technologies and appears to be utilizing a narrow interpretation of a terminating access monopoly as justification for maintaining some regulation instead of relying on market forces. According to the NPRM, a terminating carrier has a monopoly over the traffic delivered to end users because interconnecting carriers must use the terminating carrier selected by that end user. USTA disagrees with that viewpoint. So long as the customer has a choice of carriers to terminate traffic, there is no monopoly. A monopoly would only exist if the customer did not have a choice of carrier.

Individual customers who choose a particular carrier over another carrier do not establish a monopoly relationship as to the chosen carrier. If a monopoly could be established on an individual terminating carrier, carriers would never be able to escape regulation. Bill and keep would appear to address the FCC's concerns in this regard.

There also may be detrimental consequences from the adoption of bill and keep, some that can be anticipated and some that are unknown and cannot be anticipated. These consequences will be particularly acute if current access revenue streams are displaced and must be recovered from end user customers. This will create serious concerns regarding the affordability of rates and the ability to maintain end user rates that are reasonably comparable between urban and rural areas. In addition, current access revenue streams are used to invest in the infrastructure and to provide new and advanced services. The incentives to make such investments must be preserved and increased.

The amount of cost recovery shifted to end user customers under bill and keep will vary by company. Ideally, reductions in access charges would be accompanied by reductions in toll charges for toll end user customers thus creating overall decreases for some end user customers in their communications bill. While shifting recovery of LEC costs to end users will obviously have impacts on the customer bill, there will be circumstances where the impact is severe. USTA has analyzed the impact of COBAK on rate of return LECs using data provided by NECA showing the possible impact on end users if intrastate and interstate switched access – including common line, local switching and fifty percent of dedicated

transport – is recovered from end users instead of carriers. Based on a sample of 287 study areas, the intrastate impact of implementing COBAK ranges from a minimum of $0.12 per line per month for certain companies with over 50,000 access lines to a maximum of $88.05 per line per month for certain companies with between 1,000 and 2,500 access lines. The interstate impact of COBAK was estimated based on a sample of 1,241 study areas. Using the current SLC caps, the interstate impact of COBAK ranges from a low of $7.70 per line per month for certain companies with over 50,000 access lines to a high of $46.10 per line per month for certain companies with less than 500 access lines. The interstate impact of COBAK using the maximum SLC caps as approved in the CALLS plan and proposed in the MAG plan range from a low of $4.66 per line per month for certain companies with over 50,000 access lines to a high of $43.07 per line per month for certain companies with less than 500 access lines. The interstate impact of COBAK if the MAG plan is adopted with the RAS and the maximum SLC caps range from a low of $2.47 per line per month for certain companies with over 50,000 access lines to a high of $21.92 per line per month for companies with under 500 lines.[106] The current universal service mechanisms are not designed to accommodate these impacts, both in terms of the sufficiency of support and in terms of maintaining equitable contributions. The changing nature of retail relationships that may accompany bill and keep may require changes to the current universal service

[106] The interstate impact figures are based on averaged rates for each size category. Several carriers would have impacts greatly in excess of these averaged rates. For example, the interstate impact of COBAK could be as high as $1,030.74 per line per month for a company in the highest cost quartile under the MAG plan with the highest SLC levels and as high as $434.38 per line per month for a company in the highest cost quartile under the MAG plan with the RAS.

contribution determinations to ensure that they remain competitively neutral and all technologies contribute to the preservation of universal service.

The NPRM includes discussion of two possible bill and keep default approaches that would apply to all types of interconnection. Both COBAK and BASICS are designed to rely on negotiations among interconnecting networks but differ in the default provisions that would be triggered should negotiations fail. Both raise important issues that would have to be resolved before either could be implemented in a reasonable manner.

The default provisions of BASICS would split the costs incremental to interconnection equally among carriers and all remaining costs would be recovered from each carrier's own end user customers. Carriers would bid on the right to provide transport to another network. This approach would be difficult to implement and administer, as the default provisions are not clearly defined. Identifying and agreeing on the incremental costs of interconnection would be problematic and would require regulatory intervention. Such costs would be even more difficult to discern if a carrier wanted to interconnect at multiple points instead of one or if multiple carriers were involved in transporting a call. The bidding process itself would require a new regulatory structure, particularly if the incumbent LEC was the only bidding party, a likely outcome in most rural areas. The fact that UNEs currently are priced at TELRIC may provide an advantage for certain carriers in the bidding process. ILECs already have a ubiquitous network in place to satisfy carrier of last resort responsibilities. If the ILEC loses the bid for transport, its customers probably would be responsible for the costs of stranded

investment put in place to make sure that all consumers have an opportunity to receive service if no other carrier will serve them.

Under the default provisions of COBAK, a called party's carrier cannot charge an interconnecting carrier to terminate a call. Each carrier recovers the cost of the loop and local switch from its own end user customers. The calling party's network is responsible for the cost of transporting a call between the calling party's central office and the called party's central office. Establishing the central office as the point of interconnection (POI) raises many concerns, since carriers may locate their switches great distances from where the call actually terminates. Originating carriers could incur substantial costs to transport traffic to a terminating carrier switch, even in cases where the call is terminated in the building next door to where it originated. BASICS may reduce that problem to some degree since its default requires that transport costs be shared equally. In addition, large customers, especially those with large quantities of incoming traffic, may try to masquerade as carriers to reduce their transport costs since the originating carrier must absorb the costs to transport the traffic to them. Conversely, a carrier may try to masquerade as a customer if it is more economical under COBAK to do so. These opportunities for gaming merit additional consideration.

The NPRM requests comment on whether bill and keep will resolve the current problems it identifies and associates with the current CPNP regime. The resolution of the POI issue is critical in assessing whether a bill and keep regime can successfully alleviate current interconnection problems and serve as the intercarrier compensation regime in the future.

B. A Framework for a Reasonable Bill and Keep Regime

As the NPRM suggests, a reasonable bill and keep regime designed to fulfill the objectives listed above may address many of the problems associated with the current CPNP regime and may permit carriers to address the drivers discussed above so long as certain conditions are met. The conditions that must be present to adopt bill and keep are as follows:

- **<u>Transitional equity</u>. Carriers who have designed their business plans based on a specific set of assumptions inherent to CPNP regarding compensation arrangements, costs, rates and investment determinants must have the opportunity to adapt to a different set of assumptions under a new regime. While some participants would enjoy immediate benefits from bill and keep, others would suffer harms. Carriers must have an opportunity to identify and design the means to offset any harms that will have to be borne in order to participate in and benefit from a bill and keep regime. While some of the harms may be unavoidable by Commission action, many or most may be avoided or mitigated by companion policy changes.**

- **<u>Universal Service.</u> In areas where end user customer prices are not affordable and reasonably comparable, targeted, specific, explicit, predictable, sufficient and competitively neutral universal service mechanisms must be in place.**

- **<u>Pricing Flexibility</u>. All carriers should have the same ability to offer pricing options to their customers, including but not limited to, capacity-based pricing plans, package pricing, etc.**

- **<u>Application to all carriers, networks and technologies.</u> Convergence eliminates the need to have different rules for different carriers, networks and technologies. Seamless transfers of communications can only be assured if treated in the same manner. One of the FCC's goals must be to eliminate the arbitrage opportunities that characterize the current intercarrier compensation regime. Arbitrage borne of asymmetrical regulation dilutes market forces thereby threatening economic efficiency.**

- **<u>Application to both the intrastate and interstate jurisdiction.</u> Traditional jurisdictional boundaries are not relevant to current networks that have no geographic limitations and may not be relevant to any networks in the future. Unless implemented simultaneously in both jurisdictions, arbitrage opportunities will negate some of the benefits of bill and keep.**

- **<u>Development of a reasonable bill and keep process</u>. Such a process must meet the objectives outlined above and provide all parties with the opportunity to minimize collateral harms. A framework for a reasonable bill and keep arrangement is discussed below.**

These necessary conditions can be incorporated into a policy framework for bill and keep

under which the details of the regime can then be determined. The policy must reflect a preference for as well as appropriate incentives to facilitate negotiations among carriers and a reduced reliance on regulation. The bill and keep process must be accompanied by the rebalancing of current price structures as for example in the current transitions plans under which carrier access charges are

replaced by increased end user rates and/or universal service. Universal service support is required in areas where prices under bill and keep are not affordable and reasonably comparable. Carriers should have pricing flexibility to implement capacity-based pricing plans, package pricing and any other plan that meets customer needs. Carriers should also have the flexibility to consolidate pricing of network access with local service pricing.

The bill and keep policy itself should apply to all carriers, networks and technologies for the interconnection of switched services, including interstate switched access, intrastate switched access, reciprocal compensation, intracompany settlements, wireless and paging. It should exclude specialized or ancillary network arrangements, such as special access, 800 database, LIDB, directory assistance and operator services. Each network access provider should be permitted to recover network access cost from its end user or universal service. Network access providers should negotiate network to network arrangements if necessary to interconnect their respective networks on a nondiscriminatory basis. If negotiations fail, default rules would apply so that the calling party's network access provider is responsible for the network to network transport to reach the POI serving the called party.

If the originating carrier must transport the traffic long distances, the costs of the originating carrier borne by its end user customer will increase. In cases where the amount and distribution of traffic is fairly balanced, the carriers will have a greater incentive to negotiate a mutually agreeable POI. In other cases, carriers may have incentives to minimize costs by attempting to force the other carrier to

bear the majority of the transport costs. There must, therefore be a geographic limit on the network access provider's obligation to reach the POI that considers network efficiency, technical feasibility, customer density, and size of serving areas. Transitional POIs may have to be developed at the outset.

Network access providers with transport obligations should be free to build their own facilities or to lease facilities from a wholesale provider or from the called party's network access provider. But, network access providers should not be required to provide transiting services or to otherwise act as a wholesale provider without reasonable compensation. Network access should be consistently priced such that the destination of the call does not drive the price level or structure. Quality of service issues may have to be determined to define a network provider's responsibility to carry traffic and to define reasonable interconnection parameters.

In order to implement such a policy framework, specific processes must be established to address the following:

- **Simultaneous implementation at both the state and federal level to avoid arbitrage opportunities and to ensure that policies are integrated;**

- **operational issues such as for example, equal access obligations, dialing parity, repair and maintenance obligations, billing issues, and network compatibility;**

- **timing of implementation; and,**
- **universal service mechanisms to address affordability and reasonable comparability.**

The NPRM requests comment on whether bill and keep is appropriate for specific kinds

of traffic, including ISP bound traffic, local traffic, access charges, CMRS traffic and paging. As noted above, the FCC should establish a specific process to examine and address timing of implementation. The FCC has already proposed to adopt bill and keep for ISP bound traffic at the end of the three year transition period. While the application of the current reciprocal compensation rules created gaming opportunities that the FCC had to address, it is not clear what impact, if any, moving ahead with bill and keep for ISP bound traffic on a different timeframe will have on the market.

As explained earlier, the dislocations associated with recovery of the costs incurred to provide access services from end user customers are particularly acute. Small LECs receive a significant percentage of their total revenues from access charges. The current system of interstate access charges achieves the historic policy objectives of both low intrastate local rates and low toll rates on a nationwide basis. LECs currently charge interexchange carriers for the costs the LEC incurs in originating, terminating and transporting interexchange calls. The recovery of these costs from interstate services serve to reimburse a significant portion of the costs borne by LECs which in turn allows the LECs to maintain local rates at affordable levels. The current structure also averages rates to ensure that even customers whose unit costs are above average remain on the public switched telephone network. Shifting a major portion of this cost responsibility from toll service under a bill and keep regime will eliminate a nationwide source of revenue

from interstate users to help pay for universal services. At the same time, however, the current access structure does not work when certain carriers and services are allowed to utilize existing local networks and are not charged the same as interexchange carriers. Another issue arises from the fact that the current timeframe for access charge reform for price cap LECs, CLECs and rate of return LECs is different. The latter has not yet been adopted. It is unclear whether the different timeframes can or should be maintained.

Bill and keep, if adopted based on the necessary conditions listed above, should apply to both CMRS and paging traffic. Currently, there are serious problems with the FCC's interpretation of the reciprocal compensation rules as applied to wireless networks that must be resolved. In a May 9 letter, the Common Carrier and Wireless Bureaus established a much broader definition of "additional costs" for wireless networks than the FCC previously established for wireline networks.[107] CMRS providers are not entitled to receive additional reciprocal compensation for network components that are functionally equivalent to a wireline carrier's loop when they are used to terminate traffic to mobile customers that originate on other carriers' networks.[108] Bill and keep may provide a solution, but the same rules should apply to all carriers and all networks to avoid uneconomic arbitrage and unfair competitive advantage. An easier case may be made for the implementation of bill and keep for all identifiably one way traffic, such as paging.

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[107] Letter from Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau and Dorothy T. Attwood, Chief, Common Carrier Bureau to Charles McKee, Senior Attorney, Sprint PCS, CC Docket Nos. 95-185 and 96-98 and WT Docket No. 97-207, May 9, 2001.

[108] Reciprocal Compensation for CMRS Providers, CC Docket Nos. 95-185 and 96-98 and WT Docket No. 97-207, USTA Comments filed June 1, 2000.

V. REFORMING THE CPNP REGIME SHOULD NOT MAKE IT WORSE

A. TELRIC is Not Appropriate to Set Access Charge Rate Levels

The NPRM contains several proposals for reforming the CPNP that would really only

serve to make it a less functional compensation regime. For example, in addressing rate level issues the NPRM proposes that TELRIC be used to set the prices for both access charges and reciprocal compensation as an alternative to bill and keep and even suggests that this be adopted by the states for intrastate access as well. This proposal should be rejected.

The use of TELRIC to determine access charges and reciprocal compensation would eliminate incentives to be efficient, to upgrade networks, to provide advanced services and to invest in new technologies. It would not ensure that LECs are able to fully recover the costs of providing access services and could, therefore, discourage competition. Further, the use of TELRIC for access charges and reciprocal compensation would require the FCC to retain all of the regulatory cost identification and allocation rules that have proved to be vastly inefficient and to extend them to LECs that previously were not subject to such requirements. TELRIC is not appropriate for access charges and reciprocal compensation and its use to determine such prices will clearly result in worsening the inefficiencies of the current CPNP regime.

Likewise, short run incremental cost is inappropriate and would only exacerbate current pricing anomalies and arbitrage opportunities because it has the potential to create significant variations in costs that will require increased regulatory oversight to track. The FCC should exercise some self-restraint in its consideration of proposals that are so clearly worse than status quo.

B. New Rate Structure Requirements Should Also be Rejected.

The FCC has already addressed the issue of whether new rate structures under the current

CPNP regime should be required and the response was resoundingly negative.[109] The current rate structure regulations should be simplified and/or eliminated, not replaced with new regulation. Carriers should have flexibility to use a capacity-based or other rate structure if reasonable, but the FCC should refrain from mandating such a rate structure. The current rate structure was initially based on the investment cost of switches plus expense divided by total minutes. This is an economically sound methodology to measure and recover traffic-sensitive costs and to ensure that there is no under or over recovery.[110] It would be a mistake to mandate a capacity-based rate structure in the current regime because the implementation costs would certainly outweigh any potential gains. The information requirements and the associated regulatory oversight would be

[109] Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Interexchange Carrier Purchases of Switched Access Services Offered by Competitive Local Exchange Carriers, CC Docket Nos. 96-262, 94-1 and CCB/CPD File No. 98-63, Comments of USTA filed Oct. 29, 1999 and Reply Comments filed Nov. 29, 1999.

[110] *See*, Comments of William E. Taylor, Ph.D., on behalf of USTA, Oct. 29, 1999.

significant as individual carrier peak demands and all other peak demands of the particular switch would have to be determined. Carriers should have the ability to respond to market forces.

C. The Current Use of Virtual NXX Codes Should Not be Permitted.

The use of virtual NXX codes creates a cost recovery anomaly because of the assignment of a telephone number in an NXX to a customer who is not physically located in the exchange to which the NXX is assigned or who does not subscribe to the use of facilities physically located in that exchange. Nonetheless, the traffic is rated as local. Thus, the customer avoids paying toll charges, the carrier using the virtual NXX avoids transport or access charges and the originating LEC must pay the carrier reciprocal compensation. The originating LEC must assume all the costs of calls using virtual NXX. Virtual NXX also misuses scarce numbering resources by assigning an NXX to a rate center for customers that are not located in the rate center. The current numbering system is built around rate centers that distinguish between local and toll calls. Currently, with the exception of traffic to or from a CMRS network, state commissions have the authority to determine what geographic areas should be considered 'local' for the purpose of applying reciprocal compensation obligations under Section 251(b)(5), consistent with the state commissions' historical practice of defining local service areas for wireline LECs. Traffic originating or terminating outside of the applicable local area would be subject to interstate and intrastate access charges.[111] Virtual NXX calls do not meet this criteria. A virtual NXX has the effect of changing the local calling areas of the originating LEC because the call is rated as local, even though the called party is outside the local calling area established by the state commission. This would occur without providing the state commission an opportunity to ensure compliance with any requirements and without regard for the impact on competition, rate levels or customer interests.

Virtual NXX is also contrary to the national numbering policy. The Commission has stated that carriers must provide, as part of their applications for initial numbering resources, evidence demonstrating that they are licensed and/or certified to provide service in the area in which they seek numbering

[111] Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Interconnection Between Local Exchange Carriers and Commercial Mobile Radio Service Providers, *First Report and Order*, 11 FCC Rcd 15499 (rel. Aug. 8, 1996) at ¶ 1035.

resources. Carriers requesting initial numbering resources must also provide the NANPA appropriate evidence that its facilities are in place or will be in place to provide service within sixty days of the numbering resources activation date. The burden is on the carrier to demonstrate that it is both authorized and prepared to provide service before receiving initial numbering resources.[112]

A change in the current numbering system to permit virtual NXX could create rate shock for customers if the current distinctions between local and toll calls are ignored or if local calling areas are altered. This misuse of numbering resources to provide service to customers who do not physically maintain a presence in the rate center should not be permitted under CPNP unless the carrier using the virtual NXX pays for the transport from the rate center to the customer as well as any other appropriate compensation and the integrity of numbering resources is preserved.

VI. CONCLUSION

Understanding the environment within which regulatory changes in intercarrier compensation will be converted into market signals for consumers, investment incentives for managers, financial incentives for investors and business decisions for network operators is necessary if the FCC is to avoid unintended or unacceptable consequences. This is a tall order given the technological and economic dynamism that characterizes the current market and has made the status quo regulatory regimes unworkable. The framework provided herein may alleviate concerns regarding unwelcome consequences of a new system.

Respectfully submitted,

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[112] Number Resource Optimization, *Report and Order and Further Notice of Proposed Rulemaking*, at ¶ 97.

August 21, 2001

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Developing a Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	

REPLY COMMENTS
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SUMMARY

The FCC must reject proposals that will worsen the inefficiencies of the current CPNP intercarrier compensation arrangements, such as the prescription of interstate and intrastate access charges at forward-looking costs. In a paper attached to these reply comments, Dr. Larry Darby discusses how the adoption of such a proposal will only serve to suppress investment, deter long-term efficiency and diminish consumer welfare. He explains the critical importance of investment as a means to hasten broadband deployment and facilitate local competition as well as the relationship between regulation and capital formation. He warns that the already uncertain capital markets will be even less likely to commit necessary capital due to the enormous risks that would be associated with the delays and uncertainties accompanying a new FCC prescription of access prices. He observes that the risks would be compounded by the use of TELRIC because that would inhibit the ability of both incumbents and competitors to invest.

The choice of regulatory framework will have a significant impact on investment. Rate levels and rate structures are particularly important since they are the drivers of earnings, growth and risk and the cost basis used for rates will influence investment incentives through its implication for cost recovery, risk and expected earnings. Prescription of access charges forces the FCC to impose its judgment as to the appropriate market outcome even though it does not have the information necessary to replicate market outcomes. Regulatory intervention is far inferior to the market in setting prices. A prescriptive policy based on TELRIC only worsens the problem. Regulators cannot calculate appropriate TELRIC rates. Dr. Darby points out that the rates now in effect under the TELRIC standard show very high variation with almost random differences. He refutes the arguments of AT&T and WorldCom that the use of TELRIC will encourage efficiency since that would require that TELRIC be accurately and consistently applied and there is no evidence that such conditions exist. Further, the use of TELRIC as the standard to prescribe access charges would reduce total investment in facilities and undercut the incentives to invest in facilities. This would also impact the investment programs of entrants thus discouraging facilities-based entry and competition in local markets. Finally, Darby explains that there is no explanation that the rate reductions that AT&T and WorldCom expect to enjoy if access charges were prescribed at TELRIC will serve the public interest in any way.

USTA also points out that the FCC has rejected the self-serving arguments of AT&T and WorldCom in CC Docket No. 96-262 and that the overwhelming weight of economic evidence presented in that docket supports a market-based approach to the development of access prices.

The problems with CPNP will not disappear and the long-term answer to establishing more efficient intercarrier compensation arrangements will not materialize with the prescription of access rates at TELRIC. So long as access charges are used to pursue other beneficial policies such as universal service, TELRIC-prescribed access rates are not feasible. And, even if the universal service problem was resolved, as USTA indicated in its comments that it must be, the disparate regulatory treatment that allows information service providers to utilize local networks and escape contributing to universal service poses another unresolved problem. The regulatory arbitrage opportunities present under the current CPNP arrangement that are creating market distortions deserve the full attention of the FCC and FCC resources should not be wasted in a futile attempt to develop "correct" TELRIC rates. USTA strongly recommends that the FCC address the following: the development of an explicit, universal service mechanism that meets the requirements of the 1996 Act, the elimination of asymmetrical and outdated regulatory structures, the elimination of uneconomic pricing policies based on obsolete service/provider distinctions such as the ESP exemption, the development of coordinated rate rebalancing at both the state and Federal levels and the resolution of operational issues such as equal access obligations, dialing parity, repair and maintenance obligations, billing issues, network compatibility and network security.

USTA also strongly opposes the current use of virtual NXX codes under CPNP unless the carrier using the virtual NXX pays for the transport. USTA explains that virtual NXX is contrary to the Central Office Code Guidelines. USTA refutes those commenting parties who claim that virtual NXX is akin to FX service. Virtual NXX refers to the use of NXX code assignments to mask non-local traffic such as when toll calls are rated as local calls and yet are routed to distant toll points. With virtual NXX, carriers do not have either facilities or customers in the local exchange area. In the case of FX service, the LEC has both facilities and customers in the local exchange area and the FX customer pays for the transport. With virtual NXX, the call is accounted for as local and the carrier assigned the virtual NXX avoids paying access charges even though the call is an interexchange call. Compounding the virtual NXX problem is the fact that the originating carrier is billed for reciprocal compensation.

Other commenting parties claim that competitive carriers should be permitted to define the boundaries of their calling areas for inbound as well as for outbound calls. A virtual NXX code has the effect of changing the

local calling area of the originating LEC. The transfer point must be within the local calling area of the customer originating the call. By clearly determining where the responsibility to transport local traffic changes hands, carrier can then make business decisions about whether to purchase facilities required to handle the traffic. With virtual NXX, the traffic should be considered local only if a dedicated facility exists between the carrier owning the virtual NXX code and the local calling area. If the traffic is carried on interoffice facilities to a customer located outside the local calling area, the call is an interexchange call and is not subject to reciprocal compensation, but is subject to originating access charges. Carriers must pay when they use the facilities of another carrier to complete calls.

While most parties agreed with USTA's comments that a geographic limit on the location of the POI is necessary, some parties sought to impose additional burdens on ILECs. In order to ensure competitive neutrality as well as a fair distribution of transport costs, the FCC should adopt a symmetrical default structure that would be applicable to all carriers that could not negotiate a mutually agreeable POI. The objective of any FCC policy should be to facilitate negotiation and reduce reliance on regulation.

Some parties suggested that ILECs be required to provide transiting services at TELRIC rates. It is very unlikely that these parties would submit to such a requirement themselves. The FCC does not have exclusive authority to require transiting or to establish cost standards for transiting except for interstate traffic. A better policy approach would be to permit all carriers the ability to offer transiting as an unregulated service. If carriers do not want to purchase transiting, they could purchase special access under tariff.

Finally, while some parties requested that they implement bill and keep immediately, USTA believes that an equitable transition mechanism would have to be developed to avoid unwelcome consequences and that the transition apply to all carriers, networks and technologies to avoid the creation of new, uneconomic arbitrage opportunities and unfair competitive advantages. Regulation that creates artificial distinctions also creates false market signals, distorts investment incentives and leads to the misdirection of resources. Any benefits that may be obtained under bill and keep will be diluted if regulatory handicapping and platform discrimination are maintained in the FCC's rules.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
		)
Developing A Unified Intercarrier	)	CC Docket No. 01-92
Compensation Regime	)	

REPLY COMMENTS
OF THE
UNITED STATES TELECOM ASSOCIATION

It is not surprising that the majority of commenting parties agree that current intercarrier compensation mechanisms have created unwieldy arbitrage opportunities that distort the current market. It is also not surprising that the majority of commenting parties agree that the status quo arrangements will not be workable in the future. Finally, it is not surprising that the majority of commenting parties agree that adopting a bill and keep regime may have unwelcome consequences for many companies and customers that must be anticipated and resolved as the FCC moves toward a new arrangement. What is surprising though is that some parties suggested alternatives that actually would be worse than the current mechanisms and that would do nothing to address the regulatory arbitrage problems that exist under the current regime. Such suggestions, such as prescribing access prices based on TELRIC, would exacerbate market distortions, would have severe consequences for companies and customers and would not meet the necessary objectives for future intercarrier compensation arrangements.

I. INTRODUCTION AND SUMMARY

In its comments, USTA identified a number of objectives that should serve to guide the FCC in its development of a new intercarrier compensation mechanism for the future. USTA urged the FCC to create a policy that will provide positive incentives for investment in network infrastructures, eliminate outdated regulatory structures, including arbitrage opportunities and regulatory distinctions based on provider, geography, service or price, and accommodate technological and market forces. Changing the methods, revenue flows and cost recovery responsibilities among carriers, services and locations will have a huge financial impact. Due to the substantial nature of this impact, USTA urged the FCC to establish equitable transition mechanisms that clearly define the objectives and provide sufficient notice. USTA also listed several concerns that must be addressed within the new policy. For example, carriers that rely on access revenues received from current compensation arrangements that could be displaced must have an equal opportunity to recover costs from alternate sources. End user pricing

flexibility is required. In areas where end user recovery could result in prices that are not affordable and reasonably comparable, universal service support must be provided. Implementation must be timed to ensure that carriers maintain revenues necessary to serve existing customers, attract new ones and update network structures as necessary. To address these issues, USTA suggested that the following principles be adopted to guide FCC decision making: minimize regulatory intervention, coordinate state and federal policies, ensure competitive neutrality, ensure technological neutrality, maintain universal service, provide incentives for investment and innovation and promote quality of service.

As part of its analysis of the COBAK and BASICS bill and keep proposals, USTA developed a framework for a bill and keep policy that meets the objectives listed above. First, the following set of conditions must be met: transitional equity, universal service, pricing flexibility, application to all carriers, networks and technologies, application to both the interstate and intrastate jurisdictions and the development of a reasonable bill and keep process to guide carrier relationships. USTA refined that process to include the following: a preference for negotiation and a reduced reliance on regulation, a rebalancing of current price structures, the development of appropriate universal service mechanisms, and the establishment of a geographic limit on the network access provider's obligation to reach the POI.

This framework provides the FCC with a comprehensive look at what a reasonable bill and keep policy must consider, including the interrelationship of universal service, pricing flexibility and the need for the elimination of unequal and unnecessary regulation. Unfortunately, a number of the commenting parties failed to provide any long term policy suggestions to address the issues actually identified in this proceeding and merely used it as another forum to advance their too familiar refrain that increased regulatory constraints on LECs should be adopted. For example, some parties claim that the problems with CPNP can be resolved by prescriptively reducing access charges without modifying the access charge structure. As USTA will demonstrate below, prescription of access prices is the wrong approach and prescription of access to TELRIC or some arbitrary forward-looking cost methodology only compounds the error. USTA will respond to those comments as well as others regarding virtual NXX, transiting, location of the POI and bill and keep for wireless traffic in its reply comments.

II. THE FCC MUST REJECT PROPOSALS THAT WILL WORSEN THE INEFFICIENCIES OF THE CURRENT CPNP INTERCARRIER COMPENSATION ARRANGEMENTS.

A. The Prescription of Access Rates Based on TELRIC Will Inhibit Network Investment

In the NPRM, the FCC requested comment on whether, as an alternative to bill and keep, both interstate and intrastate access rates as well as reciprocal compensation rates should be prescribed at forward-looking costs, such as TELRIC. Several parties supported such an alternative.[113] In its comments, USTA urged the FCC to reject this proposal, as it would only result in worsening the inefficiencies of the current CPNP arrangements, a fact that the FCC acknowledged when it rejected a similar proposal in 1997.

AT&T and WorldCom argue that the FCC should maintain the status quo and continue to arbitrarily slash access charges with no provision for the alternate recovery of access costs and without considering the impact of the loss of such revenue streams on long term investment. As discussed in the attached paper by Dr. Larry F. Darby, prescription of access rates based on TELRIC will only serve to suppress investment, deter long-term efficiency and diminish consumer welfare. Dr. Darby discusses the critical importance of pursuing the goal of promoting investment by explaining that the FCC and many of the commenting parties have conveniently overlooked the importance of encouraging investment, particularly as a means to hasten broadband deployment and to facilitate local competition. He explains that emphasizing investment is important for the following reasons:

- the next generation of local networks will be very capital intensive with high ratios of sunk costs relative to variable operating costs;
- the success of competition policies requires the concurrent development of multiple paths from end users to national networks;
- capital markets are increasingly wary of underwriting these costs;
- the FCC has recently noted that investment in advanced services has slowed, and
- **the overall performance of the economy is linked to the performance of the information technology sector, which increasingly relies on upgrading the broadband capability of local networks through more rapid capital formation for its growth.**

Dr. Darby also examines the relationship between regulation and capital formation. He warns that uncertain capital markets are characterized by significant risk aversion, particularly risks associated with the delays and uncertainties that would accompany a new FCC prescription of access prices. He responds to those parties that advocate application of TELRIC to access by discussing the detrimental impact such a policy would have on the

[113] AT&T at 3, WorldCom at 13.

ability of both incumbents and competitors to invest. He concludes that the choice of the regulatory framework, whether it is ultimately bill and keep or CPNP, will have significant impacts on investment. Rate levels and structures will be particularly important since they are the drivers of earnings, growth and risk and the cost basis for rates will influence investment incentives through its implications for cost recovery, risk and expected earnings.

The suggestion that the FCC prescribe access prices at TELRIC is flawed in two major ways. First, it requires regulators to approximate a market outcome through regulatory structures that cannot work because regulators lack the information necessary to replicate market outcomes. Congress mandated that the FCC adopt a deregulatory telecommunications policy that necessarily entails greater reliance on market forces and not on new regulatory structures. The FCC is well aware that regulatory intervention is far inferior to the market in setting economically appropriate prices. As Justice Stephen Breyer observed in his separate opinion in *AT&T v. Iowa*, 119 S.Ct. 721 (1999), the Courts have consistently recognized the fallibility of regulators who attempt to approximate market outcomes. "Modern critics question whether regulators can accurately determine the 'efficient' cost of supplying telephone service…" Professor Alfred E. Kahn recently noted that for the FCC,

> …simply to prescribe at once what it thinks would be the outcome of that new form of incentive regulation flatly contradicts the reasoning that led both it and the majority of states to abandon cost-plus regulation and move to rate caps in the first place – namely, the inability of regulators to second-guess management decisions and evaluate those costs, except in cases of demonstrable imprudence, or to determine what the ultimate outcome of a competitive process would be…[C]ompetitive markets set prices on the basis (roughly speaking) of the costs of incumbents. Those prices give challengers the proper target at which to shoot – the proper standard to meet or beat and the proper reward if they succeed. If they can achieve costs lower than that, firms will enter and in the process beat prices down to efficient levels. The FCC's choice of – omnisciently – prescribing at once what it thinks would be the *outcome* of such a process, *short-circuits* it…[114]

The FCC must focus on reducing regulation and reconciling the differences in regulation between wireline, cable and wireless networks, and rigorously avoid distorting the allocation of investment and favoring one technology over another.

Second, as Dr. Darby explains in detail, a prescriptive policy will not encourage capital markets to provide investment, but will frustrate the FCC's important goal of encouraging investment in telecommunications networks. This type of regulatory intervention in particular will prevent investment by increasing risk and uncertainty and by

[114] Alfred E. Kahn, "Whom the Gods Would Destroy, or How Not to Deregulate", AEI-Brookings Joint Center First Distinguished Lecture, 2001 at 6.

restricting and delaying the recapture of investment outlays. The added uncertainty that accompanies a change in regulatory policy that has no basis in technology or market forces substantially inhibits investment. Less regulation, not more regulation, will foster an environment conducive to risk taking that will encourage financial managers to commit scarce capital.

Dr. Darby notes that the FCC is well aware of this fact, pointing out that it has been appropriately cautious about not extending traditional regulation to new technologies and new firms that compete with incumbent lines of business. More important, he finds that there is nothing in market experience over the past five years to support extending a prescriptive approach to access services. "While new regulatory tools were established under the Act as transitional devices to help open markets, it was clearly not Congress' intent or the expectations of the capital markets to have regulators prescribe a new set of prices for the telecom sector." He finds no indication from capital markets that current revenue levels generated by access charges have been a deterrent to investment for any carrier. "Most investors will recognize that if the FCC launches a new prescription for access, that process would last several more years and thereby occasion new sources of uncertainty – for all carriers and users involved in related transactions – in an already uncertain market. The result will necessarily be to add risk, increase capital costs and diminish the case for accelerating investment. Certainly a new prescription would diminish investment incentives for ILECs, but by lowering rates for fungible facilities, a Commission move toward prescription would discourage investment for all facilities-based carriers."

Professor Kahn has also warned against the debilitating impact of arbitrary cuts in access prices based on a TELRIC standard on both incumbent and competitive LECs. In 1998, Kahn opposed FCC proposals to arbitrarily cut access charges to TELRIC levels because the depressing effect on investments in upgrading the public network would not be confined to the effect on the incentives of other incumbent and competitive LECs, but would also drastically diminish their ability to finance such investments.[115] Further, since the FCC has already required that CLECs use ILEC access prices as a benchmark, a prescriptive cut in ILEC access prices will necessarily have an equally damaging impact on CLECs by arbitrarily lowering their access revenue streams as well. If this unwise approach were required of all LECs, it would subject previously unregulated CLECs to the vicissitudes of a flawed regulatory approach as well.

[115] Alfred E. Kahn, "Letting Go: Deregulating the Process of Deregulation, or : Temptation of the Kleptocrats and the Political Economy of Regulatory Disingenuousness," MSU Public Utility Papers, 1998 at 108.

The flaws inherent in a prescriptive regulatory approach would only be compounded by a requirement that access prices be based on TELRIC. AT&T and WorldCom blithely state, without factual support, that the use of a TELRIC standard for access charges will promote efficient investment so long as intercarrier rates are appropriately set on the basis of forward looking economic costs. However, as Dr. Darby points out, such a statement merely begs the question raised by Justice Breyer and Professor Kahn as to whether regulators can determine appropriate TELRIC rates. He explains that their TELRIC-related recommendations are based vaguely and ambiguously on imprecisely specified terms that have widely different meanings. There is no way to predict what prices might actually be under TELRIC. As Dr. Darby points out, rates and prices in effectively competitive markets in other sectors of the economy do not reflect TELRIC as the FCC has defined it. Such rates and prices generally reflect a variety of cost bases for prices as well as assorted variations from costs, however defined, based on demand factors, expectations and assorted random variables. Notably, the rates now in effect under the TELRIC standard show very high variation with almost random differences. Even if TELRIC is the correct standard in theory, which experts agree it is not, the implementation of TELRIC has resulted in rates with bases that defy generalization. Any possible efficiency benefits, which USTA avers do not exist, would necessarily require that TELRIC be accurately and consistently applied. Neither AT&T nor WorldCom offer any evidence that that is possible.

In addition, it also begs the question as to what is efficient investment. There is no evidence provided by any party to support the proposition that investment incentives or new capital formation will be increased by prescribing any type of forward looking cost basis. To the contrary, Dr. Darby demonstrates that using TELRIC as the standard to prescribe access prices will compound the uncertainty now pervasive in capital markets and introduce an unnecessary and costly element of regulatory lag and delay. The result would be to reduce total investment in facilities and undercut the incentives of LECs to invest in facilities. Dr. Darby notes that the impacts, as discussed above, also affect the investment programs of entrants thus discouraging facilities-based entry and competition in local markets.

> Adoption of the AT&T plan would compound enormously the uncertainty now pervasive in capital markets and introduce an unnecessary and costly element of regulatory lag and delay. The result would tend to reduce total investment in access and transit facilities by undercutting the incentives for both incumbents and entrants to invest in facilities used in their businesses. Incumbent investment programs would be subject to increased risk and reduced financial reward by adoption of the AT&T plan. This impact on incumbent investment incentives of extending the TELRIC methodology to other service is pretty clear cut. Investment programs for entrants would, for similar reasons, be distorted and investment reduced by moving to TELRIC based access charges. Such charges would discourage facilities

based entry and competition in local markets.

Dr. Darby observes that what clearly motivates and nullifies the various claims about adopting TELRIC to price access services is the very clear expectation that doing so will lead to rate reductions. But there is no evidence presented that such action will benefit consumers or serve the public interest in any way. He suggests that the FCC require that proponents show that TELRIC-based access charges will be sufficient to recover capital and earn required returns properly adjusted to reflect market, technological and regulatory risks or show how a reduction in cash flow from services provided to carriers of the magnitudes suggested by conversion to TELRIC would translate into investment incentives and the level of new capital formation needed by facilities-based carriers.

In fact, the FCC has already heard the self-serving arguments of AT&T and WorldCom seeking prescription of access prices to TELRIC levels. In CC Docket No. 96-262, the FCC properly rejected their arguments and instead adopted a market-based approach to the development of access prices.

> We conclude in this Order, based on our experience in exchange access and other telecommunications markets and the record in this proceeding, that a market-based approach to reducing interstate access charges will, in most cases, better serve the public interest…We believe that this approach is most consistent with the pro-competitive, deregulatory policy contemplated by the 1996 Act. Accordingly, where competition is developing, it should be relied upon in the first instance to protect consumers and the public interest. We acknowledge that a market-based approach under this scenario may take several years to drive costs to competitive levels. We also recognize that several commenters have urged us to move immediately to forward-looking rates by prescriptive measures utilizing forward-looking cost models. We decline to follow that suggestion for several reasons. First, as a practical matter, accurate forward-looking cost models are not available at the present time to determine the economic cost of providing access service. Because of the existence of significant joint and common costs, the development of reliable cost models may take a year or more to complete…In addition, even assuming that accurate forward-looking cost models were available, we are concerned that any attempt to move immediately to competitive prices for the remaining services would require dramatic cuts in access charges for some carriers. Such an action could result in a substantial decrease in revenue for incumbent LECs, which could prove highly disruptive to business operations, even when new explicit universal support mechanisms are taken into account. Moreover, lacking the tools for making accurate prescriptions, precipitous action could lead to significant errors in the level of access charge reductions necessary to reach competitive levels. That would further impede the development of competition in the local markets and disrupt existing services. Consequently, we strongly prefer to rely on the competitive pressures unleashed by the 1996 Act to make the necessary reductions.[116]

[116] In the Matter of Access Charge Reform; Price Cap Performance Review for Local ExchangeCarriers; Transport Rate Structure and Pricing End User Common Line Charges; CC Docket No. 96-262, 94-1, 91-213, 95-72; 12 FCC Rcd 15982, 16001-16002 (1997).

Certainly the overwhelming opinion of the expert economic evidence presented in that proceeding supported the FCC's decision. For example, Richard Schmalensee and William E. Taylor warned that if TELRIC costs were used to set switched access prices, one or more of the following would occur: local exchange rates would be increased, explicit universal service subsidies would increase and/or incumbent LECs would suffer financial losses promoting inefficient competition and hindering network-deployment incentives.[117] They also explained that a prescriptive approach would require detailed FCC intervention in the exchange access market and accurate forecasts of long run competitive prices, a process that would entail significant regulatory costs and risks of error and that would be likely to confound desirable market outcomes and skew long run market dynamics. Dr. Taylor reiterated these views in 1998:

> Any use of a prescriptive approach for moving current access rates to competitive levels would require the FCC to make two very difficult judgments. First it would have to determine the levels that access prices would reach naturally in a competitive market. Second, it would have to determine the true economic cost of access services. These are both easier said than done in today's enormously complex telecommunications industry…Therefore, as long as the industry is to remain open to market forces, it would be pointless and futile to employ a prescriptive approach (based on incomplete or imperfect information) to determine costs and prices… [N]othing in economic theory suggests that multiproduct firms in competitive markets price services at forward-looking incremental costs marked up by some arbitrary allocation of shared fixed and common costs. Firms in competitive markets recover such costs where market conditions – not accounting conventions – permit…A market-based approach reveals the economic cost of access, not as the sum of a TSLRIC study and an allocation of fixed costs, but as the level to which competitive pressure forces access prices.[118]

J. Gregory Sidak and Daniel F. Spulber explained that the adoption of prices for interstate access at TELRIC would guarantee that the LEC could not recover even its forward-looking economic costs unless accompanied by a competitively neutral, nonbypassable charge. They argued that slashing access prices to TELRIC levels would impose unconstitutional conditions on a LEC's right to just compensation. Sidak and Spulber observed that TELRIC pricing of access does not reflect economic costs and therefore creates economic inefficiencies.[119] "In

[117] Richard Schmalensee and William E. Taylor, "Economic Aspects of Access Reform", USTA Comments, CC Docket No. 96-262, Jan. 29, 1997 at Attachment 1 and "Economic Aspects of Access Reform: A Reply", USTA Reply Comments, CC Docket No. 96-262, February 14, 1997 at Attachment 3.

[118] William E. Taylor, "Access Reform Again: Market-based Regulation, Pricing Flexibility and the Universal Service Fund," USTA Comments, CC Docket No. 96-262, Oct. 26, 1998 at Attachment A.

[119] Reply Affidavit of J. Gregory Sidak and Daniel F. Spulber, USTA Reply Comments, CC Docket No. 96-262, Feb. 14, 1997 at Attachment 2.

short, the call to apply TSLRIC or TELRIC pricing to interstate access is a mantra that misapprehends the most basic principles of price theory."[120]

And, finally, Professor Kahn observed that "what is particularly troublesome about the FCC's proposal to base charges for carrier access…at TELRIC, on the basis of the belief that that would be the efficient level, is that its definition of efficiency is entirely static, while the nature of competition – especially in telecommunications – is inherently dynamic…To tie the rates for new services closely to costs, incremental or otherwise, would fatally attenuate the incentives of incumbents to develop new and innovative service as well as of competitors to enter on a facilities basis."[121]

The problems with CPNP will not disappear and the long-term answer to establishing more efficient intercarrier compensation arrangements will not materialize with the prescription of access rates at some TELRIC standard. So long as access charges are used to pursue other beneficial policies such as universal service, TELRIC prescribed access rates are not feasible because such rates will not provide LECs with the ability to support universal service. As USTA explained in its comments, the current system of interstate access charges achieves the historic policy objectives of both low intrastate local rates and low toll rates on a nationwide basis. LECs currently charge interexchange carriers for the costs LECs incur in originating, transporting and terminating interexchange calls. The recovery of these costs from interstate services reimburse a significant portion of the costs borne by LECs which in turn allows the LECs to maintain local rates at affordable levels. The current structure also averages rates to ensure that even customers whose unit costs are above average remain on the public switched network. Eliminating this cost recovery responsibility from toll services will effectively eliminate a nationwide source of revenue from interstate users to help pay for universal service. This cost recovery problem also exists, in many instances to a much greater degree, at the state level.

Even if the FCC concurrently addressed the universal service problem, as USTA also pointed out, the disparate regulatory treatment that allows information service providers to utilize local networks and escape contributing to universal service poses another unresolved problem. This disparity will only serve to incent interexchange carriers to avoid access charge payments through the use of IP technology to provide interexchange service and to be reclassified as ISPs. The regulatory arbitrage opportunities present under the current CPNP that

[120] Affidavit of J. Gregory Sidak and Daniel F. Spulber, USTA Comments, Jan. 29, 1997 at Attachment 3.

are creating market distortions deserve the full attention of the FCC in this proceeding. FCC resources should not be wasted on attempting to develop the "correct" TELRIC price for access because such an exercise will not solve the arbitrage problems associated with CPNP. Even if a jalopy is refitted with smaller tires so that it appears as if it will go faster or will be more fuel efficient, it is still a jalopy.

There are important issues that the FCC should address in order to implement the bill and keep policy framework outlined by USTA. These issues include the development of an explicit, universal service mechanism that meets the requirements of the Telecommunications Act of 1996, the elimination of asymmetrical and outdated regulatory structures, the elimination of uneconomic pricing policies based on obsolete service/provider distinctions such as the ESP exemption, the development of coordinated rate rebalancing at both the state and federal levels and the resolution of operational issues such as equal access obligations, dialing parity, repair and maintenance obligations, billing issues, network compatibility and network security.

B. Virtual NXX Codes Should Not Be Permitted Under CPNP Unless the Carrier Using the Virtual NXX Pays for the Transport.

In its comments, USTA proposed that the use of virtual NXX codes should not be permitted under the current CPNP regime unless the carrier using the virtual NXX pays for the transport from the rate center to the customer as well as any other appropriate compensation and the FCC ensures that the integrity of number resources is preserved. Such restrictions on the current use of virtual NXX are necessary since the current use of virtual NXX codes creates a cost recovery anomaly whereby the originating LEC must bear all of the transport costs of calls using virtual NXX and perverts the numbering system by assigning an NXX to a rate center for customers that are not located in that rate center.

Sprint's interpretation of the Central Office (CO) Code Guidelines is incorrect.[122] When a carrier applies for and receives a NXX code, it is for the termination of public switched telephone network traffic to that carrier's subscribers. In order for a call to reach a subscriber, the subscriber must be identified in a uniform manner that is understood by all carriers and their subscribers so that calls can be completed. Therefore, the assignment and use of number resources must conform to strict industry standards. The CO Code Assignment guidelines set forth how NXX codes can be used.

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[121] Statement of Alfred E. Kahn on FCC's Proposed Reforms of Carrier Access Charges, USTA Reply Comments, CC Docket No. 96-262, Feb. 14, 1997 at Attachment 1.

[122] Sprint at 36.

According to the guidelines, before the NXX code is activated (i.e., the public switched network recognizes the code as valid) the owner has to assign the code to a specific geographic area. Normally the NXX code would be assigned to a rate center located in the exchange where the code owner's customers reside. The NXX code is used in several different ways, including rating and routing functions. When traffic is exchanged between carriers, the NXX code of the called number is the information used to determine whether the call should be rated as toll or local. The Local Exchange Routing Guide (LERG) is the industry's guide regarding the specific routing of a call to a NXX code. The carrier transporting a call to the NXX code of another carrier uses the routing instruction of the LERG and places the call on the appropriate facilities for termination. If a virtual NXX code is assigned, even though the called party is outside the NXX routing area, the LERG rates the call as local even though it routes the call through the interoffice transport facilities of the local carrier just as it would a toll call. Thus, the call is accounted for as local and the carrier assigned the virtual NXX avoids paying access charges even though the call is an interexchange call. Compounding the problem is the fact that the originating carrier is billed for reciprocal compensation.

While the guidelines allow a carrier to obtain a NXX in advance of having a subscriber base in a particular geographic location, it is a clear violation of the guidelines to assign a NXX in a location where a carrier does not exhibit any intention of locating facilities and/or marketing its services. It is also a violation of the numbering guidelines to assign a NXX to a customer that is not located in the NXX routing area. While USTA agrees with several parties that numbering issues should be addressed specifically in CC Docket No. 99-200, nevertheless mischaracterization and misuse of currently accepted CO Code Assignment guidelines should not be permitted in this proceeding.[123]

Many commenters agreed with USTA's position. Verizon Wireless points out that some carriers are using virtual NXXs to disguise the fact that these calls are not local and that the carriers should be paying access and should not be receiving reciprocal compensation from the originating LEC for these calls.[124] BellSouth warned that virtual NXX warps the existing intercarrier compensation mechanisms and distorts the competitive landscape.[125]

It appears that those commenters who disagreed with USTA's position base their arguments on a mischaracterization of virtual NXX traffic. Many argue that virtual NXX is similar to a Foreign Exchange (FX) call

[123] Competitive Telecommunications Association at 28 and KMC Telecom at 7.

[124] Verizon Wireless at 31.

[125] BellSouth at 7. *See,* Michigan Exchange Carriers Association at 45

and therefore should be treated in the same manner.[126] Such statements are not factually correct. Virtual NXX bears no resemblance to FX service. Virtual NXX refers to the use of NXX code assignments to mask non-local traffic, as described above, when toll calls are rated as local calls and yet are routed to distant toll points. In the case of FX service, the LEC actually has facilities and customers in the exchange area for which it has received a NXX code. With virtual NXX, carriers do not have either facilities or customers in the exchange area. As explained by Verizon, transporting a FX call does not impose transport costs on other carriers. Rather, when a customer who actually resides in the exchange area where the LEC NXX is assigned calls an ILEC FX customer, the call is routed to the originating carrier's switch and then returned to the ILEC switch in the same exchange area. The ILEC then transports the call to the distant FX customer.[127]

Recently, the Maine PUC wrestled with the problem of virtual NXX. After investigating the use of virtual NXX codes assigned to Brooks Fiber, the PUC found that, based on the facts before it, Brooks was not using the NXX codes it had acquired for the purpose of providing local service, but was instead using the codes to provide an interexchange service it was characterizing as "like foreign exchange (FX) service".[128]

The Maine PUC clearly disputed this view and clearly distinguished FX from virtual NXX service. According to the PUC, under traditional FX service, a FX customer located outside of a local calling area can place and receive local calls to and from customers inside the local calling area. However, the FX customer must not only pay the local service rate in the local calling area, but must also pay the cost of the dedicated transport facilities that connect its premises to the local calling area. Under virtual NXX, there is no dedicated transport facility connecting the customer to the local exchange area. Instead, the connection is made using standard interoffice trunking facilities, the same facilities that are used to transport toll calls from the local calling area to an out of area FX customer. "Customers subscribe to FX to avoid paying toll charges and to allow others to call them without toll

[126] See, for example, Cablevision at 6-7, and Cbeyond Communications at 13.

[127] Verizon at 7.

[128] State of Maine Public Utilities Commission Investigation into Use of Central Office Codes (NXXs) by New England Fiber Communications, Order Requiring Reclamation of NXX Codes and Special ISP rates by ILEC's, June 30, 2000. Sprint attempts to distinguish the Maine decision on the grounds that in its Order on Remand and Report and Order in CC Docket Nos. 96-98, 99-68 regarding intercarrier compensation for ISP-Bound Traffic, the FCC stated that ISP bound traffic was information access and not exchange access and thus the Maine decision no longer applies. Sprint's argument relies on an overly broad interpretation of the term information access. It is not clear that the FCC intended information access and interexchange access to be mutually exclusive. In fact, the FCC has been decidedly vague in its definitions and it continues to rely on state interpretations of specific facts regarding local traffic.

charges, but they must have substantial toll calling volumes between the two locations to justify the cost of the dedicated transport facilities."[129] The Maine PUC found that based on the facts before it, the "FX like" service Brooks provided was actually a substitute for interexchange service and was not in fact local exchange service:

> A toll-free service that uses trunking facilities rather than dedicated facilities can be provided efficiently (from an engineering perspective) using either Brooks' "FX-like" configuration or an "800-like" configuration. The significant difference between the two methods is the vastly greater number of NXX codes used in the Brooks configuration. We suspect that the real difference to Brooks between those two alternatives is that by continuing to argue that it should be permitted to use 54 NXX codes to provide its service, on the grounds that the "FX-like" service is "local exchange service," it may hold onto its hope that it might avoid paying Bell Atlantic for the interexchange transport service provided by Bell Atlantic. By contrast, under an 800-like service it would be clear without any doubt that Brooks would have to pay the legitimate interexchange costs of long-distance transport, either buying (and paying access charges for) the facilities of another carrier or by paying for the costs of providing its own facilities.[130]

Other commenters claim that competitive carriers should be permitted to define the boundaries of their call areas for inbound as well as for outbound calls.[131] As USTA explained in its comments, a virtual NXX code has the effect of changing the local calling areas of the originating LEC because the call is rated as local even though the called party is outside the local calling area established by the state commission. The effective changes in the local calling area occurs without providing the state commission an opportunity to ensure compliance with any local requirements and without regard for the impact on competition, rate levels or customer interests. The Maine PUC also addressed this issue. It found that Brooks was free to offer calling areas of its own design so long as, when it uses the facilities of others to accomplish that end, it pays for those facilities on the basis of how the owners of these facilities define them for wholesale purposes. It noted that with the "FX-like" service, Brooks was not attempting to define its own calling area and was not offering a different calling area than that of the LECs. It concluded, "when a carrier uses the facilities of others, it cannot unilaterally redefine wholesale arrangements between itself and the carriers that actually carry its traffic simply by declaring that its calls are "local" if that recharacterization is to its financial advantage."[132]

The prerequisite to a rational policy in this regard is to establish a clear understanding as

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[129] Maine PUC at 9.

[130] *Id.* at 12.

[131] Focal, Pac-West and RCN at 59.

[132] Maine PUC at 15.

to where one carrier's responsibility ends and another carrier's responsibility begins. For local calls, that responsibility transfer point must be within the local calling area of the customer originating the call. Carriers cannot arbitrarily alter the local calling areas already established as Sprint suggests.[133] Misuse of numbering resources or mischaracterization of services should not be allowed to defeat this basic premise. By clearly determining where the responsibility to transport local traffic changes hands, carriers can then make business decisions about whether to purchase facilities required to handle the traffic. USTA agrees that with virtual NXX or FX-like services, the traffic should be considered local only if a dedicated facility exists between the carrier owning the virtual NXX code and the local calling area. If the traffic is carried on interoffice facilities to a customer located outside the local calling area, the call is an interexchange call and is not subject to reciprocal compensation, but is subject to originating access charges. Carriers must pay when they use the facilities of another carrier to complete calls. AT&T claims that virtual NXX is merely a "low cost" alternative to other services.[134] As has been demonstrated, the only reason this alternative is "low cost" is because carriers are not paying to use the facilities of another carrier. While it may come as a surprise to AT&T, there is no free lunch. Carriers should not be expected to provide transport of local calls beyond *their* local calling area without compensation.

III. A BILL AND KEEP MECHANISM MUST MEET THE OBJECTIVES, CONCERNS AND CONDITIONS AS EXPLAINED IN USTA'S COMMENTS

In its comments, USTA provided a framework for consideration of a reasonable bill and keep mechanism for the future. That framework addresses many of the problems associated with the current CPNP regime and would permit carriers to address the technology and market forces influencing the telecommunications industry so long as the conditions are met. These conditions, discussed in greater detail in USTA's comments included: 1) sufficient transitional equity to permit carriers who have designed their business plans based on assumptions inherent in CPNP regarding compensation, cost, rate and investment determinants the critical opportunity to adapt to a different set of assumptions; 2) the implementation of targeted, explicit, specific, predictable, sufficient and competitively neutral universal service; 3) pricing flexibility; 4) application to all carriers, networks and technologies; 5) application to both the interstate and intrastate jurisdiction; and, 6) the development of a reasonable bill and keep mechanism.

[133] Sprint at 37.

[134] AT&T at 60-61.

USTA stated that a reasonable bill and keep process must be accompanied by the rebalancing of current price structures. Since bill and keep may require shifting cost recovery responsibilities to end user customers, universal service support will be required in areas where prices are not affordable and reasonably comparable. In addition, all carriers should have pricing flexibility to implement capacity-based pricing plans, package pricing and any other plan that meets customer needs. Carriers should also have the flexibility to consolidate pricing of network access with local service pricing.

In addition, a reasonable bill and keep mechanism should apply to all carriers, networks and technologies for the interconnection of switched services, including intrastate switched access, reciprocal compensation, intracompany settlements, wireless and paging. It should exclude specialized or ancillary network arrangements such as special access, 800 database, LIDB, directory assistance and operator services. Each network access provider should be permitted to recover network access costs from its end user customer or universal service. Network access providers should negotiate network to network arrangements if necessary to interconnect their respective networks on a nondiscriminatory basis. If negotiations fail, default rules would apply so that the calling party's network access provider is responsible for the network to network transport to reach the POI serving the called party. Several parties commented on some of these conditions as will be discussed below.

A. A Geographic Limit on a Carrier's Obligation to Reach the POI is Required

The establishment of default rules regarding the location of and corresponding responsibilities associated with the POI will be critical in assessing whether a reasonable bill and keep mechanism can be established. The POI issue is important because if the originating carrier must transport traffic long distances, its costs will increase and these costs must be recovered from its end user customer under a bill and keep arrangement. In cases where the amount and distribution of traffic is fairly balanced, carriers will have greater incentives to negotiate a mutually agreeable POI. However, in other cases, carriers may have greater incentives to minimize costs by attempting to force the interconnecting carrier to bear the majority of transport costs. There must, therefore, be a geographic limit on the network access provider's obligation to reach the POI that considers network efficiency, technical feasibility, customer density and size of serving areas. Transitional POIs may have to be developed. Even if some CPNP arrangements are maintained, the POI raises important issues that must be thoroughly evaluated.

Most parties shared USTA's concerns and agreed that a geographic limit on the location of the POI would be appropriate.[135] Cablevision disagreed but did not offer any solution that would even begin to address the costs associated with the geographic placement of the POI.[136] Many parties also supported retention of the current requirement of a single POI per LATA.[137] While this may be an appropriate starting point for evaluation, there is nothing in their comments that provides any analysis as to whether the current rule will be appropriate in the future, particularly given the fact that LATAs may not even be a relevant boundary in the future.

Several parties argue that for interconnection between ILECs and CLECs, the POI must be at any technically feasible point on the ILEC's network.[138] These parties mischaracterize the requirement of Section 251(c)(2) arguing that competitive carriers must be permitted to interconnect with ILECs at any technically feasible location regardless of whether that location is within the ILECs' calling area. They fail to consider the need to recover costs incurred to transport calls outside local calling areas. In order to ensure competitive neutrality as well as a fair distribution of transport costs, the FCC should adopt a symmetrical structure that would be applicable to all carriers. Both AT&T Wireless and Sprint suggested that ILECs and interconnecting carriers should share transport costs and that new rules should be established regarding transport responsibilities and costs.[139] The best policy approach, as USTA discussed in its comments, would be to facilitate negotiations among carriers and reduce reliance on regulation.

B. Carriers Should Not be Required to Provide Transiting Services Without Sufficient Compensation

USTA commented that under a reasonable bill and keep arrangement, network access providers with transport obligations should be free to build their own facilities or to lease facilities from a wholesale provider or from the called party's network access provider. However, network access providers should not be required to provide transiting services or to otherwise act as a wholesale provider without sufficient compensation. Some parties took the position that, as an alternative to bill and keep, ILECs should be required to provide transiting

[135] BellSouth at 14-15, SBC at 25-30.

[136] Cablevision at 3-6.

[137] Level 3 at 20, Time Warner at 12.

[138] AT&T at 56, Global NAPS at 2

[139] AT&T Wireless at 56 and Sprint at 17. Sprint also proposes to base the location of the POI on specific traffic thresholds. The particular thresholds recommended by Sprint probably would not work well for interexchange traffic where volumes, particularly for larger carriers, would meet the minimum threshold immediately and therefore would require additional POIs to be established in a LATA immediately.

at TELRIC rates.[140] It seems unlikely, however, that these parties would want to be subject to such a requirement themselves. The FCC does not currently have exclusive authority to require transiting or to establish cost standards for transiting except for interstate traffic. A better policy option would be to permit all carriers the ability to offer transiting as an unregulated service. Certainly the market for this service in most areas is competitive and regulation would not be required. And, if carriers do not want to purchase transiting service they could purchase special access under tariff. However, if the FCC determined that it must impose regulation, transiting should be treated as special access and the rules applicable to special access would apply to transiting.

C. A Reasonable Bill and Keep Policy Should be Applied to All Carriers, Networks and Technologies

If a reasonable bill and keep policy is developed, USTA believes that the transition should apply to all carriers, networks and technologies to avoid the creation of new uneconomic, arbitrage opportunities and unfair competitive advantages. Many of the problems with the CPNP arise from disparate regulatory treatment of similar services. CMRS providers commented that they should be permitted to move to bill and keep immediately.[141] There is no evidence provided that fully discusses the potential impacts of such a proposal or what arbitrage opportunities would arise therefrom.

A new policy should avoid the mistakes of the past and be applied in a technologically and competitively neutral manner. Regulation asymmetrically applied to different carriers, technologies, service platforms and services will create new arbitrage opportunities. Regulation that creates artificial distinctions also creates false market signals, distorts investment incentives and leads to the misdirection of resources. Any benefits that may be obtained from bill and keep will necessarily be diluted if regulatory handicapping and platform discrimination are maintained in the FCC's rules. All of the suggestions by commenting parties to take this opportunity to impose new costing, pricing, interconnection and service obligations on ILECs must be rejected. It is neither advisable nor sustainable to perpetuate the disparities in regulatory control of market conduct as they now exist. As USTA pointed out in its comments, most of these differences are historical artifacts derived from dissimilar business origins and evolutionary paths. While the FCC has tended to refrain from regulating new entrants, services and platforms, it has been less successful in reducing regulation on incumbent firms in increasingly competitive markets.

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[140] AT&T at 62, Nextel at ii.

[141] Sprint at 2.

Market forces will be much more likely to serve the public interest now than in the past as market rivalries intensify due to the availability of new technology platforms and expanded broadband telecommunications offerings. The growth of voice over Internet protocols and the increasing ability of providers to offer bandwidth to be used in different applications in ways fully at the discretion of the customers will fundamentally undermine the rationale for many of the FCC's regulations governing the public switched telephone network. Unlike many of the commenters in this proceeding, the FCC must carefully weigh all the consequences of disparate regulatory policies.

IV. CONCLUSION

The importance of policies that will provide positive incentives for investment in network infrastructures cannot be overstated. The FCC must reject new regulatory schemes that will foster uncertainty and delay. Providing the correct signals for investment is the best way to encourage broadband deployment and local competition. Likewise, the FCC must eliminate uneconomic arbitrage opportunities that are used to escape paying originating carriers for costs that are incurred to use their facilities. New policies should also be focused on reducing regulation and reconciling the differences in regulation between wireline, cable and wireless networks, and rigorously avoid distorting the allocation of investment and favoring one technology over another.

Respectfully submitted,

UNITED STATES TELECOM ASSOCIATION

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November 5, 2001

Statement of Larry F. Darby
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Accompanying Reply Comments
of the United States Telecom Association

in
CC Docket No. 01-92

Developing a Unified Intercarrier Compensation Regime

November 5, 2001

I. Qualifications

1. I, Larry F. Darby, conduct a regulatory economics and financial consulting practice focused on the interfaces among regulation, services markets and financial markets in the information technology space. I received a Ph D in economics from Indiana University where I specialized in microeconomic theory, industrial organization and regulatory economics. I have been Assistant Professor of Economics at Temple University, Senior Economist in the Office of Telecommunications Policy (Executive Office of the President), Chief of the Economics Division and Chief of the FCC Common Carrier Bureau, Vice-President in Lehman Brothers Investment Banking Group and for the past decade have served as Lecturer in Telecommunications Finance at the George Washington University Graduate School. I have published several articles, reports and commentaries on the bridges among regulatory programs, capital formation and economic welfare in telecommunications.

II. Purpose and Summary of Statement

2. I have been asked by the United States Telecom Association to address the relationships between proposed FCC regulations, capital formation in telecommunications networks and economic welfare. In this statement I will address the importance and regulatory means for promoting investment and long term efficiency in telecommunications in the context of discussing how FCC regulations can be expected to influence the level, composition and timing of capital formation in the sector. I will identify linkages between regulations pertaining to rates and rate making standards and their impact on investment incentives and capital expenditure programs. I will focus on contentions respecting standards for determining access and transit rates raised by respondents in this proceeding. My conclusions follow:

- Investment is and has been a critical and discrete goal of national policy (Paras. 3-10);

- Broadband investment is a proper goal for this proceeding; dynamic efficiency -- getting signals correct for investment -- is more important than other shorter term notions of efficiency; and there are sound and compelling reasons for weighting investment heavily among Commission decision criteria (Paras. 11-18);

- Rate and service regulations like those under consideration here are critical components for financial investors and managers of regulated firms through their impact on incentives related to earnings, risk and growth. Alternative models of investment and empirical studies alike accord substantial weight to FCC regulations in capital formation decisions (Paras. 19-31);

- Uncertain capital markets are marked by considerable risk aversion, including aversion to risks from delays and uncertainties likely to accompany any new FCC rate prescription program. Investors perceive and are counting on continuation of trends toward less regulation and greater reliance on markets. Financial markets have shown no indication that current access regimes send the wrong signals or that they diminish incentives for capital formation (Paras. 32-41).

- Parties advocating use of TELRIC to prescribe access and transit charges provide no basis in principle or evidence from past or current pricing practices. Advocates have provided no evidence that expansion of TELRIC principles and ratemaking practices is needed to, or will in fact, encourage investment in local networks. (Paras. 42-64)

III. Argument

A. Background

3. Fostering investment in telecommunications networks is an important and discrete goal of the Telecommunications Act of 1996. Debate preceding the Act was marked by clear expressions of Congressional intention to stimulate investment and innovation as a means of furthering the public interest in telecommunications. Language from the Senate Report is direct and unequivocal:

> The goal is to accelerate deployment of an advanced capability that will enable subscribers in all parts of the United States to send and receive information in all its forms...over a high-speed switched, interactive, broadband transmission capability.[142]

4. When signing the new law President Clinton highlighted stimulation of investment as first among his Administration's policy goals for the telecommunications sector:

> For the past three years, my Administration has promoted the enactment of a telecommunications reform bill to stimulate investment, promote competition, provide open access for all citizens to the Information Superhighway, strengthen and improve universal service.[143]

5. With that the President made clear that creating a regulatory environment to promote investment in telecommunications infrastructure enjoyed the same rank as increasing competition and improving universal service as fundamental goals of national telecommunications policy. Accordingly, the 1996 Act requires the Commission to pursue not only competition policy, but also infrastructure investment policy and regulatory reform.

6. Given the Commission's relative emphasis on the Act's different goals, it is important for purposes of this declaration to make clear at the outset my strong view that competition policy and investment infrastructure policy are <u>not</u> congruent. The set of rules that advances any particular version of competition policy -- and there are many such versions -- need not, and most likely will not suffice to fulfill the requirement of fashioning a coherent set of rules and regulations designed to promote investment.[144]

7. The Commission has labored hard to fashion rules fostering its particular version of competition in markets for local telecommunications services. However, any and all rules enabling easier entry and promoting the health of competitors do not constitute in principle or in fact a policy to "accelerate deployment of an advanced [high speed, broadband] capability" in the local marketplace.[145] Those rules have mixed effects on an array of incentives that motivate different firms, using different technologies, to take the risks associated with investment in local infrastructure. The Commission has heretofore made no identifiable, sustained effort to fashion rules explicitly designed to encourage investment. As I will elaborate below, rules promulgated in the name of advancing the Commission's particular version of "competition" will, in fact, under a wide range of prevailing circumstances, discourage investment by both incumbents and entrants.[146] It is notable in this regard that steady, sustainable investment has grown very

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[142] Senate. Report 104-23, 104th Congress., 1st Session 50 (1995), p. 51.

[143] President Clinton's remarks at the signing ceremony are available online at: http:\\www.whitehouse.gov.

[144] The details of this argument are set forth in Larry F. Darby and Joseph Fuhr, "Investment Incentives and Local Competition at the FCC", <u>Media Law & Policy</u>, Vol. IX, Number 1, Fall 2000, pp. 1-18, especially 10-13.

[145] Preamble to House Conference Report 104-458, 104 Cong., 2nd session.

[146] I emphasize here the important but infrequently recognized fact that the structure, processes, opportunities and constraints established by the Commission in its Local Competition Order under the term "competition" are by no means unique. The version of competition implied by the Commission's construction in that order constitutes one of countless subsets of circumstances that might have been prescribed under the broad rubric of competition. The major distinction for present purposes relates to

rapidly in those areas least constrained and minimally distorted by detailed regulation – wireless, backbone broadband links and to an important extent in the cable television sector. Thus, optimal investment policy may be linked to deregulation more tightly than to the Commission's local competition policies to date.

8. Investment in infrastructure has long been a goal of regulation, but has ironically enjoyed less favor recently. The desire to promote investment has historically been a driving force in the development of national telecommunications policy under the 1934 Communications Act. For five decades after its passage, until approximately the time of the divestiture of AT&T, the goal of promoting capital formation in order to expand the geographic reach of the voice telephone network was paramount. The evolution of telecommunications policy under the mandate of the 1934 Act "...to make available...to all of the people...a rapid, efficient communication service with adequate facilities..." was harnessed to promoting investment as a means of achieving that goal. Both the structure of the industry and the conduct of its participants were constrained to promote investment in an expanding, public switched, common user network.

9. Nearly all major rulemakings during the period -- irrespective of their principal focus – considered the likely impact of proposed rules on investment incentives and plans as they related to broadening the reach of the public switched network. The Commission consistently exercised great care to make certain that its rules assured levels of expected earnings, anticipated growth and risk sufficient to induce high levels of investment in network facilities.

10. Some service rates were held below cost, but others were priced so as to generate surpluses to assure a compensatory return on investment sufficient to bring about continuous capital renewal, plant modernization and growth. Steady and predictable growth was assured by regulatory barriers to entry that protected incumbents from most competition. Risk was minimized by those same entry restrictions, but also by adoption of a) rules to assure opportunities to garner rates of return commensurate with weighted average market costs of capital, b) depreciation rules that insulated companies and consumers from the risks of technological change and c) assorted complementary cost accounting conventions. The result was a private/public compact that assured a steady stream of investment in the sector sufficient to wire over ninety-five percent of the nation's households. There is no consistently applied national policy for encouraging investment in new technologies or for expanding local networks today. The new, and laudable, emphasis on competition has not been accompanied by companion measures designed to contribute to assuring stable, high levels of investment in an increasingly risky and dynamic market environment.

B. Primacy of Dynamic Efficiency and "Correct" Investment Incentives

11. The Commission expressly solicited views regarding the impact of alternative intercarrier compensation regimes on different kinds of efficiency -- including investment in the deployment of broadband network infrastructures.

> ...we seek comment on the appropriate goals for intercarrier compensation schemes...[and] whether efficiency should be the sole or paramount goal of intercarrier compensation policy. We also seek comment on how we would evaluate whether a particular intercarrier compensation regime encourages efficiency [and] ...whether a particular pricing regime encourages the efficient use of the network? Should we also consider whether a particular pricing regime encourages the efficient investment in, and deployment of, network infrastructure, including investment in broadband infrastructure...[and]

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facilities based competition versus resale or UNE based competition. For a full appreciation of the richness and vagueness of the notion of competition, without qualification, see the standard on the matter, John Maurice Clark, Competition as a Dynamic Process, The Brookings Institution, Washington DC, 1961.

> whether a particular intercarrier compensation regime is technologically and competitively neutral?[147]

12. Thus, the Commission has invited responses to a broad range of questions about the effects of its policies respecting intercarrier compensation regimes on both economic efficiency in general and investment in particular. This recognition of the importance of investment and the impact of its rules is a very encouraging development and stands in sharp contrast to the Commission's focus following the 1996 Act. While the NPRM does not explicitly categorize different kinds of efficiency, it does recognize in a general way some distinctions. The NPRM distinguishes between a) efficiency in use, what economists call allocative or static efficiency resulting from "getting prices right" and b) efficiency in terms of encouraging the right level, composition and timing of investment in different platforms and technologies. The first is static and oriented toward the short run, while the latter is long run and dynamic in its focus on allocation of capital and the composition of investment.

13. Dr. Joseph Farrell and Dr. Benjamin E. Hermalin in their declaration supporting Time Warner Telecom support the Commission's view. Farrell and Hermalin make repeated reference to the requirements of efficiency in the rate making process. They point out that termination charges "may effect many economic incentives" and thereby have different influences on different kinds of efficiency.[148] In that context, they distinguish three types of efficiency, each related to incentives for different economic decisions over different time periods. Retail rates may effect users' decisions in the short run -- the immediate period -- as to whether to make or receive calls [from their carrier of choice]; a longer run decision relates to carrier choice of rates for competitive purposes which will impact consumers' choice of carriers; and, still longer, rates [and their relation to costs] will affect carriers' choice of network architecture [that is, the fundamental decision of whether or not to invest and, if so, in what types of technologies and platforms].[149]

14. Farrell and Hermalin observe that each of these three classes of economic efficiency in their taxonomy is potentially important. They correctly point out that much of the economic analysis in the record (especially the papers of Dr. DeGraba for WorldCom and Hermalin-Katz for Time Warner Telecom) focuses mainly on short run efficiency incentives driven by user decisions about whether or not to make calls. They argue from there that: "...the NPRM is less than crystal clear" in its analysis of longer run rate impacts with respect to users' choice of carriers, especially with respect to choosing ISPs. They go on to observe that "...the effect on carriers' choice of network architecture does not appear to have been thoroughly addressed [in the NPRM]. They conclude: "...while retail pricing efficiencies have long been important...it is by no means clear that this should be the main, let alone the only, focus of termination charge policy going forward...[A]ttention should be given to other [kinds of efficiency] concerns." [150]

15. Consistent with the Farrell and Hermalin chain of reasoning, I also conclude that the impact of the proposed rules and proposed alternatives on innovation and investment -- its level, composition and timing -- has been overlooked, or substantially underemphasized, by respondents to the NPRM.

16. While all forms of efficiency are important, as Farrell and Hermalin recognize, they are clearly not equally so in the determination of the Commission's obligations under the 1996 Act. The Commission does well to encourage efficiencies of all kinds, but when there are conflicts borne of the

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[147] *In the Matter of Developing a Unified Intercarrier Compensation Regime*, FCC, CC Docket No. 01-92, Notice of Proposed Rulemaking, Adopted April 19, 2001, para. 33. (Hereinafter, "Notice").

[148] Joseph Farrell and Benjamin E. Hermalin, "Analysis of Central Office Bill and Keep ('COBAK')" , August 2001, p. 2, (Emphasis supplied).

[149] Farrell and Hermalin, p. 2.

[150] Farrell and Hermalin, p. 5.

recognition that some rules favor one kind of efficiency over another kind, the Commission should give great weight to dynamic, long term considerations and thereby evaluate its rules carefully and fully with respect to their impact on investment and innovation.

17. This is not to say that short run, static, allocative efficiency concerns should be ignored, or that such concerns are necessarily inconsistent with longer term, dynamic, investment efficiency considerations. It is to say that fostering investment efficiency, and "correct" investment signals, is important in its own right and that, if and when there is conflict, the effect of the Commission's rules on investment should be accorded considerable weight, more so than in the recent past, in determining the public interest.[151] Doing so will assure more diligent pursuit of Congress' goal of fostering development of modern telecommunications infrastructure.

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[151] A noted antitrust scholar stated this point more succinctly. "We know that many discussions of antitrust policy and efficiency have violated the New Testament injunction against beholding the mote and ignoring the beam. X-efficiency is much more important than allocative efficiency and dynamic efficiency is almost surely even more important. F..M. Scherer, "Antitrust, Efficiency and Progress", New York University Law Review, vol. 2, November 1987, p. 1018.

Dynamic efficiency is critical; even more so than more conventional static measures, if Scherer is right. Kamien and Schwartz expressed pretty much the same sentiment in their review of the literature addressing connections between market structure and innovation.

> Thus, technical advance appears to require the sacrifice of some allocative efficiency at each moment of time for the purpose of greater efficiency in the long run. Morton I. Kamien and Nancy L. Schwartz, Innovation and Market Structure, Cambridge University Press, 1982, p. 217.

In a well known review of market structure and innovation -- including investment in advanced technologies and introduction of new goods/services – William Cohen and Richard Levin report a wide range of estimates and considerable uncertainty about the importance of losses from static inefficiency from misallocation of resources. Germane here, they conclude:

> Even the largest of these estimated costs might be worth incurring in return for modest improvements in the rate of technological progress. The potential trade off between static and dynamic efficiency is therefore central to evaluating alternative modes of firm and market organization. William Cohen and Richard C. Levin, "Innovation and Market Structure, in Richard Schmalansee and Robert D. Willig, eds. Handbook of Industrial Organization, p. 1060.

Thus, short run static efficiency is important, as are efforts by regulators to achieve it. But, the longer run performance of the economy depends most on investment and innovation -- activities that are not necessarily, or even probably, optimized by singleminded pursuit of policies requiring arbitrary costing and pricing standards -- especially if those are pursued, as they have been, without regard to dynamic considerations.

18. There are sound reasons for emphasizing investment and according it substantial weight in determining the overall public interest:

- The next generation of local networks will be very capital intensive with high ratios of sunk costs of investment relative to variable operating costs;

- Success of the Commission's competition policies require concurrent development of multiple paths from end users to national networks;

- Capital markets are increasingly wary of underwriting these costs (as discussed further below);

- Investment in the sector and particularly spending leading to deployment of advanced services has slowed dramatically in recent months; and,

- It is now commonplace to link the performance of the overall economy to performance of the information technology sector which increasingly relies for its growth on upgrading the broadband capability of local networks via more rapid capital formation.

C. Investment in Local Networks Is Linked to Rate Regulation

19. Regulation is a central element in most investment decisions. Federal regulations and those in state jurisdictions derived from them influence the level, composition and timing of new capital formation through their impacts on security prices in financial markets and through their effects on managements' capital budgeting and investment decisions.

20. Managers of local exchange telecommunications companies are constrained by the force of government rules advancing national policy goals. They are also compelled by the economic, technological and financial forces driving markets in which they participate. These forces are reflected in competition with other service providers, as the Commission has noted on countless occasions, but also in capital markets to which professional managers are strictly accountable for the use of the assets they deploy and to their owners. This dual responsibility should be recognized by the Commission and reflected in its decisions. Managers are subject to the discipline imposed by the financial objectives and alternative investment opportunities of their creditors and shareholders.

21. Managers must be and are responsive to the investment alternatives and financial goals of investors in order to attract low cost capital. Managers have a fiduciary responsibility to shareholders and creditors. The penalty for neglecting investor requirements is a higher cost of capital and higher prices to end users. For example, suppose managers disregard the preferences and values of investors, say, by launching capital expenditure programs investors find "unworthy" on the basis of their assessment of the programs' risk/return/growth profile. The result will be higher cost of market supplied equity and debt occasioned by investors selling off those securities. Given the very capital intensive nature of broadband telecommunications networks, this will lead over time to higher costs (interest, depreciation and required return on equity) which will in turn translate through market processes into higher end user prices and/or lower service quality as firms attempt to offset higher capital costs by lowering operating costs. Notwithstanding management efforts to comply with assorted regulatory exhortations that cost shareholders, they must in all cases be aware of these longer term and costly implications of doing so.

22. Institutional and individual investors alike apportion funds to different financial instruments in accordance with their particular financial circumstances and investment objectives. These objectives take several different forms. In most cases, they can be expressed in terms of current income, future growth, security (risk aversion) and increasingly in terms of flexibility and options related to deployment of the underlying assets.

23. Investors' goals are transferred to firm managers of the real assets to which financial interests attach. Incumbent local exchange company managers, like others, are impelled by capital market pressures to create, deploy and manage assets and the utilization of cash in ways that tend to maximize shareholder

value. Incentives from capital markets are conveyed to managers and require them to undertake different investment activities according to reasonable and informed expectations about risk, return, growth and future opportunities. Regulation affects of each of these investment criteria in ways discussed further below.

24. The requirements of investors constrain professional managers of local exchange companies to make only those investments that can be reasonably expected to yield current and future returns commensurate with investor perceptions of the risks involved, including regulatory risk . Such investment must also be fully informed by awareness of its opportunity costs of the capital to be committed, as measured by the returns available in unregulated sectors.

25. All companies -- regulated or unregulated -- must budget scarce capital. A principal task of management is to allocate cash not required by current operations, interest payments, taxes or dividends among competing uses. Like investors in financial securities, those who determine capital expenditures within firms must distribute limited funds among a large array of alternative investment opportunities. They are constrained to a budget consisting of internally generated cash and external funds available in capital markets.

26. It is important for the Commission to reflect in its rules the fact that the build out of broadband networks by incumbent firms depends critically on the views of external investors as expressed by their dollar votes in capital markets. Internally generated cash flow has been and is being eroded by competition for high margin, high volume accounts. The threat of further erosion is real as other technologies develop and new firms improve their ability to vie for other basic voice-related revenue streams. The development of broadband networks by incumbents will become increasingly more sensitive to the availability of external capital and the preferences being expressed in securities markets where managers' plans are daily, carefully and critically reviewed by investors. The inescapable reality of cash budget constraints forces managers to make choices based on the signals they get from capital markets indicating the expected value to shareholders of different allocations.

27. This foregoing conclusions follow from a view of investment contained in a traditional discounted cash flow or net present value framework. Constraints and opportunities created by government -- policies, rules, regulations and orders -- influence each of the inputs into standard investment models. Indeed, it is difficult to conceive of an important regulatory decision made under the 1996 Law that does not have investment implications for incumbents, their business customers, their suppliers and their competitors.

28. Regulated rates directly impact revenues, cash flows, earnings expectations and growth. The cost basis for such rates are equally instrumental since changes in cost bases will lead to rate changes and consequent changes on revenues, cash flow and earnings. Interconnection requirements, while dramatically different for incumbents and entrants, change the cost basis for rates, revenues and earnings, for both and thereby distort investment incentives from their free market benchmarks. Ratemaking processes give rise to regulatory lag and uncertainty, which are of considerable concern to investors in facilities based firms -- entrants or incumbents. Rules addressing entry conditions, pricing flexibility and subsidiary regulatory programs have significant implications for market risks, technological risks and other uncertainty to which investors are sensitive.

29. Considered in a discounted cash flow framework, regulation clearly and substantially matters to investors and alters values associated with alternative investment decisions. The same conclusion emerges from consideration of older and newer frameworks for understanding and predicting investment. Traditional microeconomic models treat the investment decision in the context of demand for an input -- capital goods -- into the production process. Thus, in the neoclassical theory of the firm investment is positively related to output price and negatively related to the risk adjusted cost of capital. Regulations that lower rates and increase capital costs will tend to reduce the rate of investment. Regulatory delay and

uncertainty create risk and increase the cost of capital. Regulatory handicapping that redistributes value among firms will change the level, composition and pace of investment.[152]

30. A more recent development in the theory of investment considers the scope of various "real" options and their effects on the incentive to invest.[153] Real options in an investment context involve the ability, or lack thereof, to change the scale, scope, timing, composition or level of investment once an initial decision has been made. Options to defer, learn, bail out, shrink or expand in connection with investment decisions lessen risk and create value. It follows that regulations that create or destroy such options will impact the value and incentive of various kinds of investment. Regulations routinely discriminate among firms in the creation/destruction of such options and thereby redistribute investment incentives.

31. I have considered alternative intercarrier compensation schemes in the context of different views of the determinants of investment and concluded that:

- Irrespective of the investment framework used for evaluation, the choice of regulatory framework -- be it bill and keep or CPNP -- and the details of implementation are predicted to have substantial impact on the level, composition and timing of investment;

- Rate levels and structures are particularly important, since they are drivers of earnings, growth and risk; and,

- The cost bases for rates will influence investment incentives through their implications for cost recovery, risk, expected earnings and future real options.

D. Investors Recognize Links between Regulation and Facilities Investment

32. The investment models reviewed above make clear that financial investors and firm managers who plan and execute capital expenditure programs are sensitive to risk and uncertainty -- both of which contribute to the cost of capital and tend, other things equal, to discourage investment. While recent financial market developments and current circumstances are not a failsafe predictor of attitudes that will prevail when the rules in this proceeding are actually adopted and their impacts realized, some current market views appear to be relatively permanent and likely to endure.

33. The competitive environment fostered by the Commission has increased competitive pressure, as anticipated, but the flip side of that coin is an increase in market risk and technology risk combined with pressure on earnings and growth rates for all marketplace rivals. Competition is a two edged sword from

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[152] See Donald A. Hay and Derek J. Morris, Industrial Economics and Organization: Theory and Evidence, especially chapter 12, "Investment Expenditures", Oxford University Press, New York, 1991. Note especially p. 445 and the list there of determinants of the optimal capital stock and investment. Inspection leads inevitably to the conclusion that regulation is a factor in every one of those determinants and a major factor in most.

[153] The literature on real options in the theory of investment is relative new and not fully developed. A good starting point is the collection of essays in The New Investment Theory of Real Options and Its Implications for Telecommunications Economics, James Alleman and Eli Noam, eds., Klewer Academic Publishers, 1999. The essays there range from a primer to discussions of applications in other sectors to a spirited debate by academics who frequently are on opposing sides in 1996 Telecom Act policy skirmishes. The summary chapter by Eli Noam is especially valuable in evaluating the contribution of the new theory to our understanding of both investment and to the impact of regulation on its level, composition and timing. Summarizing the essays Noam observed that: "Even several of the most forceful critics of the [real options approach to investment] largely concede its basic theoretical validity and argue against a specific application…." , p. 258.

an investment incentive standpoint and the net effect of any particular set of rules must be carefully weighed. The enormous capital expenditures implied by the goal of creating several alternative broadband paths for users to compare are a sobering fact of life for potential underwriters of all technology platforms. Competitive market risks have been compounded recently by longer term questions about the breadth and intensity of demand for broader bandwidth capacity loops. While some continue to believe that in the long run demand sufficient to assure capital cost recovery will materialize, there is strong and lingering uncertainty about the fact and timing of that outcome.

34. Just as they consider financial, market and technological risks in their investment decisions, investors and managers are increasingly sensitive to regulatory risk and uncertainty in their valuations. Investors are well aware and particularly sensitive to the effects of government regulations on returns to the securities of various firms and this sensitivity conveys to capital budgeting and expenditure decisions within firms.

35. Investors averse to regulatory risk tend to prefer non prescriptive to prescriptive approaches to rate determination. They understand market processes and are able better to reflect them in valuations than they are regulatory processes in which the FCC and dozens of state regulators independently can bring about significant and sudden changes in revenue streams. Given the limited ability of regulators to capture, quantify and bring accurately and consistently to bear complex market information, investors are faced with enormous uncertainty and delay when new bases for regulated rates are established by changes in policy, which themselves are mere predicates to a long and uncertain process of implementation.

36. Investors perceive a long term trend toward greater reliance on markets, development of new regulatory tools, peeling away selectively layers of regulation in some markets and generally less reliance on purely prescriptive approaches that characterized the monopoly era. They would not respond positively to adoption by the Commission of any new rate regulation program that involves more detailed prescription of rates that are now constrained by price caps and market forces. Substitution of regulation for markets in this instance cannot be regarded as an investment positive for facilities based network investors, either incumbents or entrants.

37. Financial markets have responded positively to trends toward more competition and less regulation. Investors have funded creation and expansion of numerous CLECs; they have expressed reservations about the large capital expenditures required to build out competitive broadband systems; and they have expressed changing views about the overall success of the Commission's prescriptive approach to fostering new entrants. Specific market responses have been keyed to the details of implementation of particular regulatory programs.

38. Capital markets have underwritten the growth of competition over the last five years. However, there is still substantial uncertainty among investors about a) the wisdom of the very prescriptive approach adopted by the Commission with regard to network interconnections of incumbents and entrants, b) the extent to which that approach can in the long term foster sustainable competition and, indeed, c) the rate levels that will eventually emerge from the Commission's local competition initiatives five years ago. Capital markets greeted the appearance of dozens of CLECs with exuberance, some of which in retrospect was excessive, if not irrational.[154] While the root cause of the subsequent correction is still being debated in policy arenas, the verdict of financial markets pretty clearly comes down on the side of facilities based

[154] For a brief chronicle of the CLEC roller coaster see Larry F. Darby, Communications Business and Finance, "FCC Decisions Fatten Bull Market By Boosting CLEC Stock Value" (January 17, 2000) and Communications Business and Finance "The Moral of the CLEC Story" (April 2, 2001). Both were written before the collapse of the stocks this year.

entry as the long term sustainable competitive strategy for local entrants. Analysts cite a variety of factors contributing to the uncertainty and churn in financial valuations. No single explanation stands out. But, at the same time, there are no kudos, and considerable disdain, expressed by analysts and markets for the very prescriptive approach of the FCC in attempting to create and nurture competition via various forms of regulatory arbitrage.[155] I find no support in market reports or among financial analysts for the proposition that more regulation, more prescriptive approaches or less reliance on markets is necessary or desirable to foster broadband investment in the sector.[156]

39. The Local Competition Order has tended in important ways to reduce incentives for investors to underwrite construction of broadband facilities networks for either incumbents or entrants. However, an even stronger proposition is that nothing in market experience over the past five years supports extending that prescriptive approach to other services -- access and transit services in particular. While new regulatory tools were established by the Act as transitional devices to help open markets, it was clearly not Congress' intent or the expectations of capital markets that regulators would prescribe a new set of prices for all telecom services.

40. I have seen no indications from capital markets to suggest that investors regard current revenue levels generated by access charges as a deterrent to investment for any category of carrier. Nor do markets reflect any indications that price caps as currently enforced are inadequate to assure that revenue streams reasonably reflect costs or must be changed as a means of encouraging investment. Most investors will recognize that if the FCC launches a new prescription for access, that process would last several more years and thereby occasion new sources of uncertainty -- for all carriers and users involved in related transactions -- in an already uncertain market. The result would unnecessarily add to risk and capital costs while diminishing the case for accelerating investment. Certainly a new prescription would diminish investment incentives for ILECs, but by lowering rates for fungible facilities, a Commission move toward prescription of access charges would discourage investment for all facilities based carriers.

41. In summary, any prescription at this time, using whatever standard, would tend to discourage investment. A more prescriptive approach would introduce new uncertainty and long delay as the details of the standard were being worked out and applied. The details of the rates that would emerge for incumbents and entrants would be instrumental in all capital budgeting plans. Uncertainty about their legal status, when and how and at what level they would go into effect, along with their impact on overall cost recovery would add to risk, capital costs and ultimately end user rates. There is no indication that current access rates, including scheduled changes, are discouraging investment or otherwise harming the public interest. The proposal put forth by AT&T, to which I turn next, would be especially disruptive because, in addition to being unnecessarily prescriptive, the standard it embodies has nothing to recommend it on investment or long term efficiency grounds.

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[155] A candid, complete and fair accounting of the reasons for the CLEC roller coaster is rendered by Bear Stearns analyst James Henry, "CLEC 2001 Investment Outlook", Bear Stearns, New York, (undated). There is something there to support most theories of the meltdown, since many factors were at play. However, the unavoidable conclusion is that the FCC's prescriptive approach in the local competition order contributed to both the expansion and the contraction. It did so by raising expectations and virtually eliminating capital barriers to entry by a) creating platforms requiring little investment and b) providing regulatory arbitrage opportunities to entrants.

[156] For expression of the uncertainty about the impact of FCC and state rules on the value of investing in different carriers and platforms, but focused on the merits of facilities competition versus resale or UNE-based competition, see Adam Quinton, et. al, The Telecommunicator – Survivor II: The Continued Telecom Shakeout, Merrill Lynch, March 12, 2001, p.112. See also David Barden, "Sizing up the CLECs", JP Morgan, April 2, 2001, p. 3 for expression of uncertainty and reasons for concern about whether the policy course will be toward "incremental regulation, enforcement or liberalization".

E. Extension to Access of TELRIC Would Have Negative Investment Impacts

42. The NPRM solicited comment on how CPNP regimes might be reformed should the Commission decide not to adopt Bill and Keep. Specifically the Commission asked for comment on the appropriate methodology for establishing the cost basis for rates.[157]

43. A handful of respondents (AT&T, WorldCom, Comptel, Time Warner, Focal, et al, Office of Public Utility Counsel, NASUCA and others) responded by urging the Commission to expand application -- to one or more or all services -- of some notion of a forward looking economic costing methodology (FLEC, LRIC or TELRIC) similar to that used to fix rates for unbundled network elements. In addition to the concerns expressed above about the potential negative impact of any prescriptive approach, the Commission should take careful note also of a variety of specific problems with the recommendations that TELRIC, as defined in the Local Competition Order, should be extended.

44. Several features of respondents' recommendation that the Commission apply such methods for transit, access or other services merit careful attention and critical analysis.

45. First, most of the TELRIC-related recommendations are based vaguely and ambiguously on imprecisely specified terms – terms that have widely different meanings to different analysts and in different contexts. It not possible to determine what is actually being asserted. The claimed impacts are neither concrete nor amenable to validation. The impact of basing access charges on cost concepts suggested by the terms FLEC, LRIC, TELRIC, LRMC cannot be determined in principle or without further definition. But, more importantly, as experience has amply shown, there is no way to predict from principled definitions what rates might actually be when the principles are applied by different regulatory bodies at different times.

46 Secondly, the Commission will find here no record adequate to justify extending the application of TELRIC, since proponents provide no principled or empirical basis for the long list of assertions about the merits of TELRIC. Most of the claims are so carefully and ambiguously phrased as to be meaningless. Time Warner, for example, supports "appropriate measures of forward looking costs". Others make vague claims about efficiency properties, consistency properties, fairness properties, salutary impacts on entry, competition, universal service or other benefits. Several respond to the request for evidence in the NPRM by citing the Commission's own statements made five years ago. CompTel simply declares that "TELRIC-based pricing will promote efficient pricing for all interconnection and unbundling purposes..."[158] Given my focus on the relationship between investment incentives and prescription of TELRIC-based rates, this is not the place to critique these claims. However, the Commission certainly should weigh carefully their analytical content and evidentiary value before making them the basis of any change in current access rate making standards.

47. What clearly motivates the claims and presumed merits of adopting one of these notions as the basis for access and transit rates is the very clear expectation that doing so will lead to rate reductions for connecting carriers. Yet, there is not in them the basis for the Commission to reverse course and to undertake a more prescriptive approach to establishing those charges.

48. Finally, even though there is an occasional claim of nexus, there is nothing in these comments to support the proposition that investment incentives or new capital formation will be increased by moving to prescribe FLEC, LRIC or TELRIC or for that matter any other specific cost basis for access or transit rates.[159]

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[157] Notice, para. 99.

[158] Comptel, p. 20.

[159] Alfred E. Kahn and others offer an excellent analysis of why the current, non-prescriptive approach under price caps is preferable on economic welfare grounds to more prescriptive approaches in general and

49. The most spirited advocate of TELRIC is AT&T whose comments attempt to link TELRIC to investment and innovation. AT&T claims that: "Properly structured forward looking, cost-based prices encourage efficient investment" and that the Commission "...should require intercarrier transport and termination charges to be based on the TELRIC standard."

50. The analysis of alternative rate standards and links to real investment provided by AT&T is loosely constructed, full of ambiguities and, for reasons developed below, not sufficient to warrant the dramatic change in policy it is promoting.

51. AT&T touts TELRIC as the standard for prices or rates in "effectively" or "workably" competitive industries. However, so far as I have been able to determine prices are not established anywhere else in the economy on the basis of TELRIC as defined by the FCC and interpreted by the States. Significantly, AT&T does not use TELRIC as the basis for its interLATA services in markets the Commission has found to be workably and effectively competitive.

52. Argument supporting the recommendation that intercarrier transport and termination charges be based on TELRIC is contained almost entirely in a single paragraph of AT&T's comments. It is worthwhile to include here the argument in full:

> ...the Commission should simply apply its time-tested TELRIC rules...to the transport and termination of all telecommunications. As the Commission has consistently recognized, rates based upon those forward looking, long run incremental cost principles effectively promote both efficiency and competitive neutrality [citing the Local Competition Order to the effect that "economists generally agree that prices based on forward looking long-run incremental costs (LRIC) give appropriate signals to producers and consumers and ensure efficient entry and utilization of the telecommunications infrastructure."]...the mechanisms and procedures that would be used to establish TELRIC-based rates for transport and termination are already in place. The relevant...costs must be determined...and regulators and carriers now have more than five years experience in estimating costs and designing rates under the TELRIC standard. AT&T therefore concurs with the Commission's tentative conclusion [in the NPRM] that if it maintains CPNP -- as it should -- it should require intercarrier transport and termination charges to be based on the TELRIC standard.[160]

53. This is the AT&T case in full. Circular, vague and unverifiable, it is clearly insufficient to warrant charting the new regulatory course advocated by AT&T for pricing access and transport services. It reflects only casual discussion and serial representations blending different cost concepts -- forward looking economic cost, long run incremental costs and total element long run incremental costs -- while

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to prescription of TELRIC as the basis for [access and transit] rates in particular. Beginning with the fundamental proposition underlying their adoption by the Commission that price cap regulation leads to "efficient" rate structures and levels over time, Kahn calculates that flash cutting to a TELRIC prescription would lead to immediate rate reductions of an order of magnitude that would take over twenty years to achieve under price caps. The example brings sharply into focus the dramatic collapse in underlying investment incentives likely from adopting the AT&T suggestion. See Alfred E. Kahn, Timothy J. Tardiff and Dennis L. Weisman, "The Telecommunications Act at Three Years: An Economic Evaluation of Its Implementation by the Federal Communications Commission", Information Economics and Policy 11 (1999), pp. 330-32.

[160] AT&T Comments, pp. 19-20.

misconstruing economists' general support for the principles of forward looking and incremental cost based rates as explicit support for practical application of TELRIC as we have witnessed it to date. It relies on the Commission's conjectures five years ago of the likely effect of TELRIC-based rates, while pointedly ignoring the enormous historical record available for analysis of the actual effects of regulatory implementation of those principles in the marketplace.

54. AT&T draws on a declaration provided by Professors Janusz A. Ordover and Robert D. Willig to support its recommendation that the Commission should base access charges on TELRIC.[161] However, Professors Ordover and Willig do not support TELRIC as the basis for transport and termination charges or even mention access. Indeed, they do not address or even mention TELRIC in their lengthy and detailed statement.

55. The very brief and general discussion (paragraphs 38-41) by Ordover and Willig of the efficiency effects of alternative cost standards for rates is largely unexceptionable -- not because of its rigor, but because of its general and loosely constructed nature. On the specific question on which I am focused -- the effect of TELRIC-based access charges on investment -- they declare: "...so long as intercarrier rates are appropriately set on the basis of forward looking, economic costs, [cost based CPNP] would promote efficient investment decisions." The statement of course begs all of the important policy questions in this proceeding. When are rates "appropriately set" and have they been appropriately set to date under the TELRIC standard? Would TELRIC-based rates for access in practice be consistent with FLEC or LRIC or TELRIC in principle? What effect has TELRIC to date had on efficiency and what lessons might be drawn from that to help understand the consequences of expansion to other services, particularly on the level, composition and timing of investment by incumbents and entrants? Both AT&T and the supporting declaration are silent on the issues raised by these fundamental questions.

56. Ordover and Willig respond to the Commission's request for analysis of the impact on investment by repeating back one of the Commission's own passing conjectures five years ago in the Local Competition Order: "As the Commission has recognized, the measure of costs to which prices converge in competitive markets -- whether wholesale markets or retail markets -- is forward-looking, economic cost and, specifically, long run, incremental cost."[162]

57. AT&T is correct in its admonition that: "At a minimum, the Commission should demand proof of substantial efficiency gains before embracing any B&K rule." However, the same test should be applied to the AT&T proposal that TELRIC be made the basis for access charges and rates for transport connecting carriers with each other. Specifically, it is reasonable and in the spirit of the AT&T suggestion to request that the Commission "demand proof of substantial [long run, dynamic investment efficiency] before embracing" TELRIC as the basis for access and transport rates. If the Commission is interested, as it should be, in the effect of its intercarrier compensation rules on investment in network infrastructure, it could quite reasonably require TELRIC proponents to show that TELRIC based access and transport charges will be sufficient to recover capital and earn required returns properly adjusted to reflect market, technological, and regulatory risks.

58. An alternative formulation, and a stronger test of the underlying policy proposition, would be to insist that AT&T and other proponents show how a reduction in

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[161] Declaration of Janusz A. Ordover and Robert D. Willig on Behalf of AT&T Corporation, *In the Matter of Developing a Unified Intercarrier Compensation Regime*, CC Docket 01-92.

[162] Ordover and Willig, p. 19.

cash flow from services provided to carriers of magnitudes suggested by conversion to TELRIC would translate into incentives and stimulate new capital formation by incumbents and facilities based entrants.

59. The Commission should note well the uncontested fact that no evidence has been presented in this docket to suggest that the current method for determining access charges, or the level derived therefrom, is discouraging investment and innovation in either local or interLATA networks. Thus, AT&T neither justifies the new TELRIC initiative, nor addresses flaws in the current arrangement. The Commission could reasonably insist on such a showing.

60. So far as I have been able to determine there are no empirical studies available of the impact of TELRIC-based rates on investment and innovation. Certainly, none have been cited in the first round of comments in this proceeding. That is not surprising, given that, notwithstanding contentions of TELRIC advocates to the contrary, rates in "effectively competitive markets" in other sectors of the US economy do not reflect TELRIC as the FCC has defined it. Significantly, there are no TELRIC rates to test for investment impacts. Rates and prices in unregulated, "effectively competitive" markets reflect a variety of cost bases for prices as well as assorted variations from costs, however defined, based on demand factors, expectations, and assorted random variables.[163]

61. The rates now in effect under the TELRIC standard show high variation and apparently random differences. Even if TELRIC is the correct standard in theory, which few economists defend or accept, it is demonstrable that the implementation of TELRIC has resulted in rates with bases that defy generalization and do not reflect accurately the conceptual TELRIC framework set forth by the Commission's Local Competition Order. Secondly, no workably competitive market has anything even remotely resembling the hodge-podge of state rates based on TELRIC. Thus, it is unlikely that prices generally in "effectively competitive markets" actually can or do reflect anything resembling what we have after five years under TELRIC.

62. Adoption of the AT&T plan would compound enormously the uncertainty now pervasive in capital markets and introduce an unnecessary and costly element of regulatory lag and delay. The result would tend to reduce total investment in access and transit facilities by undercutting the incentives for both incumbents and entrants to invest in facilities used in their networks. Investment programs of entrants would be subject to increased risk and reduced financial reward by adoption of the AT&T plan for two reasons. First, the reduction of incumbent access rates, which is surely the goal and expectation of AT&T in advancing the TELRIC proposal, would make it more difficult for facilities based entrants to win market share. Secondly, in view of the Commission's recent decision to push CLEC access rates over time toward ILEC access charges, the reduction in ILEC charges contemplated by AT&T would over time necessarily be mirrored by CLEC access charge reductions.[164] The clear cut impact on incumbent investment incentives of extending the TELRIC methodology to other services would convey as well to investment

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[163] Dr. Joseph Farrell, FCC Chief Economist at the time the TELRIC standard was imposed on ILECs by the Local Competition Order, now subscribes -- with his co-author Dr. Hermalin -- to the view that not all telecommunications carriers subscribe to TELRIC based rates.

> Moreover, different telecommunications carriers have different degrees of market power, are constrained by different degrees of regulation, and pursue different models of consumer pricing...Even within the moderately competitive domestic long distance industry, marginal call prices vary widely across carriers and across calling plans, and are evidently driven only in part by the fairly modest (albeit still above marginal cost) termination charges that the large incumbent LECs may levy. Farrell and Hermalin, p. 5.

[164] Seventh Report and Order and Further Notice of Proposed Rulemaking, *In the Matter of Access Charge Reform: Reform of Access Charges Imposed by Competitive Local Exchange Carriers,* CC Docket No. 96-262, (released April 27, 2001), p. 3, para. 4.

programs for entrants. The result would be to discourage facilities based entry, diminish real network competition in local markets and reduce consumer choice – all counter to the Commission's policy goals.

63. In the course of prescribing TELRIC for unbundled network elements to be provided new local entrants in the Local Competition Order, the Commission recognized the prospect that doing so would suppress investment by new entrants. It observed tersely:

> This approach, however, may discourage facilities based competition by new entrants because new entrants can use the incumbent LECs existing network based on the cost of a hypothetical least-cost, most efficient network.[165]

Events have shown this to be more than an idle academic concern. Both investors and managers of facilities based entrants have called attention to the apparent paradox of policies designed to help some competitors but wind up hurting those with facilities based business plans.[166]

64. While not elaborated by the Commission at the time, the reasons for the paradox are clear cut. Options influence investment incentives.[167] The option to lease capacity on favorable terms -- including avoiding investment and technology risk, while finessing sunk costs and long term commitment -- reduces the attractiveness of building and owning capacity. Thus, the incentive of an entrant to take on the risks and uncertain prospects for cost recovery and returns of investing in very capital intensive, fixed plant subject to risk of technological obsolescence, market risk, financial risk and others, is substantially lessened and for many eliminated entirely, if the entrant is assured the option -- in a technologically dynamic environment in which capacity costs are falling and service quality therefrom is increasing -- of obtaining capital intensive facilities at rates reflecting, not the costs of extant plant, but at rates reflecting more efficient, lower cost facilities.

F. Summary and Conclusions

65. Though investment and infrastructure growth was carefully promoted as a goal of national telecommunications policy under the 1934 Act, it has been markedly less so under the Telecom Act of 1996, despite the clear statement of expectation and intent by both Congress and the Executive. There is no identifiable, consistently applied national policy for encouraging telecommunications network investment today. Broadband investment should be fostered as a means of assuring long run economic efficiency in the provision of network services and in the growth of output and productivity in sectors dependent on them. The power to regulate and its practice carry with them the power to stimulate or suppress; to make efficient or to distort; to expedite or to delay investment in network facilities. Given cash budget constraints, managers must make hard choices about the level, composition and timing of network investment. These choices are very sensitive to signals managers read from capital markets. Investors in financial markets and managers with capital budgeting responsibility are keenly aware of the effects of regulation on the payoff from different investment programs and strategies. Several events have combined recently to raise the level of uncertainty and perception of regulatory risk in capital markets. In that context investors are likely to be very averse to any new regulatory programs or prescriptions that promise uncertainty, contention, delay and ambiguity.

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[165] Local Competition Order at para. 683.

[166] Alfred Kahn and others asked in a related context the fundamental question: if every non-incumbent provider "...can be a free rider, at prices explicitly intended to recover only the minimum cost of doing so, who is going to build the vehicle?" Were access and transit subjected to such rules, potential public investors in local telecommunications network facilities would answer that question simply: "Not us!" See Kahn, et. al., "The Telecommunications Act at Three Years", p. 349.

[167] See note 12 above.

66. The proposal to extend TELRIC principles and application to access and transport charges as a part of reform of intercarrier settlement arrangements is just such a new regulatory initiative. Proponents of this more detailed regulatory and prescriptive approach offered in the first round of comments no evidence a) that current regimes are flawed or b) that the proposed TELRIC extension would encourage investment. In fact, analysis based on established principles and observations indicate the opposite. Expansion of TELRIC to access and transport charges would very likely create adverse investment incentives for incumbents and entrants alike.

67. Investors would not welcome adoption by the Commission of any new rate regulation program that involves more detailed prescription of rates that are now sufficiently and efficiently constrained by price caps and market forces. Substitution of regulation for markets in this instance will be regarded negatively by facilities based network investors.

Reciprocal Compensation for CMRS Providers
June 13, 2000

by

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Introduction and Summary

In a recent white paper prepared on behalf of Sprint, Bridger Mitchell and Padmanabhan Srinagesh (MS) describe a methodology for calculating the *additional costs* of terminating interconnected local calls on Personal Communications Services (PCS) networks.[168] MS argue that the application of forward-looking principles to PCS networks raises significant issues of implementation that were not considered by the Commission in its analysis of wireline networks. Specifically, they conclude that based on the Commission's rules, forward-looking traffic sensitive costs can be recovered in charges for transport and termination and, more importantly, <u>all</u> PCS network components, with the exception of handsets, are additional costs as defined by the Commission.

Apart from the proper level and nature of PCS network costs—which are important in their own right—the Commission's Public Notice raises fundamental economic issues. As the FCC points out in the *Local Competition Order*, efficiency considerations generally favor symmetric *reciprocal compensation* for interconnecting carriers based on the forward-looking cost (TELRIC) of an efficient firm.[169] As the FCC states (¶1086):

> A symmetric compensation rule gives the competing carriers correct incentives to minimize its own costs of termination because its termination revenues do not vary directly with changes in its own costs.

Symmetric rates that are based on the costs of an efficient firm provide proper economic signals to market participants, thus ensuring that competitive distortions do not arise. Symmetric rates avoid the cost-plus nature of regulation with respect to entrants' costs—with all its attendant economic distortions—that pervaded the industry prior to price cap regulation. Sprint's proposal conflicts with this basic premise and would result in losses

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[168] Bridger M. Mitchell and Padmanabhan Srinagesh, Transport and Termination Costs in PCS Networks: An Economic Analysis, April 4 2000, CC Docket Nos. 95-185, 96-98, and 97-207, referred to as (MS).

[169] *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd 15499,16025, ("*Local Competition Order*").

in economic efficiency and require extensive cost regulation of a fledging competitive industry.[170]

While the FCC rules permit *asymmetric* rates based upon a cost study in accordance with TELRIC principles, the *Local Competition Order* is silent on the nature of that study: i.e., on the legitimate economic reasons why an entrant's efficiently incurred costs might be higher than those of an efficient firm and thus require asymmetric rates. We disagree with Sprint's contention that differences in technology or service quality[171] justify asymmetric rates. In general, differences in technology or service quality do not generate legitimate differences in costs for the purpose of setting asymmetric compensation rates. Apart from distorting carriers' incentives to minimize costs, under asymmetric compensation, a wireline LEC that sends a call to a (higher-cost) PCS provider does not save in avoided costs what it incurs in reciprocal compensation payments. It is precisely this proposition—i.e., that carriers compensate each other based on the avoided costs of a fully efficient firm—that should govern reciprocal compensation and that enhances economic welfare.

Compensating carriers for transport and termination of calls that have different technological characteristics or provide different service qualities than that supplied by the originating carrier at the same rate as those of a fully efficient firm using least-cost technology to supply the same service as the originating carrier <u>will not</u> discourage these carriers from deploying their networks. Sprint's PCS service provides a fundamentally different type of service than wireline networks—specifically, it offers end users mobility which is valued differently than services from traditional wireline networks. Economic efficiency is achieved if the additional costs incurred to provide this different type of

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[170] "Symmetric" reciprocal compensation rates mean that the CLEC and ILEC pay each other the same rates when one terminates traffic on the network of the other. Some ILECs argue that if they are required to pay reciprocal compensation for ISP-bound traffic, the rate should be lower for such traffic (because per-minute costs associated with longer holding times are lower, for instance) than for ordinary voice traffic. Such rates are still "symmetric" because both LECs charge each other the same rate for ISP-bound traffic and the same (higher) rate for ordinary voice traffic. The observation here (for CMRS/wireline interactions) that different technologies or different service characteristics should not warrant *asymmetric* reciprocal compensation rates is fully consistent with the proposal to charge different *symmetric* reciprocal compensation rates for traffic having different cost characteristics.

[171] The phrase "service quality" here and elsewhere describes calls having different and desirable characteristics (i.e., mobility).

service are recovered from the cost-causing agent. Therefore, an efficient intercarrier compensation mechanism must not distort: (i) the value consumers place on originating or receiving calls, (ii) the economic costs to the carrier of transmitting the call, and, most important, (iii) the market price paid by the cost-causer.

The success or failure of PCS providers and the success or failure of different types of PCS services should depend solely on how customers value those firms and services in the marketplace, not on the type of intercarrier compensation between network providers. To the extent that some PCS services are provided that would not be provided but for the existence of asymmetric rates, economic efficiency is reduced. The FCC and State Commissions, having already experienced the economic distortions and rent-seeking behavior associated with reciprocal compensation for ISP traffic, should avoid setting in place an intercarrier compensation system for wireless traffic that would distort local exchange competition, support higher cost carriers, and create incentives to generate uneconomic traffic.

In addition, from a practical perspective, we dispute MS's depiction of the PCS network and its implication that technological differences require asymmetric rates. MS's description of the technological differences between the wireline and wireless world—and the nature of the cost differences that result—contain numerous errors. It is insufficient to examine solely whether a facility is shared or dedicated—as MS do—in determining the *additional* costs to transport and terminate traffic that the facility imposes. There are many costs that MS identify as primarily traffic sensitive (TS) that are indeed not TS. MS describe a simple model of the cost structure of wireless—handsets are non-traffic sensitive (NTS), everything else is TS. It would be hard to be more wrong. Handsets have significant TS costs (not borne by the carrier). The infrastructure network has massive NTS costs: as we describe below, a simple model indicates that the vast majority of the infrastructure costs are NTS costs.

While the recommendations put forth by MS appear to be straightforward and simple to implement, the opposite is the case. Because of the added economic and engineering complexities of PCS networks—which are for the most part overlooked by

MS—the correct solution is more complex. The end result is that following Sprint's recommendation will open the door to far more extensive cost-based regulation of a thriving competitive industry that is at the forefront of the information age and is poised to provide immense value to consumers through the burgeoning market for such broadband services as wireless web browsing. Additional regulation of the wireless industry will not improve economic efficiency and is not consistent with the public interest. A better solution would be to establish reciprocal compensation based on symmetrical rates and, to the extent carriers such as Sprint PCS desire to provide a different quality of service, permit them to recover those additional costs from the cost causer through some other rate mechanism thus ensuring that only those services that consumers value and are willing to pay for are provided.

Economic Efficiency Considerations in Wireline-PCS Local Interconnection

Section 252(d)(2) of the Telecommunications Act of 1996 requires that prices for the "transmission and routing of telephone exchange service and exchange access" be compensatory:

> such terms and conditions [must] provide for the mutual and reciprocal recovery by each carrier of costs associated with the transport and termination on each carrier's network facilities of calls that originate on the network facilities of the other carrier…

and based on incremental costs:

> such terms and conditions [must be] determine[d] on the basis of a reasonable approximation of the additional costs of terminating such calls. [emphasis supplied]

In addition, Section 252(d)(1) provides that interconnection rates should be based on the cost of providing interconnection, should be nondiscriminatory, and may include a reasonable profit. To implement this requirement, the FCC, in its *Local Competition Order*, applied the interconnection provisions of the Act only to traffic within a local exchange[172] and determined that the cost principle for determining the price of

[172] 47 CFR 51.305 (b) limits application to carriers providing "telephone exchange service," which is defined in 47 CFR 153 (47) as service within a telephone exchange. The rules for pricing reciprocal compensation for transport and termination of local telecommunications traffic are found in Subpart H of Section 51, which restricts reciprocal compensation to "telecommunications traffic…that originates and terminates within a local service area established by the state commission…" (§51.701(b)(1).

interconnection should be its version of total service long-run incremental cost, TELRIC, as described in 47 CFR 51.503 and 505.

Economic efficiency is best achieved through symmetric reciprocal compensation rates.

In general, the FCC established symmetrical rates for reciprocal compensation based on the incumbent LEC's incremental costs (§ 51.705(a)). It permits the state commission to establish asymmetrical rates for transport and termination of local telecommunications service only if:

> the carrier other than the incumbent LEC (or the smaller of two incumbent LECs) proves to the state commission on the basis of a cost study using the forward-looking economic cost based pricing methodology described in §§ 51.505 and 51.511 of this part, that the forward-looking costs for a network efficiently configured and operated by the carrier other than the incumbent LEC…exceed the costs incurred by the incumbent LEC…, and, consequently, that such that a higher rate is justified. [§ 51.711(b)]

In its discussion of symmetrical rates, the FCC observes that symmetric compensation gives the CLEC correct incentives to minimize its cost of termination [*Local Competition Order* ¶ 1086] and will give CLECs "reasonable opportunities" to enter the local exchange market [¶ 1088]. Indeed, basing reciprocal compensation on the costs of the most efficient supplier is precisely what would occur in unregulated, competitive markets, in which prices of services are driven towards the cost of the most efficient supplier, not the cost incurred by any particular entrant. The principal problem with permitting higher-cost firms to charge higher interconnection rates would be an immediate reduction in economic welfare because service would be provided by a firm whose costs exceeded those of an efficient firm. This loss in welfare is classified by economists as a "first-order" reduction in economic efficiency because scarce resources are wasted on every unit of output supplied by the higher-cost firm.[173] In competitive, unregulated markets, entry by suppliers whose costs exceed those of incumbent firms

[173] In contrast, efficiency losses from pricing services above incremental cost are classified as second-order welfare losses because efficiency is only lost on the units of demand repressed by the excess of price above cost, i.e., on the units of demand which customers would have been willing to consume at a price equal to the cost of supplying those units of demand.

would generally not occur, and customers would not have to pay the higher market price that would be necessary to sustain entry by the higher-cost firm.

Moreover, Sprint's proposal would require detailed cost regulation of wireless costs similar to the cost-plus type of regulation that dominated the industry prior to price cap regulation. This would require state regulators to determine the efficiently-incurred wireless investments needed to provide service, the forward-looking return on capital required and other forward-looking expenses. Wireless technology and costs are changing rapidly, and a TELRIC study based on Sprint PCS's current equipment and practices would have to be repeated frequently to reflect the on-going, changing costs of a currently-efficient carrier.

Asymmetric prices also violate a basic premise underlying intercarrier compensation: namely, that carriers' cost savings roughly offset their reciprocal compensation payments. With symmetric reciprocal compensation rates between carriers providing the same service, each carrier saves in avoided costs what it pays out in reciprocal compensation. Even if traffic is unbalanced, in this situation, neither carrier receives a windfall or loses money because it is obliged to terminate calls originating from other networks. Under *asymmetric* reciprocal compensation, however, a wireline ILEC that sends a call to a (higher-cost) PCS provider would save less in avoided costs than it would receive from reciprocal compensation payments.

Exceptions for Asymmetric Rates

While the FCC permits firms to petition for asymmetric rates, the FCC is silent on the nature of the legitimate differences between ILECs and entrants that would justify asymmetric rates. The Telecommunications Act requires that charges recover:

> costs associated with the transport and termination on <u>each</u> carrier's network facilities of calls that originate on the network facilities of the other carrier [§ 252(d)(2)(I), emphasis added]

which suggests that carriers should be compensated for their costs. However, the FCC is careful to warn state commissions [*Local Competition Order* ¶ 1089] that the asymmetrical costs in question must be those of "efficiently configured and operated systems" calculated giving "full and fair effect to [its] economic costing methodology".

Apparent differences between the TELRICs of entrants and ILECs which stem from different assumptions about traffic volumes, depreciation lives, fill factors or costs of capital should not be treated as real differences: to be consistent with the FCC's TELRIC concept, the forward-looking economic cost of terminating traffic should be measured using the parameters of an efficient firm. For example, small firms that cannot achieve scale economies must compete at a cost disadvantage in competitive markets, and nothing in a competitive market permits a firm with a higher cost of capital to sell its wares at a higher price than a firm having a lower cost of capital. Why should ILEC subscribers pay more to terminate calls with a high-cost carrier, even if the cost differences are due to size or risk?

In theory then, how could the forward-looking economic cost of an efficient supplier be different for an entrant and an ILEC, particularly if they must be calculated using the FCC's TELRIC methodology? While the FCC provides little guidance on this issue, one possible answer is that an entrant may choose to serve a limited geographic area or a particular set of customers, whereas the ILEC's costs are averaged over all customers. In that case, an entrant having costs that are different than the ILEC's average termination cost is not necessarily inefficient. Therefore, legitimate reasons why an entrants' TELRIC differs from an ILEC's TELRIC include geographic or customer-type specialization by CLEC—as long as its costs of serving that segment are no higher (for those segments) than those of the ILEC which are averaged into its single TELRIC.

Differences in costs due to differences in technology should not <u>necessarily</u> be reflected in TELRIC.

In the FCC's definitions in the *Local Competition Order*, TELRIC is the idealized cost of an efficient supplier. Both in the *Order* and in economic theory, that cost concept is independent of the actual experience of the firm: what is measured is the expected response of an <u>efficient</u> firm to a change in demand equal to the total market demand, not what the response of any incumbent firm actually is. Firms whose costs of purchasing, installing and maintaining equipment are higher than necessary should not be rewarded through reciprocal compensation at any higher level than a competitive market would reward them, which would be at the cost of an efficient firm to provide those functions.

Similarly, if two firms provide the same service using different technologies, a competitive market would not compensate them at different rates simply because the costs of their technologies differ. Choice of technology is no different from any other economic choice a firm makes, and TELRIC calculations should not automatically ratify a firm's technological choices and insulate it from application of an efficiency standard. For example, an ILEC that can serve rural areas more cheaply with wireless technology (fixed or mobile) should use wireless costs in its mix of services for its TELRIC calculation. Symmetrically, if it would have been cheaper for a wireless CMRS provider to transport and terminate calls using wireline technology, then the TELRIC for the wireless carrier to terminate the same quality of call as the ILEC originated should be the wireline TELRIC. That is, if the forward-looking cost to transport and terminate a call is higher for an efficient CMRS provider because its technology generates a higher-quality service, that additional cost should not be recovered in reciprocal compensation, as discussed below. If the efficient, forward-looking cost of an efficient CMRS provider is <u>lower</u> because it provides a lower quality service, the FCC requires the CMRS provider to supply a TELRIC study and to recover no more than the TELRIC of the particular service it supplies:

This treatment of reciprocal compensation is reflected in §51.711(c) of the Commission's rules:

> Pending further proceedings before the Commission, a state commission shall establish the rates the licensees in the Paging and Radiotelephone Service…, Narrowband Personal Communications Services, …, and Paging Operations in the Private Land Mobile Radio Services…may assess upon other carriers for the transport and termination of local telecommunications traffic based on the forward-looking costs that such licensees incur in providing such services, pursuant to Secs. 51.515 and 51.511.

The Commission's reasoning is set out in ¶1092-1093 of the *Interconnection Order*:

> Paging is typically a significantly different service than wireline or wireless voice service and uses different types and amounts of equipment and facilities…Using incumbent LEC's costs for termination of traffic as a proxy for paging providers' costs, when the LECs' costs are likely higher than paging providers' cost, might create uneconomic incentives for paging providers to generate traffic simply in order to receive termination

> compensation…we direct states…to establish rates for the termination of traffic by paging providers based on the forward-looking economic costs of such termination to the paging provider…

Differences in service qualities should not generate differences in costs for setting asymmetric compensation rates

There is another important economic issue that arises when one examines the proper intercarrier compensation mechanism between wireline and CMRS providers. When two carriers interconnect and provide fundamentally different service qualities or characteristics—thus increasing the efficiently-incurred termination costs of the carrier providing a higher quality service—reciprocal compensation is inefficient and would not likely be the type of compensation mechanism that arises between two networks in undistorted competitive markets. If a carrier chooses to provide a higher quality service it should not be compensated for terminating a call that originated on a standard-quality network—for which customers are paying standard quality prices—at the cost of a higher-quality call. Interconnection between wireline and CMRS providers is one such example of a standard-quality network (wireline) interconnecting with a higher-quality network (CMRS).

While transport and termination services provided by either the wireline or CMRS provider are similar in function—i.e., using network elements to ensure that the call gets delivered from the point of interconnection to the end user—there is a significant difference that affects the optimal level of intercarrier compensation. A call on a wireline network is fundamentally different in many respects than a call on a CMRS network. From the customer's perspective, all calls are not the same and a minute is not a minute. For example, there are differences in quality and characteristics that include technical characteristics (e.g., noise and bandwidth) speed (e.g., normal, store-and-forward), and information content (e.g., notification, audio, video). These differences must be taken into account when determining the optimal level of intercarrier compensation between two networks.

Reciprocal compensation spreads the cost of terminating traffic on both networks over all users. When both networks provide similar type services—and thus generate

similar efficiently-incurred costs—reciprocal compensation is efficient. However, when subscribers originate traffic having expensive qualities or characteristics—as is the case when a wireline customer places a call to a CMRS provider—reciprocal compensation is inefficient because customers do not face higher prices to reflect the higher cost they impose on the combined networks. When prices fail to reflect costs, economic distortions arise. An example illustrates this point.

Imagine a climber ascending Mt. McKinley in Alaska—or any mountain range in the United States—and having a mobile handset with service provided by a CMRS provider. In the extreme, the climber is on top of Mt. McKinley and uses Inmarsat, Globalstar, Iridium or like service. Clearly, the service provided by these carriers is different from the service provided by the wireline carrier. Before it fell into bankruptcy, the costs of terminating the average call on Iridium were much higher than the costs of terminating the average call on the wireline network. Under such conditions, is reciprocal compensation based on asymmetric rates—i.e., Iridium would have been permitted to charge higher termination rates than the wireline network—optimal and does it provide correct economic signals to market participants?

The answer is a clear no. The climber is paying Iridium because it is important for some people to be able to receive or send calls from anywhere on the face of the earth, e.g., on the top of Mt. McKinley. Some people value the ability to receive or send calls anywhere on the face of the earth more than the economic costs incurred to provide this service. Since these consumers are willing to pay at least the economic costs, economic efficiency is increased whenever they are able to purchase the service. Moreover, there are some callers that originate calls to Iridium's subscriber that place a high enough value on the call that they also would be willing to pay the economic costs of the call—again, economic efficiency is increased. But, just as important, there are customers who do not value the ability of receiving or sending calls anywhere on the earth more than the economic costs incurred to provide the service. Likewise, there are callers who do not place a high enough value on calling a friend on Mt. McKinley and are not willing to pay the economic costs of such a call. Intercarrier compensation for transport and termination of such calls must not distort these decisions.

Reciprocal compensation based on asymmetric rates distorts market outcomes because ILEC subscribers who place calls to friends on the top of Mt. McKinley do not face a price that fully reflects the cost to transport and terminate the call. More calls are made by such customers than is socially optimal. And since reciprocal compensation spreads the cost of terminating traffic on both networks over all users, ILEC customers who do not cause any of the costs of terminating the traffic on the higher cost network are made to pay for a portion of those costs. In addition, to the extent that reciprocal compensation with asymmetric rates permits Iridium subscribers to pay lower subscription and usage rates than would otherwise be the case, too many calls are placed and resources are used inefficiently. Fundamentally, the danger of reciprocal compensation based on asymmetric rates for higher quality networks is that such a compensation mechanism may support technologies or services that would not be able to survive if left to market forces.

What then is the best form of intercarrier compensation between two networks of different quality service? Economic efficiency is increased if the additional costs incurred to provide higher quality service are recovered from the cost-causing agent. Basing compensation on symmetrical rates and having the additional costs recovered from the cost-causing agent provides both carriers with optimal incentives to deploy innovative technology and provide higher quality service. Moreover, it also ensures that only those services that consumers sufficiently value will be provided by market participants.

Engineering and Network Characteristics of Wireless Systems

If it were determined (unwisely, in our view) to permit wireless carriers to charge asymmetric reciprocal compensation rates for transport and termination based on their costs, we would then be compelled to understand their costs of handling "additional traffic." The authors of the Charles River Associates study (CRA) present their view of the cost structure of wireless telephone systems clearly. For example their Figure 1 shows that they regard everything except the handset and traffic sensitive.

CRA's

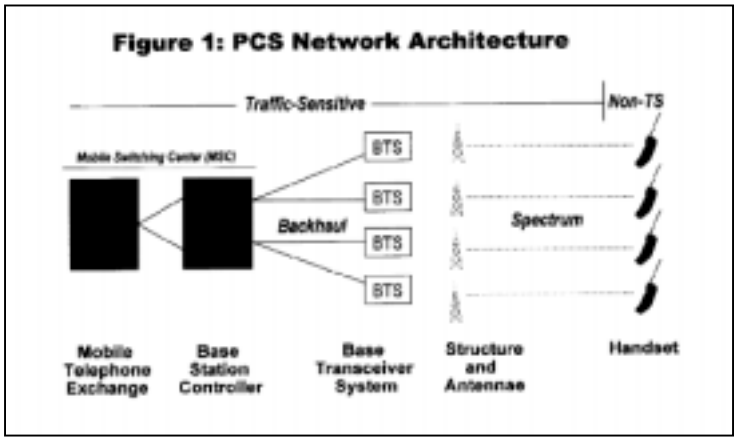

Figure 1

Figure 3

Similarly, they state,

> Analyzing each component of a PCS network, we conclude that the costs of all components, excepting those of PCS handsets, are additional costs as defined by the Commission.

There are profound flaws in the CRA analysis. This section has three parts. First, we address the services offered by modern wireless systems, such as Sprint PCS, and establish that call termination is just one of many services that is provided over the wireless network. Second, we discuss the basic functions of a wireless network and show that much of the network infrastructure is required in order to provide the option of placing and receiving telephone calls or Internet access. Third, we look in more detail at the various elements of a wireless system, identify the extent to which the costs of each subsystem are caused by additional usage, and provide an estimate of the fraction of the costs of a modern wireless network, such as Sprint's, that are due to usage rather than to other activities. We follow CRA's partitioning of the costs into the carrier's network (hereinafter infrastructure), radio licenses or radio spectrum (spectrum) and subscriber units (handsets).

Wireless Services

Wireless carriers provide a variety of services, including voice telephone service, short message services, Internet access, automobile services, and data communications. The same fundamental infrastructure is used for providing all of these services.

For example, in recent press releases, Sprint has said,

> Sprint PCS Wireless Web offers customers instant access to news, weather, shopping, stocks, sports, email and other select Internet information directly on the minibrowser of their Internet-ready Sprint PCS Phone.[174]

and,

> Sprint PCS, Barnes & Noble Form Mobile Shopping Pact—Sprint PCS and Barnes & Noble.com today announced the nationwide availability of Barnes & Noble.com Internet shopping services on the Sprint PCS Wireless Web. Sprint PCS, the nation's largest and fastest-growing 100 percent digital nationwide wireless network, is now providing customers with another choice for nationwide access to two-way Internet shopping via the Sprint PCS Wireless Web with one of the world's largest Web sites, Barnes & Noble.com.[175]

For an extra $2.95 per month, Sprint also offers a service, called Roadside Rescue, that provides battery service, towing, gasoline, and other help with automobile failures on the highway. In describing how to use Roadside Rescue, Sprint says,[176]

> Just dial **#ROAD** from your Sprint PCS Phone. Or dial a toll-free number from any other phone.
>
> As long as your Sprint PCS Phone is with the vehicle that needs help, service costs are covered.

Figure 4 Sprint Promotional Materials on Roadside Services

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174 Sprint Press Release, *Sprint Launches Advanced Wireless Service—Including the Sprint PCS Wireless Web— in Charleston, SC***.** CHARLESTON, SC, May 19, 2000.

175 Kansas City, MO., May 2, 2000.

176 http://s3.sprintpcs.com/services/ie.asp?target=header_learn.html

Wireless telephone services can be divided into two major components or elements—providing the **option** to use the service and actual **usage**. Many consumers buy wireless telephones and subscribe to wireless service in order to gain access to calling at many locations. Being able to call 911, AAA or a tow-service in the case of a highway emergency is one example of such an option demand. A person buying wireless service for such emergencies desires the option of calling at many locations where he or she is likely to travel. The subscriber's home neighborhood is one such location—but so too are remote highway locations, miles from the nearest pay telephone.

Similarly, advocates for victims of domestic violence support the provision of wireless phones to abuse victims to give them the option to call. The Wireless Foundation states,

> "The national Donate a Phone campaign collects wireless phones to benefit victims of domestic violence. In the hands of a victim, *these phones are a lifeline, enabling them to call for assistance when faced with an emergency situation*." [177]

GM offers its OnStar service based on the installation of a GPS receiver and a wireless phone in automobiles. GM says,

> Current OnStar services include automatic notification of air bag deployment, stolen vehicle tracking, OnStar MED-NET, AccidentAssist, emergency services, roadside assistance with location, remote door unlock, route support, OnStar concierge, and convenience services such as location of hotels, restaurants, gas stations and other points of interest.[178]

The value of OnStar services such as remote door unlocking and automatic notification of air bag deployment depend on the widespread coverage by the wireless systems providing the communications infrastructure to the OnStar system. In a service such as OnStar or for customers who buy a wireless phone only for emergency calling, consumers depend on the ability to place calls in many locations. However, such customers are not likely to actually place calls in those locations.

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[177] http://www.wirelessfoundation.org/12give/ (emphasis added). See also the website for the National Coalition Against Domestic Violence at http://www.ncadv.org.

Wireless Voice Services

The simplest wireless phone service is rendered to users who pick up their handset, dial the operator and charge a call on a credit card. This arrangement does not require that the user have a preexisting account with the wireless carrier (although it does require does require a credit card account). There are no monthly subscription fees. We are aware of suggestions that, for emergency purposes, one should keep an old cellular phone in the trunk of each car, just as one keeps tools, flares and a flashlight. A limitation of this arrangement is that the user does not have a telephone number and can't receive calls. In addition, usage costs are high because of the substantial transaction costs.

More common is wireless services where the user subscribers to wireless service, calls can be dialed with reduced transactions cost (e.g., without a manual credit check), and incoming calls are delivered to the handset. In order to provide such presubscribed services and to permit customers to travel around the country and receive service far from their home locations, wireless service require substantial underlying facilities. For example, the wireless system keeps information on every handset in a database called the Home Location Register (HLR). Data on all handsets from distant systems that have roamed into a system's service area are kept in a Visitor Location Register. An Authentication Center assists with checking to see that handsets are not clones or otherwise fraudulent.

Overview of a Wireless Telephone Call

Modern wireless networks are systems of enormous complexity and subtle beauty. Consider the process of placing a telephone call in a modern IS-95B network such as that run by Sprint. The process begins when the consumer turns on his or her handset. Upon power-up the handset searches for a wireless system. It begins by searching for a CDMA Pilot Channel and acquiring the signal of that channel. Once the handset finds a Pilot Channel and acquires it, the handset then finds the Synch Channel corresponding to that Pilot Channel and obtains system configuration and timing information from the Synch Channel. If the system configuration information is for a

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[178] See http://general.motors.xs2.net/news/events/sema99/onstar.htm.

wireless system that the handset is authorized to use, the handset then begins the registration process. If the handset recognizes that it is not authorized to use the wireless system, it begins searching for another Pilot Channel.

After recognizing that it can proceed to registration, the handset sends a message to the base station on one of the cell's Access Channels alerting the wireless system to the presence of the mobile unit.[179] The handset and the wireless system then have a brief dialog during which the wireless system verifies that the handset is permitted to use the system and records in one of the Location Registers which cell is serving the handset. The system transmits to the handset various parameters, such as how far the handset can travel before it must reregister. The handset stores these parameters and then goes to sleep. The handset then wakes up at prescheduled times and listens on the Paging Channel to see if there are any incoming messages for the handset. If the user pushes the power off button on the handset, before the handset turns itself off, it notifies the wireless system that the handset will powering off. This is another form of registration—really of deregistration. After getting such notification from the handset, the system updates the entries in the Location Registers. Similarly, if the handset travels into new cells or if sufficient time passes, the handset will register again. Thus, the information in the Location Registers can be kept up-to-date and properly reflect the status of each handset.

Once the handset has registered, it is ready to handle traffic. If the user now dials a number on the handset and pushes send, the handset will use an Access Channel to notify the wireless system that the handset wishes to call that number. The system and the handset will then exchange a series of messages and user communications will be established over Traffic Channels.

The process for an incoming call is similar. When a call comes in to the mobile switch, it interrogates the proper Location Register to determine which cell is serving the handset. It then sends a message to the handset over the Paging Channel from that cell.

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[179] The Access Channel is a subdivision of the upstream (mobile-to-base) or reverse radio channel. Information about the Access Channels is broadcast to all handsets by the base station using the Synch Channel.

The handset receives the message, engages in a short dialog with the mobile switch, and begins the process of notifying the user of an incoming call (i.e., the handset rings and displays caller ID information). If the user answers the call, communications are established.

Defining the Cost Divisions

The first question that arises is, "What is the proper base to measure the added costs of carrying traffic?" CRA considers the base to be no network at all. Then, they assign all costs of the network to traffic. Their theory appears to be that if there were no traffic there would be no network, so the network is traffic sensitive. However, this is incorrect as a matter of both engineering and economics. As discussed above, some nontelephony uses of wireless networks—for example the OnStar notification of the fact of airbag deployment and the geographic location of that deployment or browsing the web—require the same infrastructure as do telephone calls. Similarly, providing the option to call—the ability to place calls at many locations where one will never actually call—is an important service.

We consider two different levels of network operation or function. The first category of network activity, which we will call *option costs* (corresponding more or less to non-traffic sensitive [NTS] costs)—consists of all the costs that must be incurred in order to give a subscriber the capability or option of placing and receiving calls. We also consider a second category of network activity—which we call *usage costs* (corresponding to traffic sensitive costs)—consisting of all the added costs that are incurred when the network is actually carrying traffic. For example, the entry of information describing a subscriber's equipment (e.g., the electronic serial number [ESN], or equipment capabilities, passwords, phone numbers, etc.) into databases necessary to permit calling is a non-traffic sensitive cost. Just consider information about the telephone number used with the phone. That number must be entered into both the carrier's database and the subscriber unit. The costs of the data entry and of the data storage do not vary with usage. Rather, they are incurred in order to permit usage. These costs are similar to the costs of the loop or the line card in wireline telephone service in that they must be incurred before the users phone can even ring—let alone carry a

conversation. The table below lists some illustrative option costs and usage costs for both wireline and wireless telephony. Corresponding entries are paired for the two systems. This table is illustrative only, and many wireless costs are not considered.

TABLE 1
Comparing Cost Structures of Wired and Wireless Telephony

Wireless		Wireline	
Option Costs	Usage Costs	Option Costs	Usage Costs
Handset except for battery	Shortened battery life	CPE	Wear and tear on CPE caused by use
Pilot carrier transmitted by CDMA base Station		Loop	
Home Location Register		Per-subscriber entries in Class 5 switch	
	Capacity cells		Tandem switches
	Traffic trunks to LEC		Traffic trunks between central offices

Handset

Let us address the entries in the table as an introduction to a more detailed consideration of wireless system costs. As CRA recognizes, the wireless handset is necessary for wireless communications.[180] Handset usage, talking on telephone calls, imposes costs in the form of reduced battery life. Current technology compact, high energy-density batteries (such as Li-ion, or NMH) can only be recharged a finite number of times (typically a few hundred times). Conversational usage cuts battery life. Consequently, usage increases battery costs, and handset costs are usage sensitive. For example, a $50 battery good for 200 charges with 1.5 hours of talk time per charge, would cost 0.3 cents per minute of conversational use. (See, e.g., http://www.cellular-

[180] CRA asserts that the handsets are NTS costs. Of course, strictly speaking, in the usual run of events the carrier does not even incur handset costs—because the handsets belong to the customer not the carrier. Handsets are NTS costs the same way a customer's suit (with its pocket essential for transporting and storing the handset) or purse (capable of storing the handset) are NTS costs. A more reasonable view of the world is to focus on the carrier's network and the costs of that network.

battery.com/qualcomm/index.htm or http://www.kyocera-wireless.com/thin/accessories.html.)

The CRA assertion that handset costs are not traffic sensitive is incorrect. If one separates the nonbattery portion of the handset from the battery portion, then the CRA assertion is correct. The wireless handset (ignoring the battery) corresponds to the wireline telephone user's telephone instrument and inside wiring.

The Pilot Carrier

Sprint operates a CDMA system in the PCS bands in the United States. This system was originally standardized as ANSI-J-STD-008-1996 (now replaced by TIA IS-95B).[181] In our discussion we discuss the characteristics of wireless systems using examples drawn the CDMA technology.[182]

CDMA systems transmit multiple wideband radio signals in a single 1.25 MHz wide band of frequencies. The IS-95 design divides up the outbound signal from each base transmitter into 64 separate channels, each associated with a separate Walsh code (Walsh-0 through Walsh-63). Although not strictly correct, it can be helpful to think of each of these Walsh codes as a separate frequency or channel transmitted from the base station.[183] Each CMDA cell transmits a Pilot Carrier on Walsh-0. That pilot signal consists repeated transmissions of the Walsh-0 waveform with no information modulation. Mobile units use the pilot signal to find the base station and to synchronize their operation with the base station. Without the pilot channel, mobile units would be unable to operate. But, the pilot channel does not carry any traffic—rather it acts more like a navigational beacon showing the handsets where to look for signals.

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[181] These standards are not terse. J-STD-008 is more 3.25 inches thick when printed (double sided) on standard office copy paper. We estimate that it runs to about 800 sheets or 1,600 pages.

[182] Although the standards are the authoritative source for specifying the technology, other documents are more accessible. Two good references on CDMA are David J. Goodman, *Wireless Personal Communications Systems*, Addison-Wesley, Reading MA, 1997, and Andrew J. Viterbi, CDMA: *Principles of Spread Spectrum Communication*, Addison-Wesley, Reading MA, 1995.

[183] Mathematically speaking, the Walsh functions provide a set of nonsinusoidal but orthogonal basis functions for information transfer from each cell site.

The pilot signal corresponds, at least in part, to the loop plant of a wireline carrier. The pilot signal is always there and is just the same whether the cell is carrying no calls, 1 call, 10 calls or 30 calls.

Home Location Register

Wireless systems maintain several databases that are needed to manage calling. One of these is the Home Location Register (HLR). A wireless systems' HLR contains the subscription information about each handset served by the system. For example, an HLR might contain an entry denoting that, when the handset is turned off or busy, calls should be forwarded to voice mailbox.[184] Or the HLR may contain information indicating that calling is restricted to certain classes of numbers. The need to store such information is not a traffic-sensitive function. Rather, such information is needed to provide the option of using service. The speed of the processor needed with the HLR may well be a function of usage. Each call generates inquiries to the HLR; more calls mean more processing at the HLR. However, other events, such as turning a handset on or off, also generate transactions at the HLR and require processor capability. HLR processor capacity is consumed even in the absence of any telephone conversations. For example, the HLR records whether the handset is currently turned on, and if turned on, which base station is serving it.

These features of the HLR are similar to features of the wireline class 5 switch. For example, a class 5 switch has a database with entries for each line. One of the entries in this database is a specification of the presubscribed interexchange carrier (PIC code) for that subscriber. Another possible entry database in the class 5 switch is the number to forward a call to if the subscriber's line is busy. As in the wireless case, these entries are needed to provide the option for service; their costs do not vary with the number of calls.

Coverage Cells versus Capacity Cells

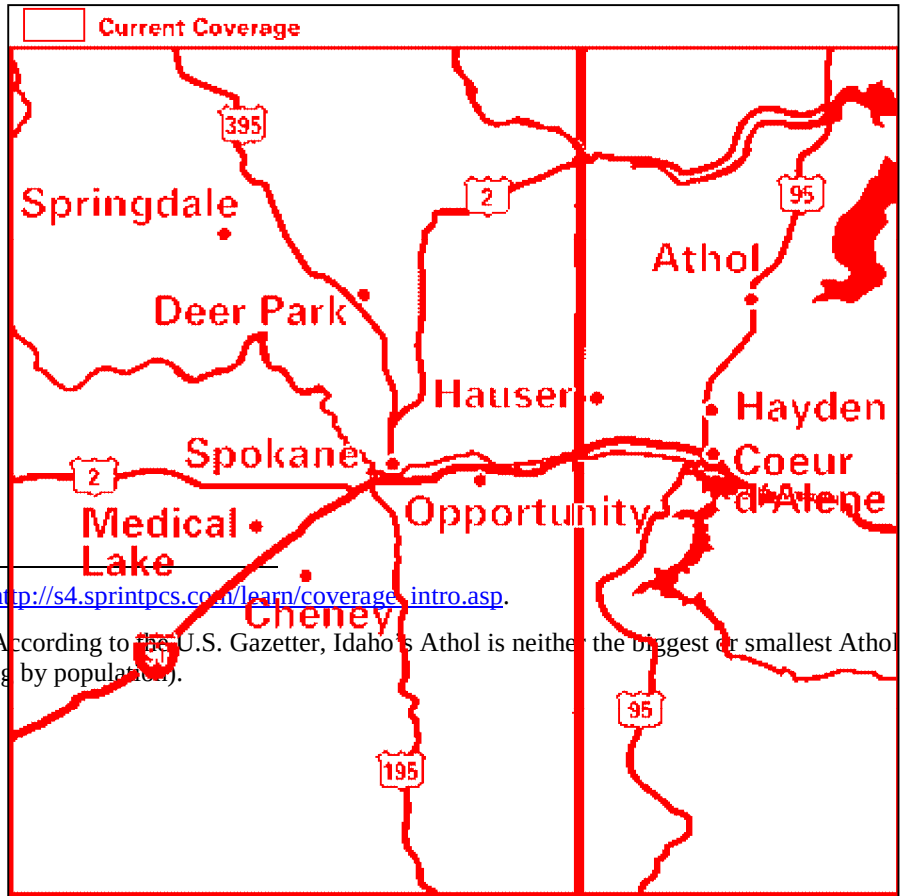
Wireless systems have two types of cells—coverage cells and capacity cells. Cells serving some locations are installed in order to permit consumers traveling to or

[184] http://www.nacn.com/industry/industry_faqitem5_frame.htm contains a discussion of support of IS-41 features across various vendors HLR products.

through that location to continue their conversations. For example, a highway may pass through a short canyon that blocks radio signals. A cell may be installed in order to provide service in the canyon so that calls made by people in cars passing through the canyon are not lost. The cell may never carry more than two or three calls and may only serve a typical call for a minute, but it is necessary to support mobile use of the service. Cells along highways outside of town, in low-density areas, and in resort areas are often such coverage cells. Sprint's PCS licenses contain an obligation to provide coverage to population in the license areas. See 47 CFR 24. Thus, coverage may also be provided to meet regulatory requirements as well as market requirements.

For example, Sprint provides wireless coverage in Hayden and Athol, Idaho.[185] See Figure 3 below which was taken from the Sprint PCS website. Hayden has a population of about 7,500 and Athol a population of only 500. Athol is a small town on State 95. Wireless subscribers may strongly value the option of placing and receiving calls there. But, given the limited population of Idaho's Athol, it seems unlikely that cells have been split there to increase

capacity.[186] Rather, it seems far more likely that the Sprint facilities there were installed to provide the option of calling.



185 http://s4.sprintpcs.com/learn/coverage_intro.asp.

186 According to the U.S. Gazetter, Idaho's Athol is neither the biggest or smallest Athol in the U.S. (measuring by population).

Figure 3 Sprint Coverage Near Spokane Washington and Coeur d'Alene Idaho.

In contrast, in urban areas peak-hour traffic may exceed the capacity of a minimal coverage cell. In that case, additional radio capacity can be added at the cell site to expand the capacity of the cell. Ultimately, all the possible radio channels available to a carrier are exhausted, and two or more smaller cells must replace the cell (a process called cell splitting). The additional costs incurred by adding radio capacity at a cell site or by cell splitting are purely costs associated with usage—even though a new cell also must have a pilot carrier and other features associated with permitting handsets to make and receive calls. We expect that cell splitting, for capacity reasons, will be rare in a network such as Sprint's.[187] Sprint has PCS licenses for both 30 MHz and 10 MHz blocks—with many of their licenses in major urban areas being 30 MHz licenses. A single CDMA RF channel requires 2.5 MHz (1.25 MHz in each direction) and can carry about 40 conversations. Thus, 30 MHz can support at least 10 CDMA RF channels (there may be some loss of capacity due to requirements to protect adjacent bands) and one cell can support at least 400 active conversations. CDMA technology also permits reusing RF channels in multiple sectors from a base station. Typically, base stations support either 3 or 6 sectors. A 6-sector base station, using 10 CDMA RF channels in each sector could support 2,400 conversations. This is substantial capacity and shows how much growth is possible before cell splitting is required.

Traffic Trunks to the Wireline LEC

A cellular carrier will have trunks connecting its switching center to the switching center of the local wireline carrier. These trunks are sized to match peak-hour traffic. It

[187] Cell splitting may occur to improve service quality or coverage. For example, if lost calls often occur on a stretch of highway between two cells, an intermediate cell may be added to provide improved coverage in the area where the calls are often lost.

is reasonable to allocate the costs of these trunks to usage. Such costs can be compared to the costs of wireline interoffice transport—which is also allocated to usage.

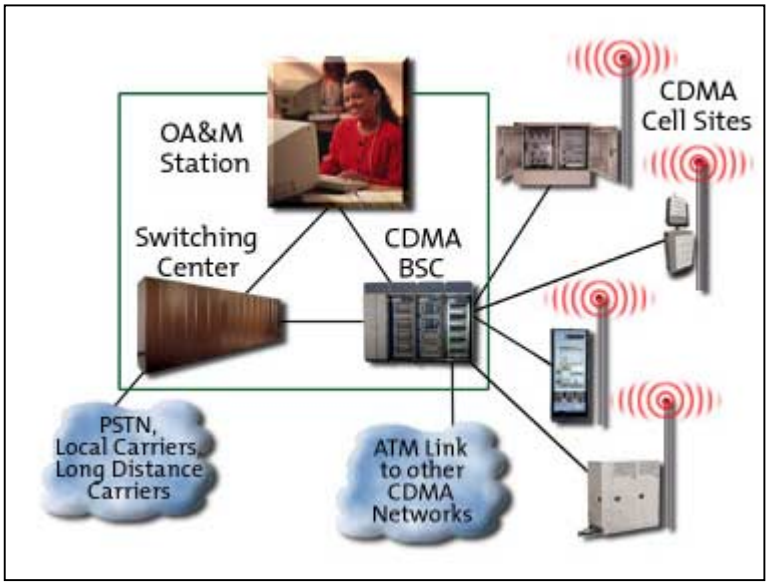


Figure 4 **CDMA System Diagram from Nortel**

Classification of Wireless Infrastructure Costs

With this introduction to the principles of classifying wireless system costs into option and usage costs, we will now turn to a detailed examination of the costs of a modern CDMA PCS system and the proper classification of those costs. The Figure above shows a diagram of a CDMA wireless system. We attempted to follow, as much

as possible, the notation and usages from the CRA study. We divide the wireless system infrastructure into the following elements: Switching Center (SC), Base Station Controller(s) (BSC), Backhaul, Signalling, Base Transceiver System (BTS), and Structure and Antennas. Our discussion here is somewhat illustrative. For example, we collocate the wireless switch with the HLR and the authentication center at the switching center. Such collocation need not be the case. If the MSC and HLR are not collocated, then the cost of the communications link between the MSC and the HLR is incurred, at least in part, to provide the option for calling.

Switching Center

The switching center contains the Mobile Switching Center (MSC). In the analog cellular world, the MSC was known as the mobile telephone switching office (MTSO). Also located at the switching center are the Equipment Identity Register (EIR), the Home Location Register (HLR), the Visitor Location Register (VLR), and the Authentication Center (AC).

The MSC must be connected to other switches to exchange both voice traffic (traffic channels) and control information (signalling channels). The MSC is also connected to the BSCs, the HLR, and the VLR. The HLR is connected to both the MSC and the AC. The Figure above illustrates this architecture, which follows the reference model in IS-41. The MSC is the mobile switch. It controls the process of call setup, routes traffic to the appropriate cells, and controls the process of taking down calls. It also maintains the HLR and VLR entries for handheld units.

Signalling system

The MSC is connected to other switches both wireless and wireline using Signalling System 7 (SS#7) in order to exchange control information. For example, when a handset attempts to register in a distant wireless system, that wireless system sends a message to the handset's home system, to obtain the information necessary to verify the validity of the handset identification information and other functions. Similarly, when an incoming call comes from a wireline carrier, the wireline carrier sends information about the call to the wireless carrier over the signalling system. Such communications between wireless systems are essential in limiting fraud.

BSC

The BSC provides many of the functions one normally associates with a base station.[188] For example, it is the entity that formats messages to handheld units directing them to change from one base station to another. The BSC manages handset registration, call setup, and handoff, among other functions.

Backhaul

The BSCs are connected to the BTSs (the radio equipment at the cells sites) through transmission systems. These transmission systems are called Backhaul Systems because they carry traffic back from the cell sites to the wireless network. Typically backhaul systems run from the cell sites to BSCs. Backhaul circuits carry the information used for registration of handheld and other control functions as well as the voice traffic to and from each cell.

Some backhaul costs must be incurred to support registration and other administrative functions. Typically, backhaul capacity comes in lumps such as the DS-1 service, available from many carriers, that provide a payload of 1.536 Mbit/sec. Microwave systems usually deliver more capacity than this. A typical low-capacity microwave system delivers about 6 Mbit/sec.

CDMA systems represent speech in a compressed form that occupies about 6,000 bits per second (on average) for an active speaker. Thus, a DS-1 with 1.5 Mbit/sec of capacity can carry about 250 conversations. For practical purposes, it is more appropriate to reserve capacity for the administrative functions and leave some headroom to accommodate statistical fluctuations in the capacity needed for each speech signal. But, it is reasonable to expect a DS-1 to support about 200 active conversations. Putting it another way, if a DS-1 must be installed to support service administration traffic between the cell site and the base station, its capacity will not be exhausted until the cell is capable of supporting more than 200 conversations.

BTS

The Base Transceiver System consists of radio amplifiers, a radio front end, control subsystems, and channel modulator/demodulator elements. For information on

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188 For a description of a BSC, see http://www.ericsson.se/cdmasystems/bsc_home.shtml.

some specific BTS products see http://www.nortelnetworks.com/products/01/cdma/base_portfolio.html#rural, http://www.ericsson.se/cdmasystems/bsc_home.shtml, or http://www.motorola.com/NSS/Technology/CDMA.html.

A minimal BTS capability is required in each cell if the cell is to be able to transmit the pilot tone, register handsets, and perform other housekeeping tasks that are necessary before any calls can be completed.

Structure and Antennas

Typically, base stations require enclosures, connections to electrical power, a tower, antennas, and waveguide to carry the radio frequency signal between the BTS and the antennas. The registration function and other housekeeping functions cannot be performed without the structure and antennas. Consequently, these items are necessary to provide the option of communications. The cost of Structure and Antennas associated with coverage cells does not vary with usage. Hence, these costs are option costs.

Wireless Cost Classification in Summary

The table below displays the division of infrastructure costs between option costs and usage costs.

TABLE 2
Wireless Cost Classification

System Element	Option Cost	Usage Cost
Message Switching Center	Yes	Partially
Home Location Register	Yes	Partially
Visitor Location Register	Yes	Partially
Authentication Center	Yes	Partially
Equipment Identify Register	Yes	Partially
Signalling (SS#7)	Yes. SS#7 connectivity is used to support roaming services and intersystem handoff.	Partially. If SS#7 capacity has to be expanded over minimal levels to support the signalling needs of usage, then this

		incremental element is a usage cost.
Base Station Controller (BSC)	BSCs are necessary to support the option of calling.	Marginally
Backhaul	A minimal backhaul connection to each coverage cell or coverage cell equivalent is required in order to provide the option of calling.	Marginally. Any increase over the minimum level (e.g., the cost of more than one DS-1 to cells serving many voice channels) is a usage cost.
Base Tranceiver System (BTS)	A minimal BTS with forward pilot channel, forward synch channel, and a reverse access channel is require to permit handsets to register for service in each cell. In addition, if the equipment manufacturer provides traffic channels bundled with the required minimum capacity, then those bundled traffic channels are part of the option costs.	Any addition to BTS capacity required to carry traffic above that carried by the minimum configuration. Similarly, all the added costs created by cell splitting to meet traffic demands.
Structure and Antennas	Option costs if for coverage cells	Any added costs for Structure and Antennas needed because of cell splitting to meet traffic demands

A simple model with reasonable parameters shows that the majority of costs in a modern wireless system are NTS costs. Consider a wireless system with 10,000 cells.[189] Assume that 700 of these cells are coverage cells and that 300 of the cells have been expanded to provide capacity as well as coverage. Assume that the average cost of a coverage cell is $750,000 and that the cost of a capacity-expanded cell is $1,000,000—of which $500,000 is allocated to capacity expansion and $500,000 is allocated to coverage. Assume further that backhaul costs and MSC costs divide in the same ratio as cell-site costs. In this model, total costs are more than $8 billion of which 90% are option or NTS costs.[190]

[189] Sprint reported in its 1999 SEC form 10K that it had approximately 14,400 cell sites under lease or option to lease at year-end 1999.

[190] Sprint has the data needed to provide a more refined version of this model. We note that the CRA authors did not use any quantitative information about the Sprint network in presenting their views.

Radio Spectrum Costs

Many wireless carriers, such as Sprint, obtained most or all of their licenses through the FCC's auctions or by purchase from entities that purchased licenses at these auctions.[191] CRA argues that the cost of these licenses is a TS cost. This view is flawed. The radio licenses are analogous to coverage cells—neither the voice services nor the other wireless services can be provided without the radio licenses. If a wireless operator is using the IS-95 technology used by Sprint, then that operator needs at least 2.5 MHz of spectrum just to provide the option of service. That is, the wireless operator cannot even turn on the Pilot Channel and accept registration traffic unless it has access to 2.5 MHz. In this case, the wireless equivalent of dial tone requires 2.5 MHz.

The FCC licensed PCS in two size blocks—10 MHz and 30 MHz. Thus, in order to be in the PCS business—to have the 2.5 MHz minimum—Sprint had to buy at least a 10 MHz license is needed. The cost of the 10 MHz license no more varies with usage than does the cost of a coverage cell. In contrast, there is a tradeoff between infrastructure costs and spectrum. In some circumstances, the wireless carrier's infrastructure costs will be lower if the carrier has access to more radio spectrum. This economic tradeoff permits placing a value on the 30 MHz licenses. Consider a wireless system built in an urban area with a 30 MHz license. Compare the cost of that system to a hypothetical system providing the same capacity and coverage, but engineered to fit into only 10 MHz of spectrum. The added costs of the 10 MHz system over the costs of the 30 MHz system reflect the savings from the added spectrum.

We note that Dr. David Reed of the FCC's Office of Plans and Policy studied the costs of PCS systems and the cost savings associated with additional spectrum.[192] He generally concluded that PCS systems would not require more than about 20 MHz of spectrum. We doubt if there are many cells in the Sprint network where all 30 MHz are

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[191] Two of Sprint's PCS licenses (Washington DC and Los Angeles) were granted through the FCC's Pioneers Preference policy.

[192] See **Putting It All Together: The Cost Structure of Personal Communications Services,** by David P. Reed; November 1992. NTIS PB93 114882;

occupied by PCS signals. We expect that there are many cells in the Sprint network where only 2.5 MHz of spectrum is occupied by PCS signals.

Conclusions

The fundamental claim of the CRA authors is that wireless systems have a simple cost structure—handsets are NTS, everything else is TS. It would be hard to be more wrong. Handsets have significant TS costs (not borne by the carrier). The infrastructure network has massive NTS costs—a simple model indicates that the vast majority of the infrastructure costs are NTS costs. Sprint has bought a lot of radio spectrum—which it needs in order to offer the wireless equivalent of dial tone—and much of which will be used to provide wireless Internet access and other future services.

Moreover, efficiency considerations generally favor symmetric *reciprocal compensation* for interconnecting carriers based on the forward-looking cost (TELRIC) of an efficient firm. We disagree with Sprint's argument that differences in technology or service quality justify asymmetric rates. In general, differences in technology or service quality do not generate legitimate differences in costs for the purpose of setting asymmetric compensation rates. Compensating carriers that have different technological characteristics or provide different service qualities at the same rate as that of a fully-efficient firm using least-cost technology and providing an average service quality <u>will not</u> discourage these carriers from deploying their networks. Economic efficiency is achieved if the additional costs incurred to provide this different type of service are recovered from the agent that causes those costs to be incurred.