EXHIBITS TO REPLY TESTIMONY OF JAMES MERTZ ON BEHALF OF O1 COMMUNICATIONS, INC.

C-15-12-020

Exhibit No.	Description
JM-Z	Excerpts of the FCC's Local Competition Order, CC Docket No. 96-98
JM-AA	Excerpts of Reply Comments of Supporters of Missoula Plan, including AT&T, FCC Docket No. 01-92
JM-BB	Excerpts of In the Matter of Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, Second Notice of Proposed Rulemaking, 10 FCC Rcd 10666 (1995)
C JM-CC	Chart showing routing of O1 traffic destined to AT&T Mobility before and after disconnection
C JM-DD	AT&T Mobility's "best and final" offer to O1 for direct interconnection, dated 12/18/2015
C JM-EE	Chart showing O1's Loss of Minutes of Use on a Customer by Customer Basis
JM-FF	Excerpts of ATIS Handbook on Intercarrier Call Completion/Call Termination (approved Oct. 2015)
JM-GG	In the Matter of Rural Call Completion, Report and Order and FNPR, WC Docket No. 13-39 (Nov. 8, 2013)
JM-HH	Order Instituting Investigation to Address Intrastate Rural Call Completion Issues, CPUC Docket No. I.14-05-012 (May 15, 2014)
C JM-II	Chart Showing ASR and PDD Rates for Indirect Routing to AT&T Mobility
C JM-JJ	Chart Showing Costs of Different Forms of Interconnection

JM-KK	**Diagrams Showing Routing of Traffic to AT&T Mobility Through Different Forms of Interconnection**
C JM-LL	**Chart Showing the Number of MOUs Terminated to AT&T Mobility Over Direct Connections, including jurisdiction**
C JM-MM	**Email correspondence between AT&T Mobility and O1 establishing direct connections**
C JM-NN	**8/21/12 Email from AT&T employee, Ola Oyefusi to L. Bax**
JM-OO	**Excerpts of In the Matter of Developing an Unified Intercarrier Compensation Regime, Order on Reconsideration, WC Docket No. 01-92 (rel. Dec. 23, 2011)**
JM-PP	**Excerpts of In the Matter of Developing an Unified Intercarrier Compensation Regime, Report and Order and FNPR, 26 FCC Rcd. 17663 (rel. Nov. 18, 2011)**
C JM-QQ	**Excerpts of AT&T Mobility Responses to Data Requests**
C JM-RR	**Excerpts of AT&T Mobility Responses to O1's Third Set of Data Requests**
C JM-SS	**Email from L. Bax, Bates No. ATT M 000334**

EXHIBIT JM-Z

Excerpts of the FCC's Local Competition Order, CC Docket No. 96-98

FCC 96-325

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996	)	CC Docket No. 96-98
	)	
	)	
Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers	)	CC Docket No. 95-185
	)	
	)	

FIRST REPORT AND ORDER

Adopted: August 1, 1996 Released: August 8, 1996

By the Commission: Chairman Hundt and Commissioners Quello, Ness, and Chong issuing separate statements.

Table of Contents

IV. INTERCONNECTION

172. This section of the Report and Order, and the three sections that follow it, address the interconnection and unbundling obligations that the Act imposes on incumbent LECs. Beyond the resale of incumbent LEC services, it is these obligations that pave the way for the introduction of facilities-based competition with incumbent LECs. The interconnection obligation of section 251(c)(2), discussed in this section, allows competing carriers to choose the most efficient points at which to exchange traffic with incumbent LECs, thereby lowering the competing carriers' costs of, among other things, transport and termination of traffic. The unbundling obligation of section 251(c)(3) further permits new entrants, where economically efficient, to substitute incumbent LEC facilities for some or all of the facilities the new entrant would have had to obtain in order to compete. Finally, both the interconnection and unbundling sections of the Act, in combination with the collocation obligation imposed on incumbents by section 251(c)(6), allow competing carriers to choose technically feasible methods of achieving interconnection or access to unbundled elements.

173. Section 251(c)(2) imposes upon incumbent LECs "the duty to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the local exchange carrier's network . . . for the transmission and routing of telephone exchange service and exchange access."[338] Such interconnection must be: (1) provided by the incumbent LEC at "any technically feasible point within [its] network;"[339] (2) "at least equal in quality to that provided by the local exchange carrier to itself or . . . [to] any other party to which the carrier provides interconnection;"[340] and (3) provided on rates, terms, and conditions that are "just, reasonable, and nondiscriminatory, in accordance with the terms and conditions of the agreement and the requirements of this section and section 252."[341]

A. Relationship Between Interconnection and Transport and Termination

1. Background

174. In the NPRM, we sought comment on the relationship between the obligation of incumbent LECs to provide "interconnection" under section 251(c)(2) and the obligation of all LECs to establish reciprocal compensation arrangements for the "transport and termination" of

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[338] 47 U.S.C. § 251(c)(2)(A).

[339] 47 U.S.C. § 251(c)(2)(B).

[340] 47 U.S.C. § 251(c)(2)(C).

[341] 47 U.S.C. § 251(c)(2)(D).

telecommunications, and are thus not telecommunications carriers within the meaning of the Act, may not interconnect under section 251.

996. Consistent with our tentative conclusion in the NPRM, we will determine whether the provision of mobile satellite service (MSS) is CMRS (and therefore common carriage) or PMRS based on the factors set forth in the *CMRS Second Report and Order*.[2347] Commenters have not raised objections to the Commission's tentative conclusion on this issue.

997. Regarding the issue of interconnecting "directly or indirectly" with the facilities of other telecommunications carriers, we conclude that telecommunications carriers should be permitted to provide interconnection pursuant to section 251(a) either directly or indirectly, based upon their most efficient technical and economic choices. The interconnection obligations under section 251(a) differ from the obligations under section 251(c). Unlike section 251(c), which applies to incumbent LECs, section 251(a) interconnection applies to all telecommunications carriers including those with no market power. Given the lack of market power by telecommunication carriers required to provide interconnection via section 251(a), and the clear language of the statute, we find that indirect connection (*e.g.*, two non-incumbent LECs interconnecting with an incumbent LEC's network) satisfies a telecommunications carrier's duty to interconnect pursuant to section 251(a). We decline to adopt, at this time, Metricom's suggestion to forbear under section 10 of the 1996 Act[2348] from imposing any interconnection requirements upon non-dominant carriers. We believe that, even for telecommunications carriers with no market power, the duty to interconnect directly or indirectly is central to the 1996 Act and achieves important policy objectives. Nothing in the record convinces us that we should forbear from imposing the provisions of section 251(a) on non-dominant carriers. In fact, section 251 distinguishes between dominant and non-dominant carriers, and imposes a number of additional obligations exclusively on incumbent LECs.[2349] Similarly, we also do not agree with the Texas Commission's argument that the obligations of section 251(a) should apply equally to all telecommunications carriers. Section 251 is clear in imposing different obligations on carriers depending upon their classification (*i.e.*, incumbent LEC, LEC, or telecommunications carrier).[2350] For example, section 251(c) specifically imposes obligations upon incumbent LECs to interconnect, upon request, at all technically feasible points. This direct interconnection, however, is not required under section 251(a) of all telecommunications carriers.

[2347] *CMRS Second Report and Order*, 9 FCC Rcd at 1457-58 (1994).

[2348] 47 U.S.C. § 160.

[2349] *See* 47 U.S.C. § 251. The 1996 Act makes further provisions for rural carriers and, upon an appropriate showing, carriers serving fewer than 2 percent of the nation's access lines. *See* 47 U.S.C. § 251(f)(1), (f)(2).

[2350] 47 U.S.C. § 251.

compliance requirements to the extent they are required to interconnect with entities that qualify as "telecommunications carriers."

1406. Small incumbent LECs and small entities providing telecommunications services will also be under a duty not to install network features, functions, and capabilities that do not comply with standards and guidelines under sections 255 and 256. (Section IX - Duties Imposed on "Telecommunications Carriers" By Section 251(a)(2).) In addition, small entities that provide both information services and telecommunications services are classified as telecommunications carriers and are subject to certain requirements under 251(a). (Section IX - Duties Imposed on "Telecommunications Carriers" By Section 251(a)(2).)

1407. *Steps Taken to Minimize Significant Economic Impact on Small Entities and Small Incumbent LECs, and Alternatives Considered.* Small entities who provide for a fee local, interexchange and international services are defined as telecommunications carriers and, thus, also receive the benefits of section 251 including interconnection, services, and network elements, which may increase their ability to compete. (Section IX - Duties Imposed on "Telecommunications Carriers" By Section 251(a)(2).) We reject the suggestion that CMRS providers, some of which likely are small entities, should not be included in the definition of a "telecommunications carrier." (*Id.*) We determine that entities operating private, internal or shared communications networks do not qualify as telecommunications carriers, however, which excludes them from the obligations and benefits under section 251(a). Small entities providing information services but not telecommunications services are also not classified as telecommunications carriers and, thus, will not be bound by the duties of section 251(a). A carrier that provides both information and telecommunications services is deemed subject to the requirements of section 251(a). We also conclude that telecommunications carriers that have interconnected under either section 251(a)(1) or 251(c)(2) may offer information services through the same arrangement or agreement. This will permit new entrants, many of which may be small entities, to offer full ranges of services to end users without having to provide some of those services inefficiently through distinct facilities or agreements.

1408. We decide that competitive telecommunications carriers that have the obligation to interconnect with requesting carriers may choose, based upon their own characteristics, whether to allow direct or indirect interconnection. (Section IX - Duties Imposed on "Telecommunications Carriers" By Section 251(a).) This should allow significant flexibility for small entities to choose the most efficient and economical arrangement for their particular strategy. As set forth in Section IX, we reject an argument to forbear, under section 10 of the Communications Act,[3274] from imposing any interconnection requirements on non-dominant carriers.

[3274] 47 U.S.C. § 160.

EXHIBIT JM-AA

Excerpts of Reply Comments of Supporters of Missoula Plan, including AT&T,

FCC Docket No. 01-92

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

REPLY COMMENTS OF THE SUPPORTERS OF THE MISSOULA PLAN

February 1, 2007

A. The Plan's Edge Rules Are Lawful

Many of the attacks on the Plan's Edge rules stem from the suggestion that the rules are inconsistent with section 251(c)(2) of the Act, which requires ILECs to offer physical interconnection at any "technically feasible point" in the network, or with the Commission's interpretation of that rule as permitting competing carriers to physically interconnect at one point in a LATA for *all* their traffic.[69] They contend, among other things, that (1) by establishing only certain facilities as Edges, the Plan divests competitors of the right to physically interconnect at other points in the network, and (2) by allowing the *terminating* carrier to establish Edges at any eligible location, the Plan forces competitors to physically interconnect at various locations. This critique reveals a misunderstanding of the "Edge" concept and the Plan's interconnection framework.

In fact, the Plan does not limit a carrier's right to physically interconnect: it *expands* physical interconnection rights in most cases, by providing *all* carriers with an equivalent right to obtain interconnection at any point designated as an Edge under the Plan.[70] Nor does the Plan limit physical interconnection rights under section 251(c)(2) or require that any carrier abandon

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[69] *See, e.g.*, Broadview et al. Comments at 43-45; Cavalier et al. Comments at 22-25; CTIA Comments at 12-13; Missouri Comments at 50-51; NCTA Comments at 15-16.

[70] *See, e.g.*, Missoula Plan at 41. Of course, some commenters (particularly wireless carriers) argue that the Plan is inconsistent with the Act or prior Commission precedent in that it also *creates* new interconnection rights: specifically, it requires wireless carriers to accept *direct* interconnection even where they do not do so today. *See* Verizon Wireless Comments at 3-8. But the Commission is currently considering whether to require such interconnection in a separately pending proceeding, *see Neutral Tandem Petition*, and there is no question that it has the legal authority to require such interconnection if it finds it to be in the public interest. But in any event, this new requirement would not force wireless carriers to reconfigure their networks so as to accept traffic (or force any other carrier to create an eligible Edge where one is lacking): the Plan permits a carrier to designate Edges that make sense in its network, and even to designate another carrier's facilities as its Edge, subject to that carrier's agreement. If that option is more efficient, CMRS carriers can chose it to avoid any burden arising from the Plan's interconnection obligations. *See* Missoula Plan at 15.

any existing physical interconnection arrangement.[71] To the contrary, the Plan specifically provides that the Edge rules will not trump any rights carriers may have under section 251(c)(2).[72] Instead, the Plan merely sets forth which places on the network various carriers may designate as an Edge, and assigns *financial* responsibility to the originating carrier to arrange for the delivery of this traffic to the relevant terminating Edge — whether on its own network or through some other carrier's network (including that of the terminating carrier).[73]

Ultimately, opponents' concern about the Plan's Edge rules may stem from the fact that they do not like the rates that the Plan sets when the originating carrier chooses to use the terminating carrier's facilities to reach the Edge. But the carrier with the financial responsibility for interconnection always has the right to choose the means of interconnection transport, and thus this concern rings hollow. Moreover, the interstate dedicated transport rate that the Plan chooses as the default rate for using the terminating carrier's transport for interconnection has been, by definition, deemed "just and reasonable" by the Commission to recover carrier's costs. In fact, these rates are often lower than what carriers pay today for transport. Finally, where a carrier *already* interconnects at a Track 1 ILEC tandem (which is quite frequently the case), the

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71 Indeed, the Plan's grandfathered "Virtual Edge" provisions are specifically designed to protect the investment that competitive carriers have made in specific physical interconnection arrangements. *See* Missoula Plan at 32-33.

72 Missoula Plan at 41 ("Other locales for interconnection are permitted as provided for under Section 251(c)(2) of the Act and in any interconnection agreement or arbitration[.]").

73 Missoula Plan at 30. There accordingly is nothing to Broadview's argument that, because a carrier may designate several Edges within a LATA, or charge for transport between a POI and the relevant Edge, the Plan is inconsistent with the Commission's determination that CLECs may designate one point of interconnection per LATA in order to lower their costs of transport and termination of traffic. *See, e.g.*, Broadview et al. Comments at 47 (citing *Local Competition Order* at ¶ 172). But CLECs continue to have this flexibility under the Plan. If a CLEC finds that its costs of transport are lower if it exercises its section 251(c)(2) right to drop off all its traffic at one POI rather than at several Edges, it may choose the former interconnection arrangement. Conversely, if a CLEC finds that interconnecting directly or indirectly at several Edges is a more attractive option, it has that right as well.

Plan will result in elimination of any transport costs on the terminating carrier's network (since under the Plan transport applies only between the sending carrier's network and the terminating carrier's Edge).[74]

The Commission should disregard the argument made by some commenters that the Edge rules impose transport costs that are inconsistent with section 252 of the Act.[75] That provision refers to costs; it is well within the Commission's jurisdiction to establish the proper approach for measuring those costs — *i.e.*, a rate *no higher than* interstate rates. And in any event, the Commission may rightfully determine that different rules should apply to the costs carriers must bear for terminating traffic from their Edges than for hauling traffic from a different physical point of interconnection that is chosen for the interconnecting carrier's convenience. The Edges envisioned by the Plan are intended to establish efficient points of interconnection from which to serve the end users who "subtend" the particular Edge, and the Plan's rules thus require the terminating carrier to terminate traffic from the Edge at the low terminating rates set by the Plan, and to recover remaining costs from end users and the Restructure Mechanism. But it makes no sense to allow the originating carrier to force the terminating carrier's customer to bear the additional costs of hauling traffic from a less efficient POI to that Edge.

In any event, over time, the Plan should actually exert significant downward pressure on such costs. The Plan creates a right for transit carriers to interconnect, which will facilitate the provision of tandem transit by competitors.[76] The availability of tandem transit service will

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74 Today, in contrast, CLECs pay transport rates from the POI to each served end office. Under the Plan, the low termination rates apply from the Edge to the served end office. Carriers already interconnected at the tandem will thus *save* money.

75 *See, e.g.*, Cavalier et al. Comments at 61-62.

76 *See* Missoula Plan 41.

provide an incentive for the terminating carrier to offer its transport services and facilities to originating carriers at the most efficient and attractive rates possible. The Plan provides that it is always the option of the carrier with the financial duty for transport to choose how to transport its traffic to the terminating carrier's Edge: direct interconnection to the Edge via its own facilities, use of the terminating carrier's facilities, or via the facilities of a third party.[77]

B. The Edge Rules Advance Important Public Policy Goals

As discussed above, the Edge rules serve *all* carriers by ending decades of dispute and providing clear, straightforward rules regarding all carriers' obligations and rights. Contrary to the claims of some carriers,[78] intercarrier compensation disputes continue to disrupt the efficient exchange of traffic amongst networks.[79] There must be clarity about where and how customers interconnect and the scope of each carrier's transport obligation in connection with that interconnection arrangement.

The Plan's detailed set of rules on interconnection should eliminate litigation, arbitration, and administrative costs, and allow carriers to refocus their attention on the deployment of facilities and the provision of service. The interconnection rules are very comprehensive, and clarify not only that carriers *must* all interconnect, but also what such interconnection must include and where it may be provided. It is startling that, over a decade into local market competition (and even longer with respect to the entry of CMRS competitors), these rules are still unclear and inconsistently applied by carriers. The Plan's clarified rights and obligations for

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77 *Id.* 42.

78 *See* Verizon Comments at 31 (claiming that disruption of the existing intercarrier regime is unnecessary because "disputes occur less frequently today" than in the past).

79 *See, e.g.*, Sprint Corp.'s Petition for Declaratory Ruling Regarding the Routing and Rating of Traffic by ILECs, filed in CC Docket No. 01-92, May 9, 2002.

CONCLUSION

For the foregoing reasons, we urge the Commission to promptly adopt and implement the Missoula Plan for Intercarrier Compensation Reform. Intercarrier compensation reform is needed now, and the Missoula Plan is the only comprehensive plan that addresses all of the myriad intercarrier compensation issues confronting the industry today in a reasonable, realistic, and measured manner.

Respectfully Submitted,

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EXHIBIT JM-BB

Excerpts of In the Matter of Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, Second Notice of Proposed Rulemaking,

10 FCC Rcd 10666 (1995)

10 FCC Rcd 10666; 1995 FCC LEXIS 2662

Federal Communications Commission

April 20, 1995 Released; Adopted April 5, 1995; Comment Date June 14, 1995; Reply Comment Date July 14, 1995

Release No. FCC 95-149

Reporter
10 FCC Rcd 10666; 1995 FCC LEXIS 2662

In the Matter of Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services

Core Terms

interconnect, resale, cellular, carrier, roam, network, reply, reseller, customer, mobile, facilities-based, competitor, switch, licensee, public interest, market place, common carrier, tentatively, notice, cellular service, subscriber, telecommunication, market power, telephone, license, mobile radio, user, premature, terminate, interstate

Action

[1]** SECOND NOTICE OF PROPOSED RULE MAKING

Panel: By the Commission: Commissioner Quello issuing a separate statement

Opinion

[*10668] I. INTRODUCTION

1. This proceeding continues our inquiry into matters relating to the interconnection of commercial mobile radio service (CMRS) systems, and initiates a rule making to address the resale obligations of CMRS providers. This docket was initiated last year to consider proposed rules regarding CMRS interconnection. A notice of proposed rule making was adopted to consider: (1) the imposition of equal access obligations upon CMRS providers; and (2) the need for rules governing the requirements for interconnection service provided by local exchange carriers (LECs) to CMRS providers. A third aspect of CMRS interconnection was the subject of a notice of inquiry into whether the Commission should propose rules requiring CMRS providers to interconnect directly with each other, and/or propose rules prohibiting CMRS providers from restricting resale. [1] In this order, we examine only those issues raised in the Interconnection NOI.

2. Based upon the record before us, we conclude that at present it would be premature for the Commission to propose or adopt rules of general applicability requiring direct interconnection

[1] Equal Access and the Interconnection Obligations Pertaining to Commercial Mobile Radio Service, CC Docket No. 94-54, Notice of Proposed Rule Making and Notice of Inquiry, 9 FCC Rcd 5408 (1994) (Equal Access NPRM; Interconnection NOI).

arrangements between CMRS providers. Although cellular service has become a staple of modern telecommunications service, many of its potential competitors are just beginning to emerge. We have only recently concluded our auction for the A and B blocks for broadband personal communications service (PCS) licenses and have yet to begin the licensing process. The specialized mobile radio (SMR) industry is also undergoing a period of profound change and technological development. Especially in view of the nascency of many CMRS providers, and the rapidly developing technologies they may be employing, we cannot at this time make general conclusions about either the technical nature of CMRS-to-CMRS interconnection, the costs involved, or the nature of any rules that would best ensure its implementation. For present, we leave such decisions to the informed business judgment of the CMRS providers and to the competitive forces of the CMRS marketplace. Nonetheless, because of the fundamental importance **[**3]** of interconnectivity, and the needs of carriers and the investment community to understand how CMRS will be regulated, we believe that it is not too early to begin to articulate some broad policy guidelines to help chart the course of the CMRS industry through this all-important early phase of its development. Accordingly, we seek comment on several broad policy guidelines intended to pilot the implementation of the basic common carrier obligations of CMRS providers under Title II of the Communications Act of 1934, as amended. [2] In addition, we continue our inquiry into the interconnection arrangements required to support CMRS roaming service.

3. Further, we tentatively conclude that imposing a resale obligation on most CMRS providers would be in the public interest. We also tentatively conclude that a resale **[*10669]** obligation will provide additional competition as well as act to jump start the entry of personal communications services into the CMRS marketplace while imposing only minimal costs upon the subject carriers. We also seek comment on whether there should be a time limitation on the obligation of **[**4]** CMRS providers to provide resale capacity to their facilities-based competitors similar to the five-year limit on the provision of resale capacity by cellular providers to their facilities-based competitors.

II. BACKGROUND

4. The Omnibus Budget Reconciliation Act of 1993, [3] amended Section 332 of the Communications Act (the Act), inter alia, to require that the Commission respond to requests of CMRS providers to establish physical connections with common carriers pursuant to Section 201 of the Act. [4] The Budget

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[2] 47 U.S.C. §§ 201-208.

[3] Omnibus Budget Reconciliation Act of 1993, Pub.L.No. 103-66, 107 Stat. 312 (1993) (Budget Act).

[4] Specifically, the Budget Act amended the Communications Act of 1934 (Act) to provide:

> Upon reasonable request of any person providing commercial mobile service, the Commission shall order a common carrier to establish physical connections with such service pursuant to the provisions of section 201 of this Act. Except to the extent that the Commission is required to respond to such a request, this subparagraph shall not be construed as a limitation or expansion of the Commission's authority to order interconnection pursuant to this Act.

47 U.S.C. § 332(c)(1)(B). Section 201(a) of the Act reads in pertinent part as follows:

> It shall be the duty of every common carrier engaged in interstate or foreign communication . . . in accordance with the orders of the Commission, in cases where, after opportunity for hearing, finds such action necessary or desirable in the public interest, to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes.

47 U.S.C. § 201(a).

Act also classifies CMRS providers as common carriers. [5] In the CMRS Notice of Proposed Rule Making, the Commission requested comment **[*10670]** regarding whether local exchange carriers (LECs) and CMRS providers should be required to provide interconnection to mobile service providers. [6]

5. In the CMRS Second Report and Order, [7] the Commission imposed an obligation on LECs to provide the type of interconnection reasonably requested by all CMRS providers. The Commission also found that the record established in response to the CMRS Notice of Proposed Rule Making was inadequate to decide whether to adopt generic rules requiring CMRS providers to furnish interstate interconnection to other mobile service providers. The Commission expressed its intention to initiate an inquiry into that question. [8]

6. On July 1, 1994, the Commission released a Notice of Proposed Rule Making (Equal Access NPRM) proposing equal access obligations for certain CMRS providers, seeking comment on tariffing requirements for LEC to CMRS interconnection, and instituting a Notice of Inquiry (Interconnection NOI) into whether the Commission should find that it would be in the **[**6]** public interest to impose a general interconnection obligation on CMRS providers. [9] The Interconnection NOI further sought comment on whether the Commission should impose roaming [10] and resale obligations on some or all CMRS providers. [11]

7. Seventy-four parties filed comments and 45 parties filed reply comments. These parties include LECs and their affiliated cellular companies, non-wireline cellular companies, interexchange carriers (IXCs), industry trade associations, SMR licensees, mobile satellite service (MSS) providers, and parties who intended to bid on PCS licenses. [12]

[*10671] III. PLEADINGS; DISCUSSION

A. Interconnection Obligation

1. Generally

a. Background

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[5] 47 U.S.C. § 332(c)(1).

[6] Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Notice of Proposed Rule Making, 8 FCC Rcd 7988, 8001-002 (1993) (CMRS Notice of Proposed Rule Making).

[7] Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Second Report and Order, 9 FCC Rcd 1411 (1994) (CMRS Second Report and Order), reconsideration pending.

[8] Id. at 1499-1500.

[9] Equal Access NPRM; Interconnection NOI, 9 FCC Rcd 5408 (1994).

[10] Roaming occurs when the subscriber of one CMRS provider enters the service area of another CMRS provider with whom the subscriber has no pre-existing service or financial relationship, and attempts to either continue an in-progress call, receive an incoming call, or place an out-going call.

[11] Interconnection NOI, 9 FCC Rcd at 5459, 5466-69.

[12] A list of the parties filing comments and reply comments is contained in Appendix A. UTC, The Telecommunications Association, filed its reply comments one day late. UTC's motion to accept a late filed pleading is hereby granted.

8. The Interconnection NOI identified as a principal objective the exploration of whether interstate interconnection requirements would foster the interconnectivity and growth of diverse and competitive mobile services. [13] The Interconnection NOI sought comment on whether it was necessary for the Commission to promulgate a general rule requiring CMRS providers to provide interstate interconnection to other CMRS providers, or whether the Commission could anticipate that the CMRS marketplace will develop in such a way that makes establishing general interconnection obligations applicable to CMRS providers unnecessary. [14]

9. Comment was also sought on two specific questions related to this general inquiry: (1) Whether there is a basis to conclude that there are policy considerations that would warrant imposition of interconnection obligations on CMRS providers even if CMRS providers lack market power and lack control of bottleneck facilities; and (2) Whether it would be a reasonable exercise **[**8]** of the Commission's discretion under Section 201 of the Act to conclude that any further examination of whether to impose interconnection obligations on CMRS providers may be premature at this stage in the development of the CMRS market. In addition, comment was sought on whether the failure to impose new interconnection obligations might unnecessarily restrict the capabty of any CMRS proriders to interconnect with the facilities of other CMRS providers. Finally, comment was sought on whether the Commission should address such matters by declaratory rulings resolving particular cases, or by issuing either specific rules or rules based on a general standard of reasonableness. [15]

b. Positions of the Parties

10. Interconnection requirement is premature. Marketplace should achieve desirable results. Many commenters argue that an inquiry into whether the Commission should require CMRS providers to provide interstate interconnection to other CMRS providers is premature, and several recommend that the Commission defer any further consideration of this issue until the CMRS industry has developed sufficiently to create a sufficient record on which to **[*10672]** proceed. **[**9]** [16] Nextel characterizes the state of the CMRS marketplace as one of ″infancy″ and argues that it is premature to consider mandatory CMRS interconnection when the CMRS marketplace was defined by the Commission less than a year ago, some CMRS players are just beginning to emerge while others have yet to be licensed, and it is still not clear what players will actually be the participants in the CMRS marketplace. Nextel continues that imposition of an interconnection mandate on a nascent industry is unjustified and unnecessary, particularly since all CMRS end users can currently interconnect with users of any other network through the public switched telephone network (PSTN). Thus, Nextel maintains, because any user on any CMRS system can reach any other party with a telephone number -- on a wireless or wireline network -- through the PSTN, at this stage in CMRS development, there appears to be no compelling need for CMRS-to-CMRS interconnection regulation. [17]

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[13] Interconnection NOI, 9 FCC Rcd at 5458.

[14] Id.

[15] Id.

[16] See, e.g., AMTA Comments at 14 and Reply Comments at 6-7; Bell Atlantic Comments at 15-17; Century Cellnet Reply Comments at 18 (mandated interconnection at best is premature, at worst is inimical to flexibility and responsiveness needed to meet evolving consumer needs); NABER Comments at 9-10; Nextel Comments at 18; Southern Comments at 4-5.

[17] Nextel Comments at 18-19. Accord NABER Comments at 9-10; OneComm Comments at 21.

11. Southern argues that at this stage, the specific technical requirements to implement CMRS-to-CMRS interconnection obligations are unknown, but the likelihood that such interconnection would be technically complex is almost a certainty. For example, Southern asserts, wide-area digital SMR systems are still in their developmental stages. Until deployed, how they will operate and compete with other commercial mobile services remains uncertain. Southern argues that because of this uncertainty, the technical implications and potential burdens involved in CMRS-to-CMRS interconnection are difficult to predict. [18] OneComm observes that the exact nature of PCS offerings also is not yet clear. [19] CTIA argues that a compulsory interconnection scheme would be particularly inappropriate for CMRS given that many CMRS networks have yet to be designed. CTIA states that at present, CMRS providers cannot know their interconnection needs and further, because each type of CMRS has a unique network with potentially different technological requirements, the costs of direct interconnection may be prohibitive. [20]

12. NABER asserts that few customers of traditional SMR systems have the need for interconnected service beyond the service area of a single operator. Rather, NABER states, such users typically require dispatch capabilities over a wide area. [21] The New York DPS contends that the current network structure, whereby the connection is made through the LEC, **[*10673]** has been efficient because of the low volume of traffic of this nature. Further, that this is true even though each CMRS provider is required to pay access charges to the LEC. The New York DPS argues that where most of the CMRS traffic is from the CMRS customer to the landline customer direct interconnection between CMRS providers is not a critical issue. However, the New York DPS argues that as the number of CMRS providers and services increase and usage charges decline, there may be a dramatic increase in the number of calls completed between CMRS carriers and thus a direct connection between them may become more desirable from both a cost and a service standpoint. [22]

13. Most carriers argue that marketplace forces, rather than regulation, should **[**12]** determine the manner in which interconnection is furnished among CMRS providers, and urge that the Commission refrain from imposing interconnection obligations. [23] For example, Bell Atlantic argues that although the Commission can declare that CMRS carriers have a basic obligation as common carriers to interconnect with other licensed carriers upon reasonable request from those carriers, it should first rely on the marketplace to determine the appropriate interconnection arrangements. Bell Atlantic contends that the CMRS industry is undergoing rapid change, rendering present data on speculative inquiries, such as those contained in the Interconnection NOI an unreliable basis upon which to adopt particular interconnection requirements. In addition, Bell Atlantic argues that there is no evidence that wireless carriers have been unwilling to interconnect with each other, or that they have an economic incentive

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[18] Southern Comments at 4.

[19] OneComm Comments at 21.

[20] CTIA Reply Comments at 13-14.

[21] NABER Comments at 10.

[22] New York DPS Comments at 6.

[23] See, e.g., AirTouch Comments at 22-23; Ameritech Comments at 4; Alltel Comments at 8; Bell Atlantic Comments at 15-17 and Reply comments at 13; Century Cellnet Reply Comments at 18; CTIA Comments at 26-28; GTE Comments at 46 and Reply Comments at 39; New Par Comments at 22; OneComm Comments at 21 and Reply Comments at 11; OPASTCO Comments at 5; Rochester Comments at 10 and Reply Comments at 10-11; SNET Mobility Comments at 13-14; Vanguard Comments at 22.

to avoid interconnection. Bell Atlantic maintains that to the extent interconnection facilitates a carrier's ability to offer attractive services to its customers, the carrier will have sufficient market incentives for interconnection, without the need for the Commission to **[**13]** intervene. [24] Moreover, Bell Atlantic asserts, experience shows that CMRS providers (for example, paging and cellular carriers) have reached voluntary interconnection agreements to serve the needs of their customers, indicating that there is no need to intervene to regulate interconnection arrangements among new or existing CMRS providers. [25]

14. BellSouth urges that, given the competitive nature of CMRS, the Commission should refrain from adopting any specific interconnection requirements. BellSouth suggests instead that any CMRS-to-CMRS interconnection arrangements should **[**14]** be established through **[*10674]** good faith negotiation among the carriers involved. BellSouth recognizes that, although each CMRS provider should have an obligation to satisfy reasonable requests for interconnection, the definition of ″reasonable″ will vary from case to case. BellSouth notes that the technical and service requirements of a CMRS provider requesting interconnection from another CMRS provider must be balanced against factors such as the ability to provide the needed connection and the existence of alternative sources and forms of interconnection. [26] NYNEX also suggests that the Commission should permit interconnection arrangements to proceed by good faith negotiation, but should continue to monitor interconnection agreements to ensure that interconnection requests are not unreasonably denied. [27]

15. PCIA urges that the Commission not establish formal, detailed broadband PCS-to-PCS interconnection obligations now. PCIA states that in light of the competitive nature of the marketplace and the nascency of many service providers, specifying up-front **[**15]** what forms of interconnection will be considered technically reasonable would be imprudent. PCIA further argues that in the absence of control over bottleneck facilities, marketplace forces should result in interconnection being made available where warranted. Additionally, the pace of technical change in the industry and the developmental nature of many CMRS offerings counsel against the adoption of an overly rigid interconnection framework. [28]

16. Interconnection obligation is undesirable. Many CMRS providers, including most cellular carriers, some SMR providers, and several LECs with CMRS affiliates, oppose imposition of an interconnection obligation, arguing that the state of competition and the lack of bottleneck facilities would make such an obligation not only unnecessary but unwise because it would have a negative impact on competition. [29] CTIA argues that, in determining whether to impose interconnection obligations on CMRS providers, the Commission should be guided by the principle that such requirements are only

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[24] Bell Atlantic Comments at 15-17; accord Ameritech Reply Comments at 5.

[25] Bell Atlantic Reply Comments at 13; accord Alltel Comments at 9.

[26] BellSouth Comments at 13; accord NYNEX Comments at 13-14.

[27] NYNEX Comments at 14 and Reply Comments at 8.

[28] PCIA Comments at 14-16.

[29] See, e.g., AirTouch Comments at 22-23; AT&T Reply Comments at 5; BellSouth Comments at 13-14; Comcast Comments at 17; CTIA Comments at 25-26 and Reply Comments at 12-14; NYNEX Comments at 13-14; SBC Comments at 66; Vanguard Comments at 22.

necessary in those markets where a firm possesses persistent, sustained market power. [30] CTIA and other commenters assert **[**16]** that in a competitive market, such as CMRS, consumer demand and business necessity will dictate the extent and need for interconnection. They further argue that because commercial mobile radio services are operating in a competitive environment, there is no need to impose **[*10675]** interconnection obligations on them. [31] CTIA notes that only one case exists, concerning international record carriers, where the Commission has required carriers lacking market power to interconnect. [32] Comcast argues that the Commission should encourage the development of competitive networks through progressive LEC interconnection policies rather than by imposing costly and premature direct connection requirements on CMRS providers. [33]

17. CTIA further argues that, given the expense involved to establish compatibility by upgrading software, switches, and other network equipment, such requirements would be contrary to the public interest. [34] McCaw concurs with CTIA, arguing that imposing interconnection obligations will lead to situations where the expense of interconnection would exceed the value. [35] Horizon asserts that, for smaller carriers, the imposition of unwarranted and burdensome interconnection obligations would likely further decrease the limited capital that these providers would otherwise invest in their systems, ultimately degrading the quality of service that subscribers would otherwise obtain. [36]

18. Additionally, opponents of interconnection requirements argue that an interconnection obligation comparable to the landline interconnection obligation would require unnecessary regulatory oversight and deter investment in, and growth of, competing facilities. They argue that until an identifiable problem develops, it would be premature to adopt regulations that could skew marketplace decisions. [37] McCaw contends that regulation is too imperfect to discriminate accurately between situations where interconnection is efficient and other situations where it is inefficient. McCaw asserts that requiring inefficient interconnection would confer a disproportionate benefit on resellers and other CMRS **[*10676]** providers who could obtain interconnection at artificially low prices. [38] CTIA also

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[30] See CTIA Comments at 25-26. See also RAM Comments at 6-7 (arguing that the Commission should impose interconnection obligation only on those carriers possessing market power).

[31] See, e.g., CTIA Comments at 25-26; GTE Comments at 46; McCaw Comments at 6.

[32] See CTIA Comments at 30-32.

[33] Comcast Comments at 17.

[34] See CTIA Comments at 26-27. See also Vanguard Comments at 22 (an interconnection obligation risks hampering new providers with regulatory costs when the Commission is in the process of structuring and stimulating a vibrant, competitive CMRS marketplace) .

[35] See McCaw Comments at 9-10. See also RCA Comments at 10 (interconnection may be illogical with respect to networks that provide different capabilities, i.e., interconnection of voice and data services).

[36] Horizon Reply Comments at 7-8.

[37] See, e.g., AirTouch Comments at 22-23; CTIA Comments at 26-28. See also Ameritech Comments at 4 (until a real ″problem″ develops in the area, it would be premature for the Commission to adopt regulations that could skew marketplace decisions).

[38] See McCaw Comments at 9-10. See also SNET Comments at 14 (mandatory interconnection increases the risks faced by new and existing providers by allowing competitors to benefit from the providers' innovations without incurring the risks).

argues that interconnection may ultimately diminish consumer choice while substantially raising costs. [39]

19. CTIA and others argue that an interconnection obligation between CMRS providers is unnecessary because CMRS providers may access the network via the LEC. [40] CTIA contends that if all CMRS providers are interconnected with a LEC, then they and their customers will have access to all carrier networks. As a result, insists CTIA, direct connection of CMRS networks should be established only when such interconnection is more efficient than paying the LEC for transport and switching functions. [41] Both CTIA and SBC argue that direct CMRS-to-CMRS interconnection will develop naturally as firms recognize a business need for such a link. [42] However, McCaw asserts, indirect CMRS-to-CMRS interconnection through the LEC is likely to be the most efficient form of interconnection for the foreseeable future. [43]

20. NABER argues **[**20]** that interconnection obligations for SMR providers are both unnecessary and, in some cases, economically infeasible. NABER asserts that since typical SMR customers utilize interconnected service as an adjunct to dispatch service (and have other choices if unsatisfied) mandatory interconnection is unnecessary to ensure access to the PSTN. NABER contends that few SMR end users need to communicate with users on other SMR systems. Thus, routing such calls through the LEC should not be too inefficient or expensive. [44] E.F. Johnson asserts that it is illogical to assume that the subscriber of a local SMR system desires, or is willing to pay for, the ability to interconnect with PCS systems. Rather, contends E.F. Johnson, the customer expects to be able to communicate with other affiliated mobile units and, through interconnection with a LEC, other locations in the public switched network. [45] NABER also claims that there are three commonly used SMR platforms **[*10677]** which are incompatible. Therefore, argues NABER, while interconnection between platforms is technically possible, it would require a massive replacement of equipment for hundreds of SMR operators across the country. **[**21]** [46] Finally, NABER asserts that similar technical problems exist in the technologies announced for wide-area SMR systems and argues that the Commission therefore should not impose interconnection obligations on either traditional or wide-area SMR providers. [47]

21. PageNet contends that the Commission should only impose interconnection obligations where an industry is dominated by one or two providers that control bottleneck facilities. Since the paging

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[39] CTIA Reply Comments at 14.

[40] AirTouch Comments at 22; CTIA Comments at 28-29; E.F. Johnson Comments at 7; McCaw Comments at 10-11; New Par Comments at 22-23; Nextel Comments at 18; SBC Comments at 66-67; SNET Comments at 13; Vanguard Comments at 22.

[41] CTIA Comments at 28.

[42] Id. at 28-29; SBC Comments at 66-67.

[43] McCaw Comments at 10 (citing Nelson Declaration at para. 3).

[44] NABER Comments at 9-10.

[45] E.F. Johnson Comments at 7.

[46] Id. at 10.

[47] Id. at 11 (claiming that Geotek's FHMA technology, Motorola's MIRS technology, RAM's Mobitex technology, and Ericsson/GE's EDACS technology are not compatible with one another). See also RAM Comments at 7 (interconnection obligations for narrowband services, including 900 MHz SMR services unwarranted).

market is highly competitive, there is no need for interconnection requirements. Further, PageNet urges that the Commission exclude paging providers from an interconnection obligation, arguing that a decision to require a particular service to interconnect should be made in light of that service's particular characteristics. PageNet asserts that **[**22]** in the context of intraservice interconnection, such as the interconnection requirement in cellular, interconnection policy stems from the desire for seamless service. PageNet contends that in the paging context seamless service already exists, thereby eliminating the need to impose an interconnection obligation on paging providers. [48]

22. Interconnection obligation is desirable. Pacific Bell supports a right to interconnection between CMRS providers and between CMRS providers and the LECs to enable the ubiquitous origination and termination of telecommunications. Pacific Bell observes that CMRS providers are designated as common carriers by the Omnibus Budget Reconciliation Act and thus are specifically subject to Section 201 of the Act. Continuing, Pacific Bell notes that Section 201 requires interconnection when the Commission determines that interconnection is in the public interest. Pacific Bell argues that interconnectivity of mobile communications promotes the public interest because it enhances greater flexibility in communications and makes services more attractive to consumers. Pacific Bell claims that one of the goals of the Commission **[**23]** in providing for the regulation of PCS is the universality of service and that interconnection will support this goal by enabling faster access to service over a wide area. However, Pacific Bell states, it only supports interconnection where technically feasible. Pacific Bell concludes that a requirement to enter into agreements negotiated in good faith should be sufficient to ensure that CMRS providers benefit from their right to interconnection. Pacific Bell observes that the Section 208 complaint process is **[*10678]** available to any party experiencing difficulty obtaining an appropriate interconnection agreement. [49]

23. Other commenters agree that the Commission should recognize the basic common carrier right to interconnection between CMRS providers. MCI and CSI/ComTech contend that there is nothing in Section 201 or Commission precedent that dictates that any and all interconnection obligations are premised on a connecting carrier having bottleneck facilities. [50] In its comments, MCI argues that CMRS providers are presumptively common carriers and should be required to interconnect with any other common carrier upon reasonable **[**24]** request pursuant to Section 201(a) of the Act. [51] In its reply comments, MCI argues further that the Commission has plenary authority under Section 201(a) of the Act to require that CMRS providers interconnect with one another. MCI asserts that in the interest of stimulating the most productive use of CMRS services, the Commission should exercise that authority, but refrain at this juncture from prescribing the terms of such interconnection. Continuing, MCI argues that interconnection among CMRS providers is presumptively in the public interest because it would ensure the most rapid growth and dissemination of mobile services. Accordingly, MCI reasons, it is appropriate for the Commission to require, as a matter of policy, such interconnection among CMRS providers and to stand ready to intercede in the event a CMRS provider refuses to interconnect, but it not necessary to prescribe the details of such interconnection

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[48] PageNet Comments at 10-11.

[49] Pacific Bell Comments at 16-18.

[50] CSI/ComTech Comments at 6 and Reply Comments at 3-4; MCI Reply Comments at 10.

[51] MCI Comments at 12; accord DCR Comments at 2 (interconnection should be an automatic right and obligation of all carriers offering service to the public).

arrangements unless the CMRS providers are unable to resolve any differences that may arise. MCI concludes that a broad Commission policy position favoring interconnection should provide a powerful incentive for even a recalcitrant CMRS carrier to agree to a reasonable **[**25]** interconnection request. [52]

24. GSA argues that the establishment of specific CMRS-to-CMRS interconnection requirements will foster interconnectivity and the growth of diverse and competitive mobile services. GSA maintains that the public interest will best be served, and the government's own competitive procurement responsibilities enhanced, if the Commission acts now to adopt CMRS-to-CMRS interconnection requirements that encourage the development of a robust ″network of networks, ″ and not a situation where most traffic from one CMRS provider must pass through a LEC switch to reach another CMRS provider, if such routing would be inefficient or unduly costly. [53]

[*10679] 25. NCRA argues that requiring cellular carriers to interconnect with other CMRS providers at just and reasonable **[**26]** rates will produce consumer benefits similar to those anticipated from the Commission's Expanded Interconnection proceeding. [54] NCRA further argues that interconnection and access to unbundled service elements will dramatically improve the viability of cellular resellers as well as other facilities-based CMRS providers and thereby increase the overall number of CMRS carriers from which customers may choose to obtain service. [55] NCRA argues that Section 332(c)(1)(B) requires interconnection upon reasonable request. NCRA submits that all interconnection arrangements that are technically and economically feasible should be considered reasonable; that the party requesting interconnection pay costs directly related to interconnection; that the interconnecting party should not be responsible for the costs of increasing network capacity; that parties alleging infeasibility should be required to demonstrate such conditions by a clear preponderance of the evidence; and that carriers should be required to charge interconnecting parties reasonable, unbundled, cost-based rates. [56]

26. TRW argues that CMRS-to-CMRS interconnection should be mandated as soon as possible in order to encourage the development of a nationwide, seamless, wireless communications network that is independent of the LECs and can compete with the extant landline network. However, TRW also advocates deferral of the imposition of interconnection obligations on mobile satellite service (MSS) related CMRS providers. TRW contends that because MSS space segment providers are not yet operational and because of the unique attributes of MSS itself -- including its global coverage area and

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[52] MCI Reply Comments at 10-11.

[53] GSA Comments at 7 and Reply Comments at 10-11 (such interconnection should be pursuant to interstate tariffs).

[54] Expanded Interconnection with Local Telephone Company Facilities, CC Docket No. 91-141, Report and Order and Notice of Proposed Rule Making, 7 FCC Rcd 7369 (1992) (Special Access Expanded Interconnection Order), recon., 8 FCC Rcd 127 (1992), vacated in part and remanded sub nom., Bell Atlantic v. FCC, No. 92-1619 (D.C. Cir., June 10, 1994); recon., 8 FCC Rcd 7341 (1993); on remand Memorandum Opinion and Order, 9 FCC Rcd 5154 (1994) (Virtual Collocation Order). According to NCRA, such benefits include increasing LEC incentives for efficiency and encouraging LECs to deploy new technologies facilitating innovative service offerings; making LECs more responsive to customers; increasing the choices available to access customers who value redundancy and route diversity; and increasing competition resulting in reduced prices for services available from both the LECs and alternative suppliers. NCRA Comments at 12, citing Special Access Expanded Interconnection Order, at para. 14.

[55] NCRA Comments at 13.

[56] NCRA Comments at 16-18.

limited gateway access -- it is unclear how the capacity will be used on a local level by CMRS providers and end users. TRW asserts that the uncertainty regarding the way in which MSS systems will be used to provide CMRS and how the market will develop for those services, renders imposition of interconnection requirements for MSS providers premature. TRW argues that until the expected demand for MSS space segment in the CMRS marketplace has had an opportunity to develop, imposing a mandatory interconnection obligation on MSS CMRS providers could, in **[*10680]** fact, inhibit the genesis of a robust market **[**28]** by depriving operators and CMRS providers of desirable design and implementation flexibility. [57]

27. Interconnection guidelines are desirable. Although PCIA recommends that the Commission let CMRS-to-CMRS interconnection proceed largely at the direction of the marketplace, it urges that the Commission nonetheless establish basic interconnection guidelines within which this development should occur. [58] PCIA and APC each propose that the Commission establish broad guidelines for interconnection based on the requirements of Sections 201 and 202 of the Communications Act, in order to reinforce incentives for interconnection and promote goals of efficient access to public networks. Specifically, they recommend the following: (1) as required by Section 201(a) of the Act, CMRS providers should be required to provide interconnection service upon reasonable request. A CMRS provider should not be permitted to deny interconnection unless it can demonstrate that such a denial is reasonable; [59] (2) as required by Section 202(a), CMRS providers cannot engage in unreasonable discrimination in offering interconnection to other CMRS providers. That is to say, **[**29]** if a CMRS provider offers an interconnection arrangement to one CMRS provider, the carrier may not deny that arrangement to a similarly situated CMRS provider without demonstrating that such denial is reasonable; (3) CMRS providers are co-carriers and as such should be required to negotiate in good faith. Carriers should respond to requests for interconnection in a reasonable and timely manner. [60] PCIA suggests that these principles should apply to all broadband PCS providers, including resellers using their own switches, and further adds that the Commission should not extend interconnection rights to private carriers or individuals (other than grandfathered private carriers that will be reclassified as CMRS). [61]

[*10681] c. Discussion

28. As a general matter, we believe that the interconnectivity of mobile communications networks promotes the public interest because it enhances access to all networks, provides valuable network

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[57] TRW Comments at 5-8.

[58] PCIA Comments at 16-18 and Reply Comments at 7-8; accord APC Comments at 6-7. But see Nextel Reply Comments at 14 (even guidelines are premature in light of industry's infancy).

[59] Both PCIA and APC advocate classification of CMRS providers as ″dominant″ and ″nondominant″ for purposes of their proposed guidelines. PCIA suggests that in the event of a dispute under Section 201(b), the interconnection rates of non-dominant CMRS providers should be presumed just and reasonable; CMRS providers (if any) that are considered dominant would have the burden, if challenged, of producing evidence that their interconnection rates are just and reasonable. PCIA states that as with LEC/CMRS interconnection, this standard can be satisfied by cost-based rates, but non-cost based rates may also be just and reasonable based on other considerations, such as technical challenges or uncertain demand for particular interconnection arrangements. PCIA Comments at 17. APC goes further, and argues that PCS providers should be classified as non-dominant CMRS providers and their rates be presumed just and reasonable. APC argues that cellular providers, on the hand, should be classified as dominant CMRS providers and accordingly bear the burden of demonstrating, if challenged, that their rates are just and reasonable. APC Comments at 6.

[60] APC Comments at 6-7; PCIA Comments at 16-18.

[61] PCIA Comments at 18.

redundancy, allows for greater flexibility in communications, and makes communications services more attractive to consumers. It is one further step toward a ubiquitous ″network of networks. ″ [62] Under appropriate circumstances, we believe that CMRS-to-CMRS interconnection can promote the efficient provision of service to consumers at reasonable prices and will promote and achieve the broadest possible access to telecommunications networks and services by all telecommunications users. We seek to establish a framework under which the benefits of interconnection are realized primarily through private negotiations and arrangements. We are prompted to seek such a framework in part because we are cognizant that private discussions and transactions among carriers may provide a more suitable mechanism for distributing the costs and realizing the benefits associated with CMRS-to-CMRS interconnection than the regulatory process. We believe that the public interest **[**31]** considerations should play a role in guiding these carrier transactions, and we are at the same time confident that the technical and economic feasibility of such interconnection will be explored and defined through these private arrangements.

29. We agree with the majority of commenters who argue that it is premature, at this stage in the development of the CMRS industry, for the Commission to impose a general interstate interconnection obligation on all CMRS providers. First, and most tellingly, the record in response to the Interconnection NOI provides an insufficient basis for proposing a general interstate interconnection obligation. This is due, at least in part, to the fact that the CMRS industry is undergoing rapid change in terms of technologies and facilities employed, rendering many of the inquiries contained in the Interconnection NOI speculative and any data provided in **[**32]** response to such inquiries unreliable as a basis for a rule making. How some of these new mobile services will operate and compete with other services remains uncertain. As Nextel observed, the CMRS marketplace is in the early stages of its development, with some CMRS companies just beginning to emerge while others have yet to be licensed, leaving unclear the identity of the companies that will actually be participants in the CMRS marketplace. [63] The Commission only recently concluded its initial auction of spectrum for the A and B blocks of broadband PCS services. [64] Until those initial licenses are awarded, and **[*10682]** PCS system build-out begins, the nature of the needs of the parties with the greatest potential interest in directly interconnecting with other CMRS providers will not be clearly established. Because we do not know what the CMRS networks will look like, we cannot determine as a general matter what points of interconnection would be the most efficient. In view of the nascency of many service providers, and the rapidly developing technologies they may be employing, we cannot at this time make general conclusions about either the technical nature of CMRS-to-CMRS **[**33]** interconnection, the costs involved, the impact of general interconnection obligations on infrastructure development and network efficiency, or the nature of any rules that would best promote efficient interconnectivity.

30. Second, as several commenters note, all CMRS end users can currently interconnect with users of any other network through the LEC landline network. [65] The NY DPS, we believe, correctly observes

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[62] See, e.g., H.R. Report No. 103-111, 103d Cong., 1st Sess. 261 (1993)(House Report)(″The Committee considers the right to interconnect an important one which the Commission shall seek to promote, since interconnection serves to enhance competition and advance a seamless national network. ″)

[63] See Nextel Comments at 18-19.

[64] See Press Release No. 52905, ″PCS Auction Update: FCC Receives Full $ 1.4 Billion Deposit,″ dated March 21, 1995.

[65] See, e.g., Nextel Comments at 19; Comcast Comments at 17; NY DPS Comments at 6.

that the current network structure whereby the connection is made through LEC facilities has been efficient because of the low volume of CMRS traffic (as compared to landline traffic) even though each CMRS provider has been required to pay interconnection charges to the LEC. [66] In such an environment, where most of the traffic is typically from the CMRS customer to the landline customer, direct CMRS-to-CMRS interconnection has not been perceived as a critical issue by CMRS carriers. However, we caution that this is not to say that the balance will not shift in the future. As the number of CMRS providers (both **[**34]** facilities-based carriers and resellers) and the number and variety of mobile services increase, and current mobile services rates evolve toward lower usage charges, there may be a dramatic increase in the number of calls completed between CMRS systems, making more extensive direct connections between CMRS providers beneficial from both a cost and service standpoint.

31. Third, we do not think that present market conditions indicate that it is necessary to impose a general interstate interconnection obligation at this time. The fact that interconnection is already available through LEC facilities reduces the potential for CMRS providers to use denial of interconnection as an anticompetitive tool against their competitors. If interconnection between CMRS providers could only be accomplished through direct links (without access to LEC facilities), one CMRS carrier could prevent a second from terminating calls on the first carrier's network or from receiving calls from customers of the first network, thus limiting the service the second carrier could offer its customers. **[**35]** If the first carrier were much larger than the second, lack of interconnection would be more harmful to the second. With interconnection available through the LEC, however, no CMRS carrier can limit the service that another can offer.

32. If costs of indirect interconnection through the LEC were higher than direct CMRS-to-CMRS interconnection, however, some potential might exist for CMRS providers to raise their rivals' costs by denying direct interconnection, or increasing the price of direct **[*10683]** interconnection to the price charged by the LEC for indirect interconnection. The ability to harm rivals would then depend on the relative costs of direct interconnection and interconnection through the LEC, and on the share of the rival's traffic that terminated with the CMRS provider. In most cases, to have an anticompetitive incentive and ability to deny interconnection to a rival, a CMRS provider would have to be much larger than the rival (or at least carry more of the rival's terminating traffic than the rival carries of its terminating traffic); otherwise the denying carrier's own costs would be raised as much as the rival's by lack of direct interconnection. Thus, **[**36]** unless considerable difference exists in market share among CMRS firms, the firms will probably gain more from jointly lowering their own costs through allowing direct interconnection than from raising rivals' costs by denying it. We invite interested parties to provide data and analysis arguing for or against the view that interconnection among CMRS providers is particularly important to the economic viability of CMRS providers, or to the advancement of Congressional and Commission public policy goals with respect to enhancing competition, promoting infrastructure investment, and facilitating access to the Nation's telecommunications networks. [67]

33. This discussion makes clear that the CMRS provider's market share, and the definition of the relevant market, are important to the determination of the potential for profitably raising rivals' costs.

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[66] See NY DPS Comments at 6.

[67] See note 62, supra, (citing Budget Act legislative history); CMRS Second Report and Order, 9 FCC Rcd at 1419-22.

We tentatively conclude that there are at least three possible relevant product markets: (1) local exchange, both landline and wireless; (2) all commercial mobile radio services; and (3) **[**37]** mobile voice services. The first market definition could be supported by the view that the only way to raise a rival's cost significantly is to deny direct interconnection for a significant proportion of all calls originating on the facilities of the competing CMRS provider. The second definition could be supported by the view that the customers of CMRS providers find it particularly valuable to be able to reach at low cost the subscribers of other CMRS providers. The third might be based upon the consideration that a paging provider cannot compete directly with a cellular carrier to complete telephone calls. We seek comment on each of these definitions of the relevant product market and solicit data and analysis pertinent to our identification of the definition most useful to a decision regarding CMRS interconnection.

34. We also seek comment regarding whether the relevant geographic market should be considered to be a local market, under the view that two providers in different cities, for example, do not serve as substitutes for terminating calls to a given subscriber. Under this approach, the relevant geographic market may be either the service area or license area, depending **[**38]** on the definition of the relevant product market chosen. This analysis assumes that most CMRS calls are terminated locally. We seek comment on the distribution of call termination because this may affect the ability of a firm with a high share of a single local market, or set of local markets, to raise rivals' costs. For example, if a significant portion of **[*10684]** calls were terminated in another area, then the power of a local CMRS provider to increase rivals' costs through denial of interconnection would be significantly diminished.

35. We seek comment on our tentative conclusions regarding the relevant market definitions for purposes of analyzing the need for an interstate interconnection obligation. Interested parties are encourage to propose any alternative product and geographic markets that they think are relevant. Interested parties are encouraged to propose any altemative product and geographic markets that they think are relevant.

36. In the past, the Commission has found it in the public interest to impose interstate interconnection obligations generally either to promote competition in the provision of monopoly interstate services, or to prevent anticompetitive **[**39]** conduct by carriers with market power who could use refusals to interconnect for anticompetitive purposes. [68] We have more recently recognized that the presence or absence of market power is an important factor in determining whether the imposition of a general interconnection obligation in the form of an equal access obligation on CMRS providers may be in the public interest. [69] As a result of our recent spectrum auctions, as well as other developments in the industry, we believe that all commercial mobile radio services will be provided on a competitive basis

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[68] See, e.g., In the Matter of Establishment of Policies and Procedures for Consideration of Application to Provide Specialized Common Carrier Services in the Domestic Public Point-to-Point Microwave Radio Service and Proposed Amendments to Parts 21, 43, and 61 of the Commission's Rules, 29 FCC 2d 870 (1971); The Need to Promote Competition and Efficient Use of the Spectrum for Radio Common Carrier Services, Memorandum Opinion and Order, 59 RR 2d 1275, 1283 (App. B)(1986); Declaratory Ruling, 2 FCC Rcd 2910 (1987), aff'd Memorandum Opinion and Order on Reconsideration, 4 FCC Rcd 2369 (1989).

[69] See Equal Access NPRM, 9 FCC Rcd at 5425. There, we tentatively employed the definition of market power used by the Justice Department: ″the ability profitably to maintain prices above competitive levels for a significant period of time. . . .″ Id. at 5425 n.86, citing United States Department of Justice, Federal Trade Commission, ″Horizontal Merger Guidelines,″ (Apr. 2, 1992), at 4 & n.6 (explaining that ″[s]ellers with market power also may lessen competition on dimensions other than price, such as product quality, service, or innovation″).

by multiple facilities-based competitors in each license area in the near future, thus potentially lessening the need for regulatory intervention.

37. Through their comments, established industry representatives (cellular carriers, LECs, trade associations) have represented that when traffic volumes between CMRS systems justify direct connections, the industry will implement interconnection because it will make business sense to do so. The current record presents the Commission with no reason to believe that this will not be the case, and we fully expect all CMRS providers to behave in an economically rational manner and to implement direct and efficient network connections at reasonable costs when the opportunity and need arise. For now, we are confident that the **[*10685]** decision of interconnection ″where warranted″ is best left to the business judgment of the carriers themselves.

38. Nonetheless, we believe that it is important to reiterate the statutory rights and obligations of CMRS providers and to begin to articulate some policy guidelines to help chart the course of the CMRS industry through this all-important early phase of its development. This reiteration is intended to aid carriers in determining how the Commission will implement the basic common carrier rights and obligations of commercial mobile radio **[**41]** providers under the Communications Act. First, we remind all CMRS providers from whom interconnection is sought, that they are common carriers subject to the basic commands of Sections 201 and 202 of the Communications Act. Second, we remind any CMRS providers seeking interconnection that they may avail themselves of the Section 208 complaint process to seek redress for violations of the Communications Act or the Commission's rules. [70]

39. The first clause of Section 201(a) of the Act requires all CMRS providers and other common carriers **[**42]** to furnish communications service upon reasonable request. [71] The second clause of Section 201(a) states that common carriers must establish physical connections with other carriers ″in accordance with the orders of the Commission, in cases where the Commission, after opportunity for hearing, finds such action necessary or desirable in the public interest. ″ [72] We read Section 332(c)(1)(B) of the Communications Act, as added by the Budget Act, [73] together with Section 201(a) to mean that the Commission is required to **[*10686]** respond to requests for interconnection with

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[70] Section 332(c)(1)(A) of the Act mandates the common carrier treatment of commercial radio mobile services. It states, in pertinent part:

A person engaged in the provision of a service that is a commercial mobile service shall, insofar as such person is so engaged, be treated as a common carrier for purposes of this Act, except for such provisions of title II as the Commission may specify be regulation as inapplicable to that service or person. In prescribing or amending any such regulation, the Commission may not specify any provision of section 201, 202, or 208 . . .
47 U.S.C. § 332(c)(1)(A).

[71] The first clause of Section 201(a) states: ″It shall be the duty of every common carrier engaged in interstate or foreign communication by wire or radio to furnish such communication service upon reasonable request therefor. . . .″ 47 U.S.C. § 201(a).

[72] Id.

[73] The Budget Act amended the Communications Act to provide, pursuant to Section 332(c)(1)(B), that:

Upon request of any person providing commercial mobile service, the Commission shall order a common carrier to establish physical connections with such service pursuant to the provisions of section 201 of this Act. Except to the extent that the Commission is required to respond to such a request, this subparagraph shall not be construed as a limitation or expansion of the Commission's authority to order interconnection pursuant to this Act.
47 U.S.C. § 332(c)(1)(B).

proceedings to determine whether it is necessary or desirable in the public interest to order interconnection in particular cases. In addition, CMRS providers are protected from unjust and unreasonable charges, practices, classifications, and regulations in connection with communications service under Section 201(b), and from unjust and unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services for or in connection with such service under Section 202(a) of the Act.

40. The steps the Commission may take to enforce the statutory rights and obligations set forth in Section 201(a) as they relate to the provision of CMRS may include: (1) initiation of a notice and comment rule making proceeding aimed at developing rules of general applicability to broad classes of common carriers; (2) resolution of individual complaints pursuant to Section 208, and (3) initiation of other proceedings in response to requests of CMRS providers for interconnection pursuant to Section 332(c)(1)(B) of the Act. Thus, for example, CMRS providers may avail themselves of the Section 208 complaint process to bring to our attention any denials of interconnection they believe to be unreasonable or otherwise unlawful and may also use Section 208 to bring to our attention any terms and conditions of interconnection they believe to be in violation of the Section 201(b) or Section 202(a) prohibitions on unjust or unreasonable charges or practices.

41. We tentatively conclude that regardless of the procedural vehicle chosen, the central legal issue under Section 201(a) is whether the public interest would be served by the imposition of interconnection obligations on CMRS providers. **[**44]** We have tentatively concluded that efficient interconnection will serve the public interest by promoting the efficient provision of service to consumers at reasonable prices and by fostering competition. We tentatively conclude that a market power analysis should be the basic analysis we conduct in determining whether to impose specific interconnection obligations. Past interconnection decisions have primarily been addressed to local exchange carriers with significant market power. However, we are heading into unchartered territory as we consider issues of interconnection between CMRS carriers, who are less likely to have market power in the future. Therefore, our interconnection analysis should also consider whether other public policies, such as insuring broad access to the networks of the future, argue for imposing interconnection obligations in **[*10687]** the absence of significant market power. [74] We solicit comment on this analysis by any interested parties.

42. Thus, in addressing requests for interconnection, we would anticipate the need to engage in an analysis of market power and an assessment of other public policy goals, together with an analysis of

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[74] See generally Equal Access NPRM, 9 FCC Rcd at 5424 (tentatively concluding that the public interest determination with respect to CMRS equal access should include both a market power analysis and analysis of whether equal access would promote these other policy goals), citing Mid-Texas Communications v. AT& T, 615 F.2d 1372, 1379 (5th Cir. 1980), reh'g denied, 618 F.2d 716, cert. denied, ***459 U.S. 1145 (1981)***(Commission considers a number of specific non-competition-related factors in determining public interest in interconnection cases); Phonetele, Inc. v. AT&T, 664 F.2d 716, 722 (9th Cir. 1981), cert. denied, ***U.S. , 112 S.Ct 1283 (1992)***(such factors include network safety and efficiency, the need of the public for reliable service at reasonable rates, the proper allocation of the rate burden, the financial integrity of the carriers, and the future needs of both users and carriers) , citing, inter alia, Proposal for New or Revised Classes of Interstate and Foreign Message Toll Telephone (MTS) and Wide Area Telephone Service (WATS), Second Report and Order, 58 FCC 2d 736, 740 (1976)(there is a pro-competitive policy embodied in the Federal Communications Act, although it is a corollary of the more basic policy of favoring customer utility and freedom of choice). See also Virtual Collocation Remand Order, 9 FCC Rcd at 5184 (in absence of any other identified public interest benefits in mandating reciprocity, Commission found no reason to impose expanded interconnection requirements on parties that lack market power and do not control bottleneck facilities) and CMRS Second Report, 9 FCC Rcd at 1417-22 (identifying public interest goals of commercial mobile radio service regulation.

the facts in the particular case. We believe that our analysis of market power is important because carriers possessing market power might deny interconnection and thus preclude other carriers from gaining economically efficient access to telecommunications networks and from competing to serve end users. We further believe that it is important to consider public policy goals in addition to market power because the statutory standard for ordering interconnection under Section 201(a) is ″the public interest, ″ an inquiry that is broader than an inquiry into the presence or absence of market power. Finally, we would, of course, make this public interest evaluation based upon the circumstances presented in the particular record under consideration. We intend to monitor the number and nature of interconnection-related requests and complaints carefully. Should the Commission find itself faced with an increasing number of complaints alleging unreasonable denial of interconnection, we **[**46]** may revisit the need for adopting interconnection rules of general applicability through the rule making process. Similarly, we intend to monitor closely the development of the CMRS marketplace and any emergence of market power in that marketplace.

43. We reiterate that the Commission stands ready to intercede in the event a CMRS provider refuses a reasonable request to interconnect. We will be particularly vigilant in policing, where they exist, any efforts by CMRS providers to deny interconnection in order to gain an unfair competitive advantage. For example, we would find LEC investment in, and affiliation with, the party denying interconnection an important factor in assessing whether **[*10688]** such denial was motivated by an anticompetitive animus. Unlike independent CMRS carriers, LEC-affiliated CMRS carriers may have a unique incentive to deny interconnection so as to keep CMRS-to-CMRS traffic interconnected through the local exchange landline network, and to continue to collect CMRS interconnection charges from both sets of CMRS providers through their access charge structure. Such LEC ownership interests may play an important role in assessing whether a denial of **[**47]** interconnection is a reasonable business decision or a form of anticompetitive conduct intended to raise rivals' costs of doing business and hence hinder competition. [75]

44. We seek comment on our assessment of the role of LEC investment in CMRS providers in determining the reasonableness of a denial of interconnection. We also seek comment regarding other anticompetitive incentives that may motivate CMRS providers to withhold interconnection or to attempt to make interconnection available on unreasonable or unreasonably discriminatory terms or conditions. Finally, in light of the foregoing discussion regarding the prematurity of imposing a general interstate interconnection obligation at this time, we seek additional comment on the issue raised in the Interconnection NOI with respect to preemption of state-imposed interconnection obligations. [76]

2. Roaming

a. Background

45. ″Roaming″ describes the situation which occurs when the subscriber of one CMRS provider enters the service area of another CMRS provider with whom the subscriber has no pre-existing service or

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[75] See S. Salop & D. Scheffman, ″Raising Rivals' Costs,″ AEA Papers and Proceedings, May 1983, at 267-271; T. Krattenmaker & S. Salop ″Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price,″ 96 Yale L.J. 209 (1986).

[76] See Interconnection NOI, 9 FCC Rcd at 5468, stating: ″In particular, if we decide not to impose interconnection obligations on some or all CMRS providers, should we preempt any state from imposing such obligations?″ Although we received comments from some parties in response to this question in the Interconnection NOI, we seek additional comment in light of the discussion contained herein.

CONFIDENTIAL EXHIBIT JM-CC

Chart showing routing of O1 traffic destined to AT&T Mobility

before and after disconnection

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-DD

AT&T Mobility's "best and final" offer to O1 for direct interconnection, dated 12/18/2015

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-EE

Chart showing O1's Loss of Minutes of Use on a Customer by Customer Basis

[REDACTED PUBLIC VERSION]

EXHIBIT JM-FF

Excerpts of ATIS Handbook on Intercarrier Call Completion/Call Termination

(approved Oct. 2015)

ATIS-0300106

ATIS Standard on -

INTERCARRIER CALL COMPLETION/CALL TERMINATION HANDBOOK

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

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ATIS-0300106, *Intercarrier Call Completion/Call Termination Handbook*

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ATIS Standard on

Intercarrier Call Completion/Call Termination Handbook

Alliance for Telecommunications Industry Solutions

Approved October 2015

Abstract

This handbook describes some of the problems being encountered by rural telephone company customers in receiving long distance calls. It discusses some of the industry standards and practices relevant to ensuring call completion, particularly signaling, routing, and trouble handling. This handbook attempts to relate these standards and practices to the call completion problems reported, and offers some best practices for ensuring call completion. This handbook provides a resource to carriers to address issues as they are encountered related to long distance call completion/call termination.

Foreword

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Next Generation Interconnection Interoperability Forum (NGIIF) addresses next-generation network interconnection and interoperability issues associated with emerging technologies. Specifically, it develops operational procedures that involve the network aspects of architecture, disaster preparedness, installation, maintenance, management, reliability, routing, security, and testing between network operators. In addition, the NGIIF addresses issues that impact the interconnection of existing and next generation networks and facilitate the transition to emerging technologies.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, Next Generation Interconnection Interoperability Forum (NGIIF), 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, Next Generation Interconnection Interoperability Forum (NGIIF), which was responsible for its development, had the following leadership:

Mary Retka, NGIIF Co-Chair, CenturyLink

Amy Hindman, NGIIF Co-Chair, Verizon

Trademark Acknowledgments

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ATIS Standard on –

Intercarrier Call Completion/Call Termination Handbook

1 Scope, Purpose, & Application

1.1 Scope

Call completion/call termination in today's Public Switched Telephone Network (PSTN)[1] depends on coordination between different service provider (SP) entities, each playing their part in setting up a workable connection between calling and called parties. As the PSTN has evolved through the Bell System divestiture, the Telecom Act of 1996, and the introduction of Internet Protocol (IP)-based technologies, the number and diversity of these entities has grown. In this context, problems with call completion may arise. The NGIIF was originally made aware of serious problems encountered by some rural telephone company customers in receiving long distance (LD) calls in particular, through an industry survey by rural associations in March 2011 and the FCC's Rural Call Completion (RCC) Task Force meeting held in October 2011.

This handbook:

- Is a living document, which will be updated as applicable;
- Describes some of the problems being encountered;
- Discusses some of the industry standards and practices relevant to ensuring call completion, particularly signaling, routing, and trouble handling;
- Attempts to relate these standards and practices to the call completion problems reported; and
- Offers some best practices for ensuring call completion, especially in the management of intermediate providers.

1.2 Purpose

This handbook provides a resource to carriers to address issues as they are encountered related to intercarrier LD call completion/call termination.

1.3 Application

1.3.1 Problems Reported

Customers of some telecommunications SPs (particularly those in rural areas) have experienced difficulties with the receipt of LD calls via their phone service, including problems that generally fall into the following categories:

- *Call completion failure*: failure scenarios reported included:
    - The Calling Party hears ringing but the Called Party hears nothing (no ringing);
    - The Called Party's phone rings, but the Called Party hears nothing when the call is answered, i.e., "dead air";
    - The Calling Party hears local busy tone (when the line was not busy); and
    - The Calling Party hears fast or network busy, or hears a network failure announcement including inappropriate "number not in service".

[1] PSTN is used here to refer to the set of networks used to complete calls using E.164 number addressing.

- *Very long post dial delay.*
- *Poor transmission quality* (both voice and fax).
- *Misidentification of Calling Party.*
- *Management of Intermediate Providers.*

1.3.2 Call Completion Components

In the *Report and Order* (*R&O*) and *Further Notice of Proposed Rulemaking* (*FNPRM*) in FCC 13-135 and WC Docket No.13-39, adopted October 28, 2013 and released November 8, 2013 ("RCC Order"), the FCC defined the term "answered call"[2] to mean:

> "A call that was answered by or on behalf of the called party (including calls completed to devices, services or parties that answer the call, such as an interactive voice response, answering service, voicemail or call-forwarding system), causing the network to register that the terminating party is prepared to receive information from the calling user."

Also, as a result of the Final Rules issued in the RCC *R&O*, the term "call attempt"[3] means "a call that results in transmission by the covered provider toward an incumbent local exchange carrier (LEC) of the initial call setup message, regardless of the voice call signaling and transmission technology used."[4]

With respect to call completion, a call attempt can be signaled either as Answered, Busy, Ring No Answer, or Unassigned Number.[5] FCC Form 480[6] reporting on the aforementioned categories will vary due to differences in carrier network technology elements.

2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ATIS-0300009, *NGIIF Reference Document Part I- Installation and Maintenance Responsibilities for Special Access Services, WATS Access Lines, and Switched Access Services Feature Group "A"*.[7]

ATIS-0300010, *NGIIF Reference Document Part II- Installation and Maintenance Responsibilities for Switched Access Services Feature Groups "B," "C," and "D"*.[8]

ATIS 0300011, *NGIIF Reference Document Part II- Installation and Maintenance Responsibilities for Switched Access Services Feature Groups "B," "C," and "D"*.[9]

ATIS-0300012, *NGIIF Reference Document Part III- Attachment A- MTP Compatibility Tests*.[10]

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[2] FCC 13-135, paragraph 72 and FCC 13-135 footnote 114.

[3] 47 CFR § 64.2101 (b).

[4] Appendix A to FCC 13-135, 47 CFR §64.2103, *Retention of Call Attempt Records*.

[5] Appendix A to FCC 13-135, 47 CFR § 64.2105, *Reporting Requirements*.

[6] Available at: < https://www.fcc.gov/encyclopedia/Form-480-Filer-Resources >.

[7] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26043 >.

[8] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26044 >.

[9] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26045 >.

ATIS-0300013, *NGIIF Reference Document Part III- Attachment B- ISUP Compatibility Tests*.[11]

ATIS-0300014, *NGIIF Reference Document Part III- Attachment C- SCCP Protocol Class 0 Compatibility Tests*.[12]

ATIS-0300015, *NGIIF Reference Document Part III- Attachment D- Test Severity Analysis Criteria*.[13]

ATIS-0300016, *NGIIF Reference Document Part III- Attachment E- SS7 Network Gateway Screening*.[14]

ATIS-0300017, *NGIIF Reference Document Part III- Attachment F- SS7 ISUP Tests for ISDN Network Interconnection*.[15]

ATIS-0300018, *NGIIF Reference Document Part III- Attachment G- SS7 Link Diversity Validation Guidelines*.[16]

ATIS-0300019, *NGIIF Reference Document Part III-Attachment H SS7 Cause Codes and Tones and Announcements*.[17]

ATIS-0300020, *NGIIF Reference Document Part III- Attachment I- SS7 Security Base Guidelines*.[18]

ATIS-0300021, *NGIIF Reference Document Part III- Attachment J- SS7 Software Validation*.[19]

ATIS-0300022, *NGIIF Reference Document Part III- Attachment K- Dual STP Failure Prevention Procedures*.[20]

ATIS-0300023, *NGIIF Reference Document Part IV- Installation and Maintenance Responsibilities for X.75 Gateway Services*.[21]

ATIS-0300024, *NGIIF Reference Document Part V- Test Line Guidelines*.[22]

ATIS-0300030, *NGIIF Reference Document Part IX- Installation, Testing, and Maintenance Responsibilities for Facilities*.[23]

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[10] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26046 >.

[11] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26047 >.

[12] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26048 >.

[13] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26049 >.

[14] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26050 >.

[15] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26051 >.

[16] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26052 >.

[17] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26053 >.

[18] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26054 >.

[19] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26055 >.

[20] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26056 >.

[21] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26057 >.

[22] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26058 >.

ATIS-0300032, *Next Generation Interconnection Interoperability (NGIIF) Reference Document: Part X, Interconnection Between LECS Operations Handbook – Local Interconnection Service Arrangement*.[24]

ATIS-0300035, *NGIIF Reference Document Part XII- Toll Free Industry Test Plan*.[25]

ATIS-0300051, *Central Office Code (NXX) Assignment Guidelines*.[26]

ATIS-0300082, *Guidelines for Reporting Local Number Portability Troubles in a Multiple Service Provider Environment*.[27]

ATIS-0300105, *Next Generation Interconnection Interoperability Forum (NGIIF) Auto Dialers Reference Document*.[28]

ATIS-0300209.2013, *Operations, Administration, Maintenance and Provisioning (OAM&P) – Network Tones and Announcements*.[29]

ATIS-1000002, *Number Portability Switching Systems*.[30]

ATIS-1000113.2015, *Signaling System No. 7 (SS7) – Integrated Services Digital Network (ISDN) User Part*.[31]

ATIS-1000679.2015, *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part*.[32]

ATIS-1000607.2014, *Integrated Services Digital Network (ISDN) – Layer 3 Signaling Specification for Circuit Switched Bearer Service for Digital Subscriber Signaling System Number 1 (DSS1)*.[33]

IETF RFC 3261, *SIP: Session Initiation Protocol*.[34]

IETF RFC 3325, *Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks*.[35]

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[23] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26064 >.

[24] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26066 >.

[25] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26069 >.

[26] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=27882 >.

[27] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=22617 >.

[28] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26137 >.

[29] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=27914 >

[30] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=21228 >.

[31] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=24941 >,

[32] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=25371 >.

[33] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at <https://www.atis.org/docstore/product.aspx?id=24729 >.

[34] This document is available from the Internet Engineering Task Force (IETF) at < http://www.ietf.org >.

[35] This document is available from the Internet Engineering Task Force (IETF) at < http://www.ietf.org >.

3GPP TS 24.229, *IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3*.[36]

GR-905-CORE, *Common Channel Signaling Network Interface Specification (ccsnis) Supporting Network Interconnection, Message Transfer Part (mtp), And Integrated Services Digital Network User Part (isdnup).*[37]

GR-317-CORE, *Lssgr: Switching System Generic Requirements For Call Control Using The Integrated Services Digital Network User Part (isdnup).*[37]

GR-394-CORE, *Lssgr: Switching System Generic Requirements For Interexchange Carrier Interconnection (ici) Using The Integrated Services Digital Network User Part (isdnup).*[37]

FCC Report and Order and FNPRM, In the Matter of Rural Call Completion (WC Docket No.13-39) (FCC 13-135).[38]

ATIS-0300046, *Recommended Notification Procedures to Industry for Changes in Access Network Architecture*.[39]

ITU-T E.721, *Network grade of service parameters and target values for circuit-switched services in the evolving ISDN*.[40]

Report and Order and Further Notice of Proposed Rulemaking, Connect America Fund (WC Docket No. 10-90), A National Broadband Plan for Our Future , (GN Docket No. 09-51), Establishing Just and Reasonable Rates for Local Exchange Carriers (WC Docket No. 07-135), High-Cost Universal Service Support (WC Docket No. 05-337), Developing an Unified Intercarrier Compensation Regime (CC Docket No. 01-92), Federal-State Joint Board on Universal Service (CC Docket No. 96-45), Lifeline and Link-Up (WC Docket No. 03-109), Universal Service Reform Mobility Fund (WT Docket No. 10-208) (FCC 11-161).[41]

Perlman, Radia, *Interconnections: Bridges, Routers, Switches, and Internetworking Protocols*. Addison-Wesley, 2000.

Declaratory Ruling, In the Matter of Developing an Unified Intercarrier Compensation Regime (CC Docket No. 01-92) and Establishing Just and Reasonable Rates for Local Exchange Carriers, (WC Docket No. 07-135) (DA 12-154).[42]

First Report and Order, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 (CC Docket 96-98) and Interconnection between LECs and Commercial Mobile Radio Service (CMRS) Providers, (CC Docket No. 95-185) (FCC 96-325).[43]

Report and Order, In the Matter of Rules and Regulations Implementing the Truth in Caller ID Act of 2009, (WC Docket No. 11-39) (FCC 11-100).[44]

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[36] This document is available from the Third Generation Partnership Project (3GPP) at < http://www.3gpp.org/specs/specs.htm >.

[37] This document is available from the Telcordia Technologies at < http://telecom-info.telcordia.com >.

[38] This document is available from the FCC at < https://www.fcc.gov/ >.

[39] This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < https://www.atis.org/docstore/product.aspx?id=26072 >.

[40] This document is available from the International Telecommunications Union. < http://www.itu.int/ITU-T/ >

[41] This document is available from the FCC at < https://www.fcc.gov/ >.

[42] This document is available from the FCC at < https://www.fcc.gov/ >.

[43] This document is available from the FCC at < https://www.fcc.gov/ >.

[44] This document is available from the FCC at < https://www.fcc.gov/ >.

3 Definitions, Acronyms, & Abbreviations

For a list of common communications terms and definitions, please visit the *ATIS Telecom Glossary*, which is located at < http://www.atis.org/glossary >.

3.1 Definitions

- **Business Integrated Routing and Rating Database System (BIRRDS) –** The Telcordia™ Business Integrated Routing and Rating Database System contains data in the routing and rating of calls. Contains a complete description of all Local Exchange Companies' networks in the NANP Area and pertinent information relating to the networks of other code holders. This provides information for, (1) message routing, (2) common channel signaling call setup routing, and (3) operator service access routing. Data supports all CO Codes assigned through these Guidelines, as well as all CO Codes in place prior to the existence of these Guidelines, and covers all Numbering Plan Areas (NPAs) administered under the North American Numbering Plan (NANP).
- **Facsimile (Fax) –** A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.
- **Telegraphy –** A form of telecommunication which is concerned in any process providing transmission and reproduction at a distance of documentary matter, such as written or printed matter of fixed images or the reproduction at a distance of any kind of information in such as form.
- **Telephony –** The branch of science devoted to the transmission, reception, and reproduction of sounds, such as speech and tones that represent digits for signaling.

3.2 Acronyms & Abbreviations

3GPP	3rd Generation Partnership Project
ACM	Address Complete Message
ANI	Automatic Number Identification
ANSI	American National Standards Institute
AOCN	Administrative Operating Company Number
ASC	Access Service Customer
ASP	Access Service Provider
ASR	Answer/Seizure Ratio (also called Call Answer Rate)
ATIS	Alliance for Telecommunications Industry Solutions
BICC	Bearer-Independent Call Control
BIRRDS	Business Integrated Routing and Rating Database System
BT	Busy Tone
CDR	Call Detail Records
CLEC	Competitive Local Exchange Carrier
CMRS	Commercial Mobile Radio Service
CN	Charge Number
COCAG	Central Office Code (NXX) Assignment Guidelines
CPC	Calling Party's Category
CPE	Customer Provided Equipment (also Customer Premises Equipment)
CPN	Calling Party Number
CPNI	Customer Proprietary Network Information
DMoQ	Direct Measures of Quality

DSS1	Digital Subscriber Signaling System Number 1
EAS	Extended Area Service
ENS	Emergency Notification System
ETS	Emergency Telecommunications Service
FCC	Federal Communications Commission
FG	Feature Group
I-IWU	Incoming Interworking Unit
IAM	Initial Address Message
ICC	Intercarrier Compensation
ICN	Interconnecting Networks
ID	Identification
IETF	Internet Engineering Task Force
INC	Industry Numbering Committee, ATIS Committee
INT	Intercept
IP	Internet Protocol
IPM	Impulses per Minute
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
IXC	Interexchange Carrier
kbps	kilobit per second
kHz	kiloHertz
LAN	Local Area Network
LATA	Local Access and Transport Area
LD	Long Distance
LEC	Local Exchange Carrier
LNP	Local Number Portability
LRN	Location Routing Number
MF	Multi-Frequency
MOU	Minutes of Use
MTP	Message Transfer Part
NANP	North American Numbering Plan
NANPA	North American Numbering Plan Administration
NCA	No Circuit Announcement
NER	Network Effectiveness Ratio
NGIIF	Next Generation Interconnection Interoperability Forum, ATIS Committee
NGN	Next Generation Network
NPA	Numbering Plan Area
NPAC	Number Portability Administration Center
NXX	Central Office Code – 3 digits following the NPA in a World Zone 1 TN
OAM&P	Operations, Administration, Maintenance and Provisioning
OLI	Originating Line Information

PBX	Private Branch eXchange
POI	Point of Interface
POS	Packet Over SONET
POT	Point of Termination
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
REL	Release Message
RCC	Rural Call Completion
ROTL	Remote Office Test Lines
RI	Redirection Information
RO	Reorder Tone
ROA	Reorder Announcement
SAS	Switched Access Services
SCPS	Signal Control Points
SDP	Session Description Protocol
SIM	Subscriber Identity Module
SIP	Session Initiated Protocol
SP	Service Provider
SPCD	Service Provider Contact Directory
SS7	Signaling System No. 7
TDD	Telecommunications Devices for the Deaf
TDM	Time Division Multiplexing
TN	Telephone Number
UDI	Unrestricted Digital Information with Tone and Announcement
USF	Universal Service Fund
VCA	Vacant Code Announcement
VoIP	Voice over Internet Protocol
WATS	Wide Area Telephone Service

4 General Standards/Guidelines

General standards and/or guidelines should be employed by SPs to help maintain proper network function and to detect and respond to RCC/call termination issues.

SPs should implement quality processes to ensure basic functions of network maintenance, modernization, and repair do not introduce failures into the network, and have procedures for all activity that touches the network. Network alarming should be in place to promptly alert carriers to service-affecting events.

4.1 General Network Management Practices

Given billions of call events annually, even low levels of call completion failures related to process gaps or technical problems could overwhelm investigative resources and detract from efforts to identify and address catastrophic/systemic problems. SPs should continue to implement quality processes to ensure that basic functions of network maintenance, modernization, and repair do not introduce failures into the network. In that respect:

- Carriers should have written procedures for all activity that touches the network;

- Devices, software, and configurations should be validated in lab environments before being introduced into production;
- Implementation procedures should be documented and should include verified back-out procedures to ensure ability to revert to last known good operating environment in the event the implementation does not go as planned;
- Network alarming should be in place to promptly alert carriers to service-affecting events; and
- Network metrics should be monitored to ensure performance within intended operating parameters.

4.2 Metrics for Calculating Call Completion

Network metrics should be monitored to ensure performance within intended operating parameters. Some SPs monitor call completion rates using a variety of measurements, such as Answer-Seizure Ratio (ASR) and Network Effectiveness Ratio (NER). Performance of these metrics over various periods of time may be useful to help spot trends, persistent issues, and sudden deviations from baseline performance, any of which might merit further attention depending on the circumstances.

Metrics may be less useful if the terminating network cause codes are incorrect in accordance with GR-905, *Common Channel Signaling Network Interface Specification (ccsnis) Supporting Network Interconnection, Message Transfer Part (mtp), And Integrated Services Digital Network User Part (isdnup)*. For example, in response to an Initial Address messages (IAM), calls to unallocated TNs should always receive an immediate cause code of 1 in either the Address Complete message (ACM), or the Release (REL) message. If the SP chooses to respond with a cause code of 1 in an ACM message, the SP will also be expected to play the recorded announcement indicating the number called is a non-working TN. In this scenario, the call path will stay connected to the SPs switch until the originating party hangs up, or until the SPs announcement timer expires whereby the disconnect will be initiated by the SPs switch. If the SP chooses to respond to the IAM with a cause code of 1 in a REL message, the call path between the IXC and the SP will be torn down immediately, thus saving network resources, and the IXC or the originating SP will play the recorded announcement. When the correct cause code is not provided by an SPs EO, call attempts to unallocated numbers may be incorrectly categorized as call failures, thus negatively affecting metrics calculations. In addition, calling parties that are able to modify their calling lists based on cause code information may continue to place calls to the same unallocated TN in the absence of receipt of an appropriate cause code.

4.2.1 ASR

ASR (also known as Call Answer Rate) is calculated by taking the number of successfully answered calls and dividing by the total number of calls attempted (i.e., seizures). In some implementations, SPs attempt to adjust the formula for calls to unallocated numbers. The formula for determining ASR admittedly includes unanswered calls that are in fact successfully completing on the terminating end. However, this data point may be less susceptible to variations in data reporting or to differences in the quality or accuracy of signaling; the Called Party either answered the call or it did not.

4.2.2 NER

NER expresses the relationship between the number of seizures and the sum of the number of seizures resulting in either an answer message, or a user busy, or a ring no answer, or, in the case of Integrated Services Digital Network (ISDN), a terminal rejection/unavailability. In other words, unlike ASR, NER attempts to exclude the effects of customer behavior and terminal behavior. Some SPs monitor NER instead of ASR to attempt to identify network behavior that may merit further investigation.

5 Applicable Standards/Guidelines for Certain Root Causes

This section identifies some of the existing applicable standards and/or guidelines for certain root causes which may have relevance to issues related to RCC/call termination.

5.1 Signaling

5.1.1 Identification of Calling Party

The origin of a call can be identified in signaling through several parameters. In Signaling System No. 7 (SS7) ISUP, the Calling Party Number (CPN) parameter is carried in the Initial Address Message (IAM) and contains the Telephone Number (TN) of the originating end user (see ATIS-1000113.2015-Chapter 2, Clause 2.16, *Calling Party Number*, and ATIS-1000113.2015-Chapter 3, Clause 3.7, *Calling Party Number*).

CPN is the parameter that determines what the Called Party sees as the caller identification (ID), the TN directly, and caller name, based on database look-up of the number in the CPN. In general, CPN is propagated from the originating switch to the terminating switch as long as signaling is end-to-end SS7. If there is inband, i.e., Multi-Frequency signaling (MF) in the call path, CPN will not be received at the terminating switch.

In Session Initiated Protocol signaling (SIP), the phone number of the calling end user is populated in P-Asserted-Identity header (RFC 3325)[45]. ATIS-1000679, *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part,* defines interworking between SS7 ISUP and SIP, including a mapping between the SS7 CPN parameter and the SIP P-Asserted-Identity header[46].

The NGIIF recommends that the CPN field should be populated, by the originating network, with a valid 10-digit North American Numbering Plan (NANP) subscriber line number or directory number. More information can be found in Clause 8, *Regulatory Environment*.

5.1.1.1 Missing Caller ID

The problem of missing caller ID (i.e., no number available) as seen by the Called Party will result when CPN is not delivered to the terminating exchange. This could result if: 1) no CPN was populated at origination; 2) there was inband signaling on the path; 3) SIP-SS7 interworking was not handled properly; or 4) CPN was removed by an entity in the call path. Missing CPN may interfere with terminating the call (e.g., if anonymous call rejection is engaged). Additional information can be found in Clause 8, *Regulatory Environment*.

5.1.1.2 Incorrect Caller ID

The issue of incorrect caller ID, as seen by the Called Party, may result when a CPN, other than that normally associated with the Calling Party, is delivered to the terminating end office. This may be the result of an entity in the call path explicitly manipulating the CPN, or of a call being terminated and then re-originated in the process of routing to the terminating end office. (In the latter case, CPN may be a number associated with the network element that re-originates the call. Note that this differs from call forwarding, which retains the original CPN information in the Calling Party Address parameter in the IAM.) Changes in the CPN delivered may also interfere with terminating the call. Although the Called Party may view it as incorrect, the caller ID may be different than the CPN due to legitimate changes to the TN based on the FCC's allowed practices. Additional information can be found in Clause 8, *Regulatory Environment*.

5.1.1.3 Identification of the Chargeable Party

SS7 IAM may also include identification of the chargeable party for the call. When the number to be charged differs from the CPN, it is carried in the (IAM) in the Charge Number (CN) parameter (see ATIS-1000113.2015-Chapter 2, Clause 2.25A, *Charge Number*, and ATIS-1000113.2015-Chapter 3, Clause 3.10, *Charge Number*). Standards provide that where the Charge Number is the same as the CPN, the originating exchange can signal just the CPN and a valid Originating Line Information (OLI) parameter (ATIS-1000113.2015, Clause 2.1.9.3A, *Charge Information*). In SIP, the mechanism for population of the comparable information is not yet standardized.

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[45] If the P-Asserted-Identity header is not present, CPN may sometimes be populated based on the From header. This may occur when interworking does not support P-Asserted Identity, but is not the preferred situation.

[46] Note that ISUP parameters may also be encapsulated in SIP messages and thus passed to subsequent SS7 elements, although this approach does not appear to be widely implemented.

Therefore, an ISUP-SIP mapping has not been standardized in ATIS-1000679. Work under development in the Internet Engineering Task Force (IETF) for a P-Charge-Info header [draft-york-sipping-p-charge-info-12 (2011-09-15)] may form a basis for this in the future. Note also that a SIP mechanism corresponding to the SS7 OLI parameter has not been finalized. See the expired IETF work in draft-patel-dispatch-cpc-oli-parameter-03. Note that while the Calling Party's Category (CPC) portion of the IETF work is incorporated into the definition found in in Annex J of 3GPP TS 24.229, *IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3*, the OLI portion is not.

Where signaling from an originating exchange is inband (MF), a billing number (ANI) can be signaled (e.g., from a LEC to an IXC). ANI can be mapped into CN but is *not* mapped into CPN.

5.1.2 Cause Codes, Tones, & Announcements

Cause codes, tones, and announcements play an important role in call completion. They are key to the identification, and thus resolution of network problems, however, their misuse may exacerbate problems. Rural telephone companies have reported instances in which a busy tone or number-not-in-service announcement has been delivered to callers, when in fact the number was in service and was not engaged. Such signals, when erroneously applied, not only mislead the caller but may mask call completion problems from detection by the caller's LD provider. This Clause provides guidance for the proper use of cause codes, tones, and announcements.

5.1.2.1 NGIIF SS7 Cause Code & Tones & Announcements

The purpose of this section is to provide information related to the application of cause codes with the associated treatment, and the appropriate verbiage to be played to the customer where an announcement is required. Complete documentation is available in ATIS-0300019, *NGIIF Reference Document Part III-Attachment H SS7 Cause Codes and Tones and Announcements*.

5.1.2.1.1 General Information

ATIS-0300019 describes the tones and announcements that are used to inform customers and network operators of various conditions that are encountered on dialed calls. Tones and announcements are also used for service analysis of conditions that result in failure to complete dialed calls. Analysis data is used to evaluate administrative, engineering, and maintenance efforts to improve service. Tones are used primarily to identify the condition of called lines and network blockage of failure conditions.

For some network blockage or failure conditions, announcements are used to provide customers or network operators with additional information and to suggest action that should be taken.

5.1.2.1.2 Cause Code Standards

There are three standards by which cause codes are utilized within the telecommunications industry with one being held in reserve; they are as follows:

00 = CCITT[47]

01 = OTHER INTERNATIONAL

10 = ANSI

11 = RESERVED

[47] Also known as the International Telecommunication Union Telecommunication Standardization Sector (ITU-T).

The Coding Standards are used in the subfields of the Cause Indicators Parameter Field:

Table 5.1 – Cause Indicators Parameter Field

8	7	6	5	4	3	2	1
Ext	Coding Standard		Spare	Location			
Ext	Recommendation						
Ext	Cause Value						

In some instances, an alpha character “N” is utilized in the Cause Code matrix to indicate the Cause Code as a national standard.

5.1.2.1.3 Mapping Matrix

The cause code mapping matrix located in ATIS-0300019 identifies the action and direction of the cause codes as they traverse the network.

5.1.2.1.4 Cause Code Classes & Cause Code Default

Any cause code not being recognized will be routed to a default code in the appropriate cause code class. Cause codes should only be mapped to the applicable default code for that class.

Table 5.2 – Cause Code Classes and Default Codes

CAUSE CODE CLASS	CAUSE CODE GROUPING DESCRIPTION	CAUSE CODE GROUPS	CAUSE CODE DEFAULT
001	Normal Event	1-30	31
010	Resource Unavailable	32-46	47
011	Service Option not Available	48-62	63
100	Service Option not Implemented	64-78	79
101	Invalid Message	80-94	95
110	Protocol Error	96-110	111
111	Interworking	112-126	127

5.1.2.1.5 Cause Code Treatments

This Clause provides the definition of the different announcements that can be applied to the appropriate cause codes.

ATIS-0300019 details the circumstances under which different ause codes should be provided and the corresponding tones or announcements to be provided. Adhering to these procedures will address problems such as those reported by the rural telephone companies; for example, incorrect provision of busy tone or number-not-in-service announcements which may mislead callers about the status of the Called Party, and hinder the carrier maintaining the retail LD relationship with caller from detecting call completion problems.

5.1.2.1.5.1 No Circuit Announcement (NCA)

This announcement is played when there are no circuits available for the call to be completed. An example of such a recording is as follows:

"All circuits are busy now. Please try your call again later".

5.1.2.1.5.2 Reorder Announcement (ROA)

This announcement is played when a call did not traverse the network to completion for a myriad of reasons. An example of such a recording is as follows:

"We're sorry, your call did not go through. Please try your call again later".

NOTE: A reorder tone (also known as "fast busy") may sometimes be applied in lieu of a reorder announcement.

5.1.2.1.5.3 Intercept (INT)

This announcement is played when a customer dials a number that has been disconnected or is no longer in service. An example of such an announcement is:

"We're sorry, you have reached a number that has been disconnected or is no longer in service. If you feel you have reached this recording in error, please check the number and try your call again".

5.1.2.1.5.4 Vacant Code Announcement (VCA)

This announcement is played when a customer mis-dials a TN in some manner including when the dialed number appears to be a proper TN, but is an unassigned (vacant) number. "Mis-dialing" (entering incorrect digits than intended) a TN that has been assigned should result in call completion but would be considered dialing "the wrong number". An example of an announcement in regards to dialing an invalid or unassigned TN is:

"We're sorry; your call cannot be completed as dialed. Please check the number and dial again".

5.1.2.1.5.5 Ineffective Other

There should be announcements with the appropriate verbiage for the following situations. Specific wording is determined by the SP.

- Prefix or access code dialing irregularity.
- Improper initial coin deposit.
- Screened line access denial.
- Dialing irregularity.

At a minimum, the announcements should include the following information:

- The call cannot be completed as dialed.
- Instructions for correct dialing procedures.
- The customer should try the call again (except for Customer Calling Feature Calling).

In addition to announcements, there are instances when the application of a tone is the applicable treatment for a call. The following clauses describe tones that are normally applied as treatments.

5.1.2.1.5.6 Busy Tone (BT)

Busy Tone is applied to an originating customer's line when the Called Party is engaged in another call or the phone is at an off hook condition. The tone applied to the originating customer's line will be at a rate of 60 Impulses per Minutes (IPM).

5.1.2.1.5.7 Reorder Tone (RO)

Reorder tone (also known as “fast busy”) is applied to the originating customer’s line when the call cannot be completed, which may be due to insufficient facilities. In such instances, a tone will be applied at a rate of 120 IPM. This tone may be applied in lieu of an announcement.

5.1.2.1.6 Mapping Matrix

The following are examples of cause codes received by each network or CPE and the cause codes sent by each network or CPE. The action that generated the cause code is listed to indicate the network or CPE where the event occurred (YY and XX represent different cause codes):

- ➔ Indicates direction of cause code.
- ← Indicates direction of cause code.

Arrow facing towards cause code indicates cause code being generated.

Arrow facing away from cause code indicates cause code being passed.

Table 5.3 – Examples of Cause Codes Received and Sent by ach Network or CPE

XX	(message)	Cause Code Generated by or Received at Network of CPE
XX←	(action/message)	Network or CPE generated cause code XX
➔XX	(action/message)	Network or CPE generated cause code XX
➔XX←	(action/message)	Network or CPE generated cause code XX in both directions
←XX	(action/message)	Cause code XX being passed to next network or CPE ✶
XX➔	(action/message)	Cause code XX being passed to next network or CPE✶
←XX➔	(action/message)	Cause code XX being passed in both directions
←YY←XX	(message)	Network or CPE receives cause code XX from (message) XX➔YY➔ previous network or CPE and maps cause code XX to cause code YY

✶At the end office, treat the call per cause code XX for analog or Non-ISDN call.

5.1.2.2 Other Applicable Standards Addressing Tones & Announcements

5.1.2.2.1 ATIS-0300209, *Operations, Administration, Maintenance and Provisioning (OAM&P) – Network Tones and Announcements*

ATIS-0300209 addresses tones and announcements associated with ineffective call attempts. ATIS-0300209 addresses the following tones:

- Busy Tone.
- Reorder Tone.
- Special Information Tones.

Announcements addressed include:

- Reorder.
- No Circuit.
- Vacant Code.
- Intercept.
- Ineffective Other.

This ATIS-0300209also addresses the mapping of Cause Indicator Values specified for the ISDN User Part (ISUP) and Digital Subscriber Signaling System Number 1 (DSS1) in ATIS-1000113.2015 and ATIS-1000607, respectively, and the tones and announcements identified in this standard. This mapping is for use in call processing involving two or more interconnecting networks (ICNs) when SS7 is used for call control. This standard considers the provision of these tones and announcements by originating, intermediate, and terminating ICNs.

5.1.2.2.2 ATIS-1000113.2015, *Signaling System No. 7 (SS7) – Integrated Services Digital Network (ISDN) User Part*

Integrated Services Digital Network (ISDN) User Part defines the protocol that supports the signaling functions required to provide voice and non-voice services in an Integrated Services Digital Network. The messages and signals are defined in ATIS-1000113.2015-Chapter 2 and their format and content are contained in ATIS-1000113.2015-Chapter 3. ATIS-1000113.2015-Chapter 4 describes the basic signaling procedures for the set-up and clear-down of national and international ISDN and non-ISDN connections. This chapter also includes generic procedures for supplementary services. Service-specific procedures for supplementary services are contained in separate American National Standards Institute (ANSI) documents (see Clause 2.2 of ATIS-1000113.2015-Chapter 1).

5.1.2.2.2.1 Address Signaling

In general, the call set-up procedure described is standard for both voice and non-voice connections using enbloc address signaling for calls between ISDN terminals and non-ISDN terminals.

5.1.2.2.2.2 Basic Procedures

The basic call control procedure is divided into three phases: call set-up, data/conversation, and call cleardown. Messages on the signaling link are used to establish and terminate the different phases of a call. Standard inband supervisory tones or recorded announcements or both are returned to the caller on speech and 3.1 kiloHertz (kHz) connections to provide information on call progress. Calls originating from ISDN terminals may be supplied with more detailed call progress information by means of additional messages in the access protocol supported by a range of messages in the network.

5.1.2.2.2.3 Tones & Announcements, Basic Call Control, & Signaling Procedures

More information about basic call control and signaling procedures can be found in ATIS-1000113.2015, Chapters 2 and 3, and Chapter 4, Clause 2, *Basic Call Control & Signaling Procedures*. Specifically, Chapter 4, Clause 2 addresses successful call set-up and unsuccessful call set-up. With respect to unsuccessful call set-up, tones and announcements are addressed for speech, 3.1 kHz audio, and 64 kilobit per second (kbps) Unrestricted Digital Information with Tone and Announcement (UDI-TA).

5.1.3 Interconnection Parameters & Looping

Passing certain SS7 parameters are crucial to the prevention of call loops in which a call cycles back and forth between networks without ever reaching its destination (this is further discussed in the Clause 5.3, *Routing*). Loop detection and control is important in such circumstances because, in addition to causing call failure, loops consume network capacity and diminish the likelihood of completion of calls that do not involve looping as well.

5.1.3.1 Hop Counter

Interconnecting parties should exchange the initial value of the Hop Counter at the time of negotiation for interconnection and as changes are anticipated/made in signaling between the two networks.

If no Hop Counter is received with the SS7 incoming IAM, then if the Hop Counter capability is active, a non-forwarding transit exchange should include the Hop Counter parameter in the outgoing IAM. For technologies where the Hop Counter cannot be set on a per call type basis and for non-Emergency Telecommunications Service (ETS) calls, the network operator should set the initial count value within a range between 15 and 20. In addition, if the initial count value can be set by the network operator on a per-call type basis, then the initial count value for ETS calls should be the maximum value allowed in the exchange.

The value received should be accepted as a valid value, and the recipient switch should not reinitialize the Hop Counter. For SIP-I, the Incoming Interworking Unit (I-IWU) acting as an independent exchange should perform the normal Bearer-Independent Call Control (BICC)/ISUP Hop Counter procedure using the Hop Counter taken from the encapsulated IAM.

ATIS-1000679, *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part*, Clauses 6.1.3.8 and 7.1.4, describe the interworking of the SS7 hop counter and the analogous SIP max forwards parameter.

Where multiple protocols are involved in a single call process due to Hop Counter and max forwards having no interworking between SS7 and SIP, Hop Counter information cannot be used.

5.1.3.2 Call Forwarding/Call Looping Issues

The NGIIF has looked at customer call forwarding/call looping issues and the related network parameters [such as the Hop Counters, max forwards in an IP network, redirection information (RI), history information] which are available in either the Time Division Multiplexing (TDM) or IP networks. The current state of the industry‘s transition to All-IP will not support a full resolution of problems induced by customer call forwarding using these capabilities; therefore, the NGIIF offers the following recommendations:

- Network providers should review the use of simultaneous call forwarding restrictions that limit the number of times calls can be forwarded through a single line.
- SPs should review their services to determine whether they easily allow configurations that can generate call looping. For example, it might be desirable to design restrictions so that customers cannot simultaneously forward their mobile calls to their land line at that same time their land line is forwarding calls to their mobile line.

While call forwarding can sometimes result in looping, it seems more likely that where looping is involved in RCC problems, it may be the result of either translations errors or the involvement of multiple call completion intermediate providers who are unaware of which other intermediate provider’s networks the call may have already traversed.

5.1.4 SS7 Inter Network Trunk Signaling Testing

The Message Transfer Part (MTP), ISUP, and SCCP compatibility tests found in the NGIIF Reference Documentation (ATIS-0300011 to ATIS-0300022, *NGIIF Reference Document Part III- Attachments A through K*), are recommended to verify the compatibility of networks during interconnection. These tests are intended to be used as a recommended set of minimum tests of the SS7 protocol.

It is assumed that the two interconnecting networks may have some additional tests they may wish to perform during interconnection. These tests should be part of the bilateral agreements developed for SS7 network interconnections.

Network compatibility testing verifies the correct interworking of two SS7 implementations. The tests are written for the interconnection of two given implementations.

The full test suite of all recommended tests should be run between the two interconnecting companies for any interconnection configuration that was not previously tested. Both the manufacturer model and software load of the interconnecting signaling network elements defines the interconnection configuration. Subsequent interconnections, using configurations previously tested by the two interconnecting companies, may be tested at their discretion.

The tests in the NGIIF Reference documentation have been divided into Intrusive Tests and Non-Intrusive Tests and defined as follows:

- *Intrusive Tests:* The interconnecting circuit shall be interrupted, with the testing unit inserted into the circuit and acting as an emulator to the signaling point under test.
- *Non-Intrusive Tests:* The test shall be able to observe traffic traversing the link(s) between the two (2) signaling points, in a monitor mode.

5.1.5 Call Set-up Delay

Call set up is part of the TDM SS7 and IP SIP protocols in the PSTN, for the connection of the Calling Number to the Called Number across the PSTN.

Callers expect that call set up happens in a timely manner. While ITU Recommendation E.721 suggests a mean of 5.0 seconds, a 95th percentile of 8.0 seconds for “national” (as opposed to local) calls (conventional wireline-to-wireline calls are often considerably faster). Thus, long delayed calls, especially without feedback that the call is proceeding, may lead customers to abandon their call attempts and/or report call failure when a caller hears nothing; it is sometimes referred to by callers as experiencing “dead air”.

For SS7, the standards for the timing between SS7 messages are specified in ATIS–1000113-Chapter 4, Table 3, page 4-123. This table is for Timers. In that table, T11 shows the ACM timing as 15 - 20 seconds in response to the IAM. Along with the T7 IAM timing to ACM of 20-30 seconds, this allows for 35 to 50 seconds for call set up, up to the Release Complete Message.

For SIP, timers are defined in IETF RFC 3261, *SIP: Session Initiation Protocol,* and are generally an estimate of round trip transmission time. The RFC defaults to 500ms. The resulting timer values can thus be in the same ranges as the SS7 timers described above.

The following text, from 3GPP TS 24.229, Section 7.7, *SIP Timers*, provides additional guidance for mobile applications:

> The timers defined in RFC 3261 [26] need modification in some cases to accommodate the delays introduced by the air interface processing and transmission delays. Table 7.7.1 shows recommended values for IM CN subsystem.
>
> Table 7.7.1 lists in the first column, titled "SIP Timer" the timer names as defined in RFC 3261 [26].
>
> The second column, titled "value to be applied between IM CN subsystem elements" lists the values recommended for network elements – e.g., P-CSCF, S-CSCF, MGCF, when communicating with each other i.e., when no air interface leg is included. These values are identical to those recommended by RFC 3261 [26].
>
> The third column, titled "value to be applied at the UE" lists the values recommended for the UE, when in normal operation the UE generates requests or responses containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b", or "IEEE-802.11g", or "IEEE-802.11n". These are modified

when compared to RFC 3261 [26] to accommodate the air interface delays. In all other cases, the UE should use the values specified in RFC 3261 [26] as indicated in the second column of Table 7.7.1.

The fourth column, titled "value to be applied at the P-CSCF toward a UE" lists the values recommended for the P-CSCF when an air interface leg is traversed, and which are used on all SIP transactions on a specific security association where the security association was established using a REGISTER request containing a P-Access-Network-Info header field provided by the UE which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a" or "IEEE-802.11b", or "IEEE-802.11g", or "IEEE-802.11n". These are modified when compared to RFC 3261 [26]. In all other cases, the P-CSCF should use the values specified in RFC 3261 [26] as indicated in the second column of Table 7.7.1.

The final column reflects the timer meaning as defined in RFC 3261 [26].

Table 7.7.1 – SIP timers

SIP Timer	Value to be applied between IM CN subsystem elements	Value to be applied at the UE	Value to be applied at the P-CSCF toward a UE	Meaning
T1	500ms default (see NOTE)	2s default	2s default	RTT estimate
T2	4s (see NOTE)	16s	16s	The maximum retransmit interval for non-INVITE requests and INVITE responses
T4	5s (see NOTE)	17s	17s	Maximum duration a message will remain in the network
Timer A	initially T1	initially T1	initially T1	INVITE request retransmit interval, for UDP only
Timer B	64*T1	64*T1	64*T1	INVITE transaction timeout timer
Timer C	> 3min	> 3 min	> 3 min	proxy INVITE transaction timeout
Timer D	> 32s for UDP	>128s	>128s	Wait time for response retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer E	initially T1	initially T1	initially T1	non-INVITE request retransmit interval, UDP only
Timer F	64*T1	64*T1	64*T1	non-INVITE transaction timeout timer
Timer G	initially T1	initially T1	initially T1	INVITE response retransmit interval
Timer H	64*T1	64*T1	64*T1	Wait time for ACK receipt.
Timer I	T4 for UDP	T4 for UDP	T4 for UDP	Wait time for ACK retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer J	64*T1 for UDP	64*T1 for UDP	64*T1 for UDP	Wait time for non-INVITE request retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer K	T4 for UDP	T4 for UDP	T4 for UDP	Wait time for response retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
NOTE: As a network option, SIP T1 Timer's value can be extended, along with the necessary modifications of T2 and T4 Timers' values, to take into account the specificities of the supported services when the MRFC and the controlling AS are under the control of the same network operator and the controlling AS knows, based on local configuration, that the MRFC implements a longer value of SIP T1 Timer.				

Timers for SS7/SIP interworking are defined in Clause 8 of ATIS-1000679, *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part*.

Under normal circumstances with SS7 or SIP signaling, post dial delay is likely to be almost an order of magnitude shorter than the timer values discussed above and the timers serve mostly to kill the odd call that has gone awry. Where Intermediate Providers fail to release in a timely manner a call they cannot complete, attempt many routes, or queue calls for completion, long timer values could result in excessive post dial delay for eventually successful calls. NGIIF does not recommend that existing signaling timers be changed. Instead, carriers should expeditiously release calls that they cannot complete. Carriers should not queue calls for an extended period or cycle calls through further intermediate providers.

Even without failure to release in a timely fashion, complicated routing arrangements can result in undesirable post dial delays. Consider a group of intermediate providers, each of which has some potential routes to a given termination. Those routes may include making use of another carrier in the set whose routes may in turn include some of the same routes used by the initial intermediate provider as well as additional members of the set of intermediate providers. This situation is analogous to that in which a group of Local Area Network (LAN) bridges is interconnected and the "spanning tree"[48] algorithm must be employed to enable only certain paths to avoid looping. In the absence of information about other carriers' routes, looping may result, as well as fruitless reattempts of routes already tried by other carriers. The potentially large number of routing attempts alone may introduce unacceptable post dial delay.

5.1.5.1 Delayed Ringing or Ringing Without Call Set-up

Callers expect to hear, during call processing, that their call is progressing, and that when it has been set up, end to end, they will hear tone (ring back), indicating that the call set up has progressed to the point that it is ringing at the called end. While delayed ringing due to call post dial delays is a problem as discussed above, ring back should not be presented until the terminating switch has received and processed an IAM and is responding to the IAM with an ACM.

Delayed ringing may be due to call set up delay (refer to Clause 5.1.5).

In SIP signaling, ring back should depend on receipt of a 18X Ringing message from the far end.

When ring back is presented to the caller, in the absence of receipt of the proper SS7 or SIP message, the caller may infer that the phone they are calling is ringing when in fact it is not. Refer to Clause 5.1.2.1, *NGIIF SS7 Cause Code & Tones & Announcements*, and IETF RFC 3261 for more information.

5.1.5.2 Dead Air

A Called Party may answer a call and experience "dead air". This situation can sometimes result from the use of predictive auto dialers, but in the context of normally initiated calls is likely to have other causes in the setup of the media path.

5.2 Transmission Quality

Transmission quality issues typically reported are identified as static, noise on line, choppy voice, echo, loss, etc. Transmission issues can occur in many places within the network such as customer CPE, customer inside wiring, local loop/cable pair, central office facilities, bad trunk groups, etc.

When trying to resolve transmission degradations, trouble isolation practices should be employed to identify the origination point of trouble. Trunk maintenance procedures in many cases will identify "bad" trunks, taking the trunk out of service for testing and repair. Transmission issues may occur on an intermittent basis, making them more difficult to identify. Trouble reports and the trouble resolution procedures are another way to identify and resolve transmission quality issues within the network.

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[48] Perlman, Radia, *Interconnections: Bridges, Routers, Switches, and Internetworking Protocols*. Addison-Wesley, 2000.

Important parameters for transmission quality are included in the best practices for managing intermediate carriers.

5.2.1 Fax

TDM circuits using the G.711 codec support facsimile (i.e., fax) as well as voice transmission. Voice over Internet Protocol (VoIP) can support fax if properly engineered, but VoIP connections engineered to support voice will not necessarily support fax. Fax machines generally convert scanned data into voiceband analog signals for transmission. Non-waveform network codecs (e.g., G.729, G.723.1, etc.) used to convert these analog signals for digital transmission – either packet or circuit – will not support fax. If a packet or circuit-switched connection carries audio via a non-waveform codec, all faxes will fail. VoIP gateways provisioned for voice codecs like G.729 must renegotiate to G.711 fax pass-through or T.38 fax relay if they detect fax answer. Fax calls may also be more sensitive to IP packet loss than voice calls.

G.726 is a waveform codec that operates at lower bitrates than G.711. Some VoIP providers provision a line for the G.726 codec if they know that the line will be used for some combination of fax, modem, and voice. This typically works, although at fax or modem transmission speeds, transmission is slower than normal.

5.2.2 Voiceband Data

Voiceband data/modems would follow similar guidelines as for fax. G.711 will be needed for higher speed modems (>14.4 kbps). G.726 should work for slower speed modems.

5.3 Routing

Multiple entities will be involved in routing for all calls except those that originate and terminate within the network of a single provider. At a minimum, there will be an originating and a terminating provider and, generally, there will be an IXC or carriers involved on LD calls. Coordination in routing is thus a prerequisite to successful call completion.

Each entity has particular responsibilities. Originating carriers should ensure facilities are properly provisioned and interconnection is in place prior to routing calls. They also must maintain accurate routing table translations.

The terminating provider that serves the called number must populate the necessary information into industry databases [e.g., LERG™ Routing Guide and Numbering Portability Administrative Center (NPAC)] so that originating and intermediate entities can determine the serving switch and its homing arrangements.

The entity providing LD service to the caller must make use of current industry data and knowledge of its own network connectivity to build its routing tables. Where the LD carrier makes use of subcontracting entities, it needs to agree with those entities on the reachability to be provided.

This section discusses industry data sources, procedures for their population and use, and other issues related to routing. When a routing change is made for any reason, SPs should test the new route to ensure calls complete. Additional information can be found in Clause 7, *Trouble Reporting & Contact Directories*.

5.3.1 NPA/NXX Routing

Numbering Plan Areas/ Central Office Code (NPA/NXX) routing is the analytics of digits dialed, jurisdictional decisions, and subsequent route selection used to direct voice traffic to properly installed points of interconnection. This is primarily accomplished through the automated table-based selection of a route or routes and applies to the selection of routes by switching systems, as well as the planning of routes for a properly functioning network. Similarly, table-based routing applies to other aspects of call completion such as call setup via the signaling network. Routing is one element of the overall interconnection, routing, and billing components that work together concurrently in call completion.

For parties to properly establish and maintain NPA/NXX routing, and to troubleshoot NPA/NXX routing issues, expertise in the following aspects of telephony data, equipment, processes, etc., should exist:

- In-depth understanding of numbering resources which includes ordering, billing, and notification processes (Telcordia Technologies, Inc. dba iconectiv (iconectiv™) Business Integrated Routing and Rating Database System (BIRRDS) products – e.g., LERG Routing Guide, TPM™ Data Source).
    - The LERG Routing Guide is referenced in various ATIS guidelines – e.g., Central Office Code (NXX) Assignment Guidelines (COCAG), TPBAG – and is considered an integral part of the routing data exchange among SPs.
    - The LERG Routing Guide contains local routing information obtained from BIRRDS, reflects the current network configuration and scheduled changes within the PSTN, and provides limited routing information pertinent to other technologies that include wireless and VoIP.
    - Timeliness of receiving BIRRDS products notifications (daily/monthly/quarterly) is important to the maintenance and integrity of routing tables.
    - NPA/NXX and thousands-block data entry into BIRRDS products is important to ensure call completion and assist in troubleshooting.
- Knowledge and understanding of the operation of the PSTN:
    - Switches.
    - Interconnection.
- Knowledge and understanding of VoIP and SIP interaction with TDM and SS7 interaction in the PSTN.
- Knowledge and understanding of Extended Area Service (EAS) or franchise and Local Access and Transport Area (LATA)/Major Trading Area (MTA) boundaries, Exchanges/Rate Centers (handling of interLATA EAS – Local Number Portability (LNP) queries when interLATA Location Routing Number (LRN) is returned.
- Knowledge and understanding of the various tandem functions within a given network architecture (i.e., access, local, intraLATA, interLATA, intermediate, operator services, 911).
- Knowledge and understanding of network interconnection homing hierarchies.

5.3.2 Interconnection Agreements

For calls to originate and terminate within the PSTN, numerous companies must interface physically, thus "interconnecting" with each other. Interconnection is *not* automatic. Contractual agreements must be established between *all* interconnecting companies.

Individual local exchange tandem provider companies may have different rules as to how/what traffic traverses their network based on the interconnection agreements between the local exchange tandem provider and the interconnected SP.

NOTE: An IXC provider follows FCC tariff rules.

In addition to agreements developed between companies that physically interconnect with each other, further agreements for billing and call termination purposes may be needed among other SPs in the call path to complete a local or toll call.

5.3.3 Homing Arrangements

Homing arrangement(s) is the last choice trunk group(s) between switching system(s) in a specific routing ladder. An SP's subtending switch serving a portion of an incumbent LEC's franchise territory should home on the appropriate tandem as designated by the incumbent LEC.[49] A competitive tandem in the same territory may have a different serving arrangement from the incumbent LEC. An SP needs to negotiate serving areas with the competitive tandem company to determine the homing arrangements for the SP's subtending switch.

[49] In some cases, an SP may choose to home on a competitive tandem rather than an incumbent LEC tandem.

There are three tandem homing jurisdictions, which are Inter-state, Intra-state/Intra-LATA, and Intra-state/Inter-LATA. Due to regulatory constraints, some SPs may be prohibited from establishing all three tandem homing jurisdictions. There are also various types of tandem functions (e.g., local, toll).

Once a valid effective date of the homing arrangement is determined, the NPA/NXX, valid switch, and supporting homing arrangement information must be entered in a timely manner into the iconectiv™ BIRRDS database for notification to other carriers via the LERG Routing Guide and related output from this database. Delays in entering this data will increase the probability of calls being blocked on the effective date.

Homing arrangements entered into BIRRDS must be valid and denote connectivity between the two switching entities for the function(s) indicated. Hence, when a switching entity indicates that it subtends or homes on a given tandem, it becomes a confirmation that there is interconnection between the two entities. On a terminating basis, the homing tandem is considered the “last choice” for completing traffic destined for the switching entity.

Incorrect homing arrangements in BIRRDS may result in blocked calls destined for a switching entity. For example, if the BIRRDS data entries for a switching entity indicate that the switch homes on a particular local tandem when in fact it does not, the local tandem company will know, in all probability, how to route calls correctly, which originate from its own subscribers. Other companies, however, will route the calls to the local tandem in accordance with LERG Routing Guide entries. The local tandem may block the calls, if there is no connectivity between the local tandem and the terminating switching entity. Likewise, there may not be interconnection between the local tandem and a toll tandem owned by the same company. Once the calls reach the local tandem there is nowhere for the local tandem to terminate the traffic, and it will be blocked.

5.3.4 Routing Implementation

- *General*:
    - There are industry recommended minimum BIRRDS data entry time intervals for network activity that should be followed to minimize problems associated with call completion/call termination. The intervals are noted in ATIS-0300046, *Recommended Notification Procedures to Industry for Changes in Access Network Architecture* (there should be an understanding that interconnection arrangements and facilities need to be in place prior to activation of an NPA/NXX and other network changes involving interconnecting companies):
        - There are different minimum time intervals for various network changes that include activity associated with new or discontinued NPA/NXXs, tandem homing arrangements, office capability changes associated with a new or changed rate center, destination code changes, etc.
        - Not following the minimum time intervals may result in call completion failure.
        - Expedites for establishing a new NPA/NXX or modification/disconnect of an NPA/NXX may run the risk of inadequate time for other SPs impacted by the activity to reflect the activity in their networks.
- *External* (Industry Notification):
    - Switching information (End Office, Tandem homing arrangements) published in BIRRDS/LERG Routing Guide:
        - The BIRRDS/LERG Routing Guide information for routing traffic to a rural company is the appropriate source for parties terminating calls to rural companies to use to set up their routing. Providers intending to route non-local traffic to a rural carrier, which does not indicate a toll tandem, should direct their traffic as shown in the LERG Routing Guide. Parties should therefore keep their routing information updated in the LERG Routing Guide.
    - Parties are encouraged to ensure that their NPA/NXX and NPA/NXX-X assignments are published and maintained/updated in BIRRDS/LERG Routing Guide.
    - Some companies may not subscribe to the LERG Routing Guide, and may use alternate sources for obtaining data; however, they need to make sure they have current data populated in their switches.

  - SPs may use third party vendors for inputting their data into BIRRDS. If the SP is not its own Administrative Operating Company Number (AOCN), it will need to contract with a third party vendor to update NPA/NXX, NPA/NXX-X, and switch data into BIRRDS. Data entry should occur within seven calendar days of assignment by the National American Numbering Plan (NANPA) or pooling administrator per the ATIS Industry Numbering Committee (INC) COCAG and TBPAG.
  - To ensure that traffic is properly routed to rural carriers, parties should negotiate the appropriate agreements for traffic termination through the appropriate tandem.
  - Currently, there is no industry consensus for a requirement that the NPA/NXX or NPA/NXX-X serving switch record be populated to reflect the local exchange tandem homing arrangement(s) in BIRRDS/LERG Routing Guide. However, parties are encouraged to ensure that their information is correctly and completely populated in the LERG Routing Guide.

- *Internal* (Building Routing Instructions):
  - Obtain interconnection layouts for each office for which routing is being addressed.
  - Apply applicable routing as outlined above in this Clause, which includes routing to end offices, wireless offices, Point of Interface (POI)s, remotes, and tandems.
  - Pass routing information to routing translations personnel for implementation in the appropriate switching infrastructure.
  - Some originating companies, supported by appropriate interconnection agreements, may elect to implement alternate routes other than what is published in the LERG Routing Guide.

5.3.4.1 Considerations in the Code Routing Process

- Secure a reliable source for embedded base and code activity (e.g., NPAs, NPA/NXXs, NXXs) related to adds, deletes, or modifies (e.g., LERG Routing Guide).
- Identify codes (e.g., NPAs, NPA/NXXs, NXXs) that require routing/translations activity as a result of adds, deletes, or modifies.
- With appropriate trunking in place, identify/create the primary routing path, including overflow routes (in today's environment, these actions are typically automated processes).
- Considerations an SP should take into account when selecting a primary route:
  - Routing must be based on dialed digits.
  - Routing arrangements between originating office(s) and terminating office(s).
  - IntraLATA versus interLATA, if applicable.
  - Local calls should be routed as local calls.
  - Toll calls should be routed as toll calls.
  - Optional calling plans.
  - Signaling required on the terminating end (e.g., seven digits versus 10 digits).
  - Determine dialing patterns on number of digits that can be dialed on a given call.
  - Determine when dialed digits require digits to be deleted and/or prefixed.
- Additional Routing Considerations:
  - It is important to understand the LERG Routing Guide is the guide for ***local*** exchange routing and its core function is to indicate the terminating switch associated with an NPA/NXX and the tandem homing arrangements for that switch. The LERG Routing Guide does not provide end-to-end routing information. IXCs must, on their own, establish routes between originating offices and terminating local network as defined in the LERG Routing Guide. SPs generally create an automated tool for this function. There is no industry database of record for this information since it is considered proprietary.

- Not all originating SPs have direct connectivity to the terminating end offices to which given NPA/NXX codes are assigned or to the access tandems to which the terminating switch is homed on in the LERG Routing Guide. Additionally, originating SPs may opt to route through other providers due to various network conditions (for example, network congestion) to reach the terminating end office.
- Originating SPs, utilizing intermediaries, should internally maintain in their respective routing tables current NPA/NXX reachability information provided to them from each of their interconnected intermediaries denoting the details of each intermediary's coverage area and other aspects relevant to route selection. Reference Clause 6, *Management of Intermediate Providers*, of this Handbook for additional information.

5.3.4.2 Example #1 – Routing Ported Traffic – Intra LATA

Example #1 depicts how LNP is handled in an intraLATA network. This example is for illustrative purposes only and is not intended to represent all possible call paths, SPs, network components, technologies, etc. There can be variations as to which switch launches the LNP query dependent upon where a call originates, Point of Termination (POT), switch capabilities, etc. (e.g., interLATA versus intraLATA, interLATA EAS, end office versus tandem, etc.).

A Code Holder is the SP assigned an NPA/NXX code (NXX-A) record or a pooled NPA/NXX thousands block as shown in the LERG Routing Guide. The NXX-A Code Holder is responsible for default routing functions (e.g., vacant code treatment) associated with its own numbering resources and any unassigned block(s) in the pooled NPA/NXX codes where the SP is the Code Holder. More information on Code Holder responsibilities can be found in the INC COCAG and TBPAG (see *References* section).

An LRN is a unique 10-digit number assigned by a Code Holder. The Code Holder selects the switches in its own network that require an LRN(s). The Code Holder assigns an LRN(s) to each of the selected switches using an NXX-A record and associated thousands-blocks served by each of its individual terminating switches. Each switch is assigned an LRN(s) that uniquely identifies the homing arrangement(s) of the terminating switch of the ported number.

Using LNP processes for this intraLATA example, the dialed number (NPA-NXX_1-1234) is determined to be "ported" via a database dip that occurs in the call setup. The dialed number, NPA-NXX_1-1234 is "mapped" in the LNP database to the new SP's LRN of NPA-NXX_2-9999. The NPA-NXX_2-9999 LRN is processed through the call setup as if it was the called number and routed accordingly to/toward the new SP. The actual dialed number (NPA-NXX_1-1234) is stored in the Ported Number GAP of the IAM message being sent. At a point prior to completing the call, the stored dialed number (NPA-NXX_1-1234) in turn replaces the LRN and the call completes to the dialed number via the new SP's network.

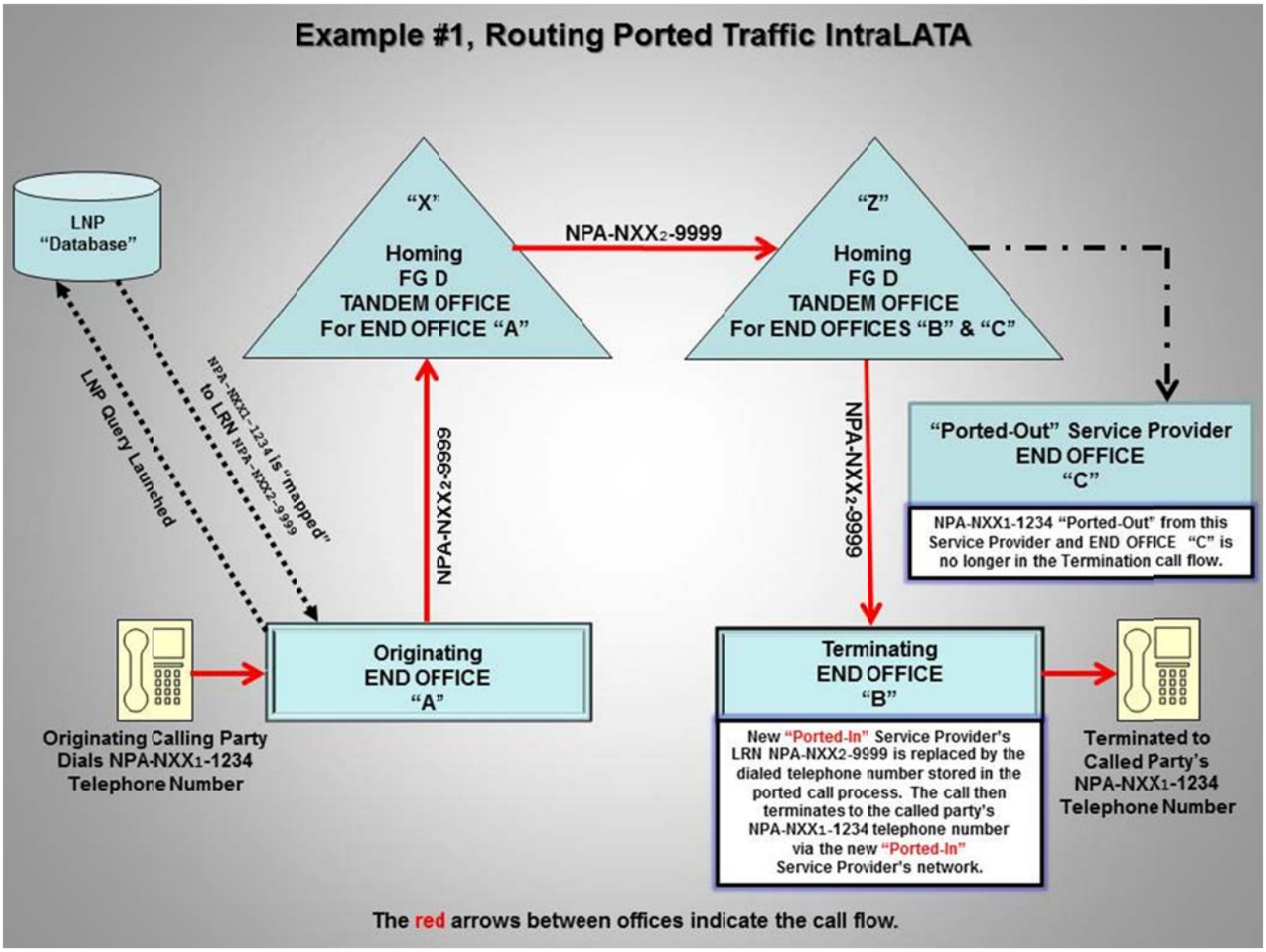

Figure 5.1 – Example #1: Routing Ported Traffic IntraLATA

5.3.5 Potential Call Failure Points

"Call failures" may occur at any point in the path a call takes, from the point of origination to the POT. In today's environment, a call may traverse multiple SPs, multiple switching entities, multiple LATAs, multiple technologies, etc. It has become commonplace for a call that originates from a TDM network, for instance, to terminate ultimately in an IP network and vice versa. Further, there are SPs who enter into contractual arrangements with other providers, sometimes referred to as intermediaries, to "carry" their traffic. The intermediary SPs may in turn, have contractual arrangements with other intermediary providers. Multiple technologies, SPs, etc., create a cascade effect in the network and generate more points of vulnerability.

SPs who are not constrained by LATA boundaries may not require the services of an IXC in the call flow process. Wireless SPs, when feasible, may elect to carry their originating traffic over their own backbone network to the point of completion for both intraLATA and interLATA calls.

A "call failure" may occur anywhere in the call path, beginning with the originating Calling Party dialing a TN, all the way to the call completion point.

5.3.5.1 Examples #2-#5 – Non-Ported Traffic – InterLATA

Although Examples #2-#5 depict non-ported scenarios, it should be noted that an LNP "Database" query is still performed, for ported and pooled areas, to determine whether or not a TN is ported or is affected by pooling.

Examples #2 and #3 show generic interLATA call flows for wireline and wireless originating calls, respectively, to a non-ported number.

Example #4 shows a more complicated routing scenario in which the IXC does not perform an LNP query on a call to a ported number.

Example #5 shows a case where the Calling Party's IXC makes use of multiple intermediate carriers.

These examples are for illustrative purposes only and are not intended to represent all possible call paths, SPs, network components, technologies, etc. Each of these examples depicts a "possible" call path.

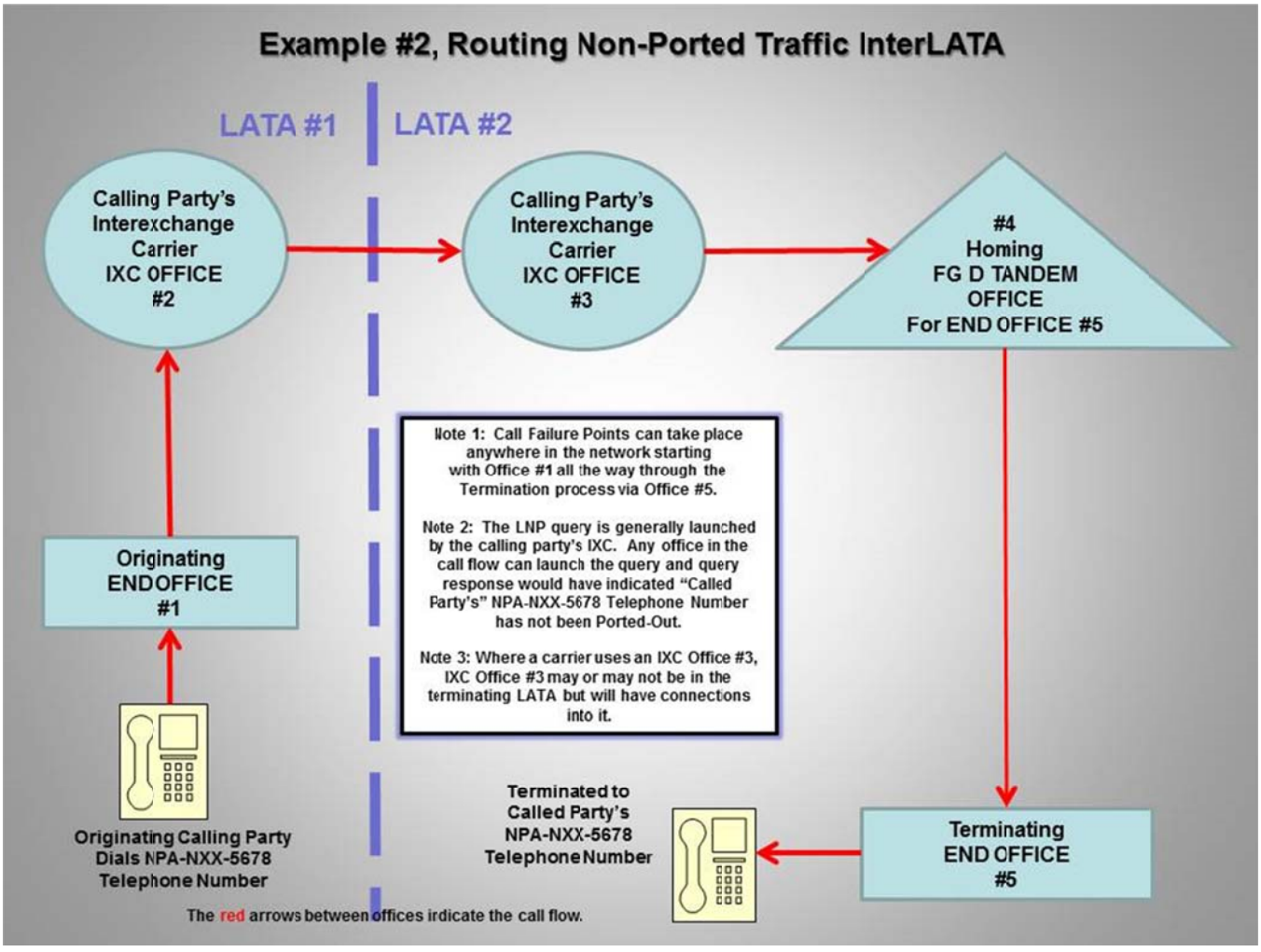

Figure 5.2 – Example #2: Routing Non-Ported InterLATA Traffic

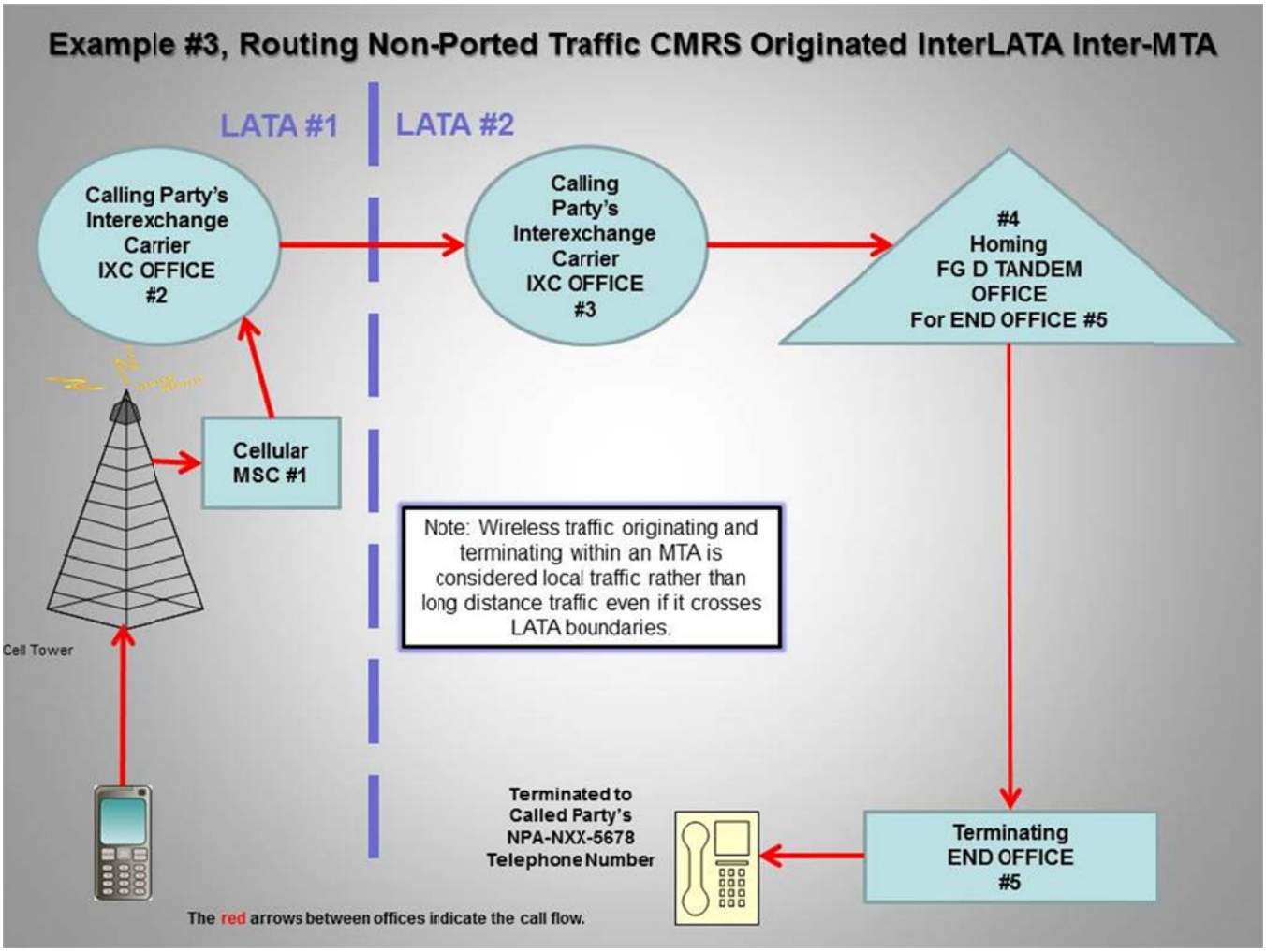

Figure 5.3 – Example #3: Routing Non-Ported Traffic CMRS Originated InterLATA Inter-MTA

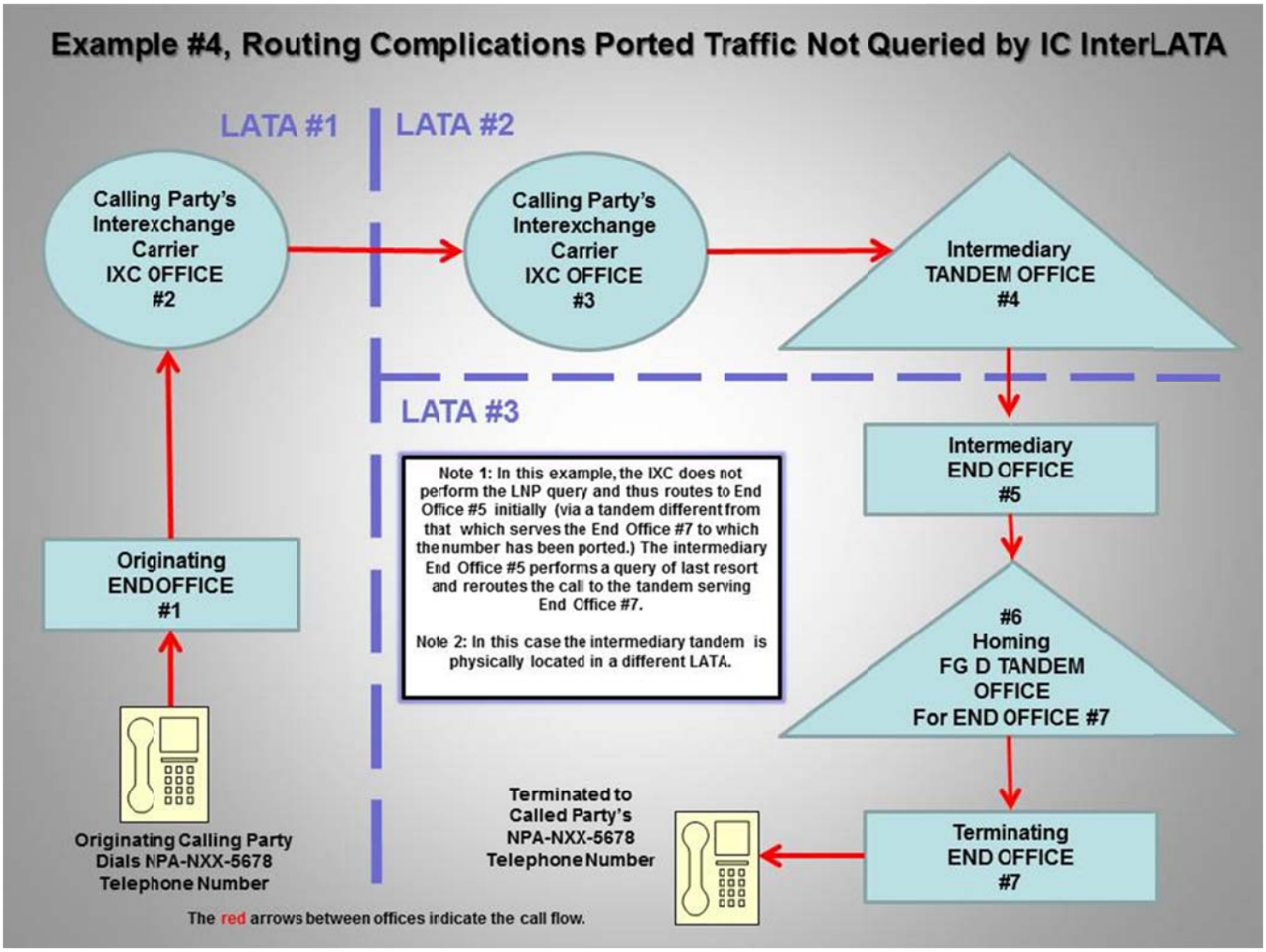

Figure 5.4 – Example #4: Routing Complications Example, Ported Traffic Not Queried by IXC

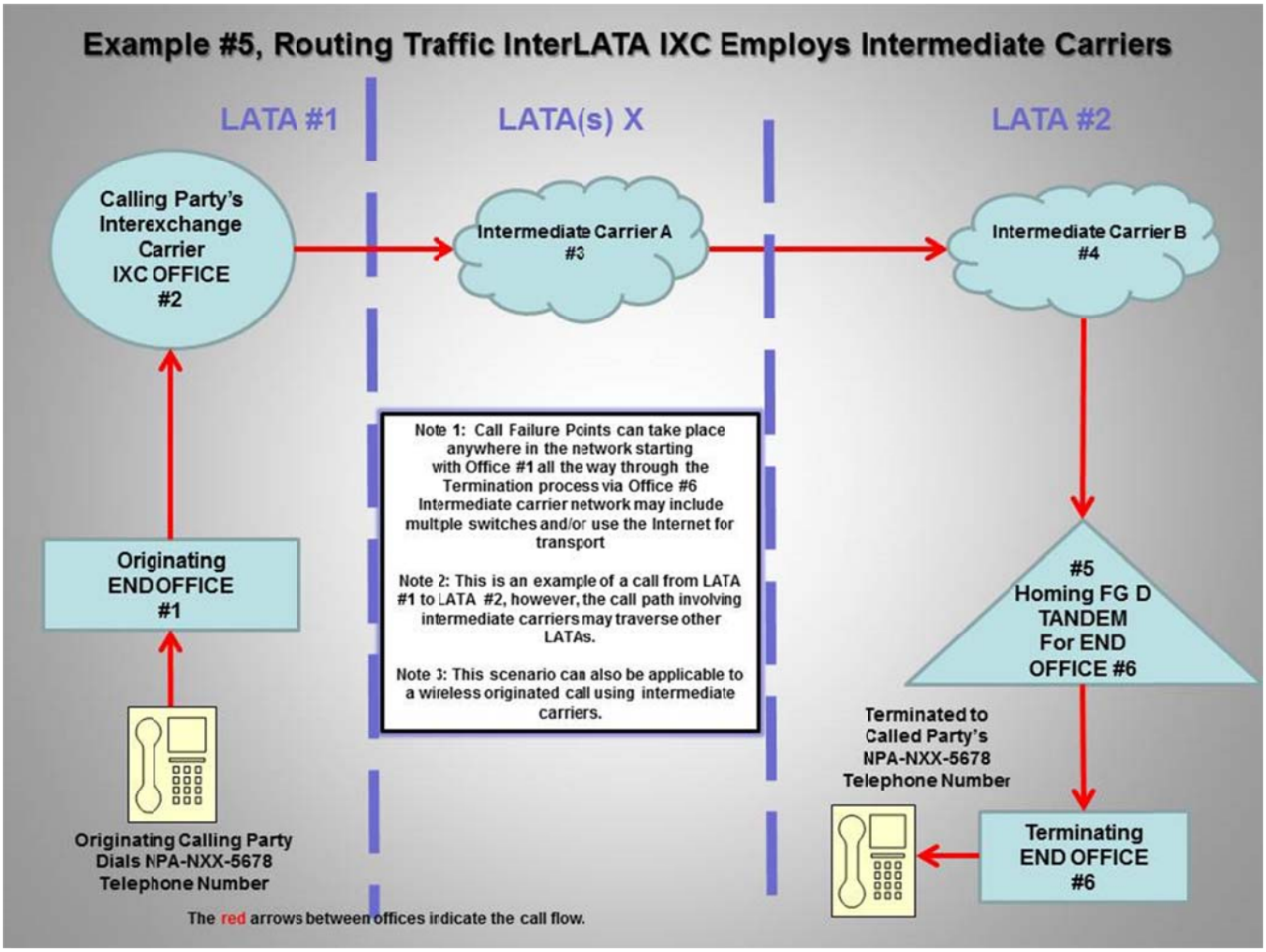

Figure 5.5 – Example #5: Routing Traffic InterLATA, IXC Employs Intermediate Carriers

5.3.5.2 Translations

Software translations direct the routing across the network (i.e., business/residence lines, trunks, switches, etc.). Software translations are input via automated or manual processes. Errors can be introduced into the network when translations are input incorrectly, resulting in calls being misrouted, call failures, etc.

5.3.5.3 Toll Free

Completion of toll free calls may be impacted by the call completion issues discussed in this handbook when a toll free number translates to a Plain Old Telephone Service (POTS) number.

In addition, toll free numbers involve the SMS/800 database and associated Signal Control Points (SCPs). Toll free number customers manage, through the Resp Orgs that update the SMS/800 database and in management of associated SCPs, the routing of toll free calls based on such factors as time of day, geographic attributes, etc. Therefore, reported problems in reaching a dialed toll free number may not be a POTS routing issue per se, but rather due to characteristics in how that number is established in the 800SMS database and SCPs, purposely or otherwise.

5.3.6 Looping

The diagram below is a basic example of call looping. Call looping may occur at any point in the call flow process after the call leaves the originating carrier's network.

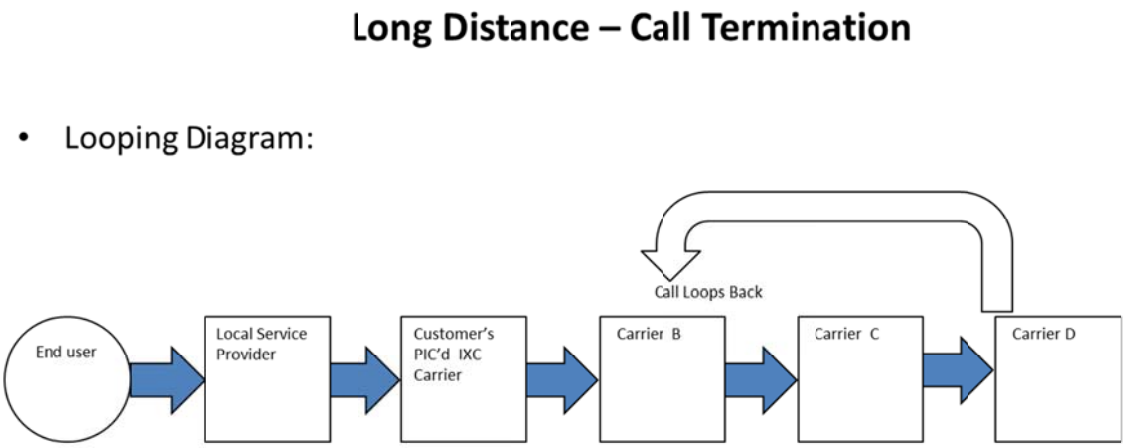

Figure 5.6 – Basic Example of Long Distance (LD) Call Looping

5.3.7 LNP Implications

Call completion/call termination issues may occur in some ported TN scenarios. In particular, when a native TN ports away from the native SP, and then at some point the TN is ported back to the native SP, the port should be completed via the "port to original" option in the NPAC. The port to original option allows for a coordinated snap back of the TN to the native SP so routing may be completed via the LERG Routing Guide, in lieu of an LRN. It has been reported that, where a native TN was ported back to the native switch via an LRN, instead of the port to original option it is possible for the N-1 carrier to not recognize the LRN as valid and create a "looping" or call failure scenario, thus preventing the call from properly terminating at the native SP's switch. Although failure to properly complete a call ported back to the Code Holder via an LRN represents a violation of LNP processing standards (ATIS-1000002, *Number Portability Switching Systems*), carriers are encouraged to use the port to original option. More information can be found in Clause 8.6, *LNP*, of this document.

5.4 Network Congestion

Typically network congestion results when traffic demand (customer call attempts) exceeds the capacity of the network, unless the network has already been degraded by some other physical situation. One standard in use in the industry is to manage to a P.01 Grade of Service. Managing to the P.01 Grade of Service may help reduce congestion-related call completion issues.

When very high calling volume occurs, the direct engineered route may overflow to the designed alternate routing path(s). Up to a point, this is normal and has been anticipated since the additional traffic that overflows the direct route takes advantage of the spare capacity in the network. However, if the calling pattern is severe and sustained (and left unchecked by either automatic or manual network management action), the designed robustness of the network then contributes to the spread of congestion throughout the network. This condition often results in lost calls.

A common cause of network congestion may be attributed to the mass calling generated by calling situations such as telemarketing, political campaigns, or Emergency Notification System (ENS) messages. Mass calling can initiate a high volume of traffic on a network over a relatively short duration. During this period of time, normal

network traffic patterns are disrupted and may result in network congestion. These situations may impact calls destined to all customers including those located in rural areas.

The following information applies to wireless/wireline and Next Generation Networks (NGN). Network congestion may be due to one or more of the following overload factors detailed in sections below.

5.4.1 Network Element Degradation

The performance of a network element may be negatively impacted due to a component failure caused by a hardware or software trouble. The loss of an element component may also limit the call handling capacity of the Network and contribute to Network Congestion.

- Switching systems.
- Facility systems.
- Signaling systems.
- Wireless systems.
- NGN systems (e.g., VoIP).
- Routing assignments.

5.4.2 Mass Calling

Customer complaints or trouble reports may be received when mass calling events, holiday call overloads, or peak day traffic patterns occur, preventing a call completion or termination. The customer generating the trouble report may not be aware of congestion events occurring in other areas of the country or in networks between point A and point B.

Networks are normally designed to accommodate average business day customer calling patterns. Peak day or holiday customer calling may result in network congestion; however, due to the regionalization of the traffic patterns, this type of mass calling is generally well-handled by network management techniques.

Mass calling scenarios generated by auto dialer devices may result in a focused overload on the network and may contribute to network congestion. Some auto dialer call types may concern/confuse customers who hear “dead air” or experience “abandoned call” situations as discussed below.

5.4.2.1 Auto Dialers

5.4.2.1.1 “Dead Air” or “Abandoned Call” Situations

Consumers experiencing “dead air” or an “abandoned call” may not be aware that they may be receiving a call generated by a type of auto dialer. When an auto dialer connects an answered call to a live agent, it is often called a predictive or power dialer, and uses real-time analysis to determine the optimal time to dial more numbers.

If someone answers but no agent is available within two seconds of the person's greeting, FCC regulations consider the call "abandoned" and require the dialer to play a recorded message. The FCC requires that predictive dialers abandon less than 3% of answered calls.

A “silent call” is a call generated by a predictive dialer that does not have an agent immediately available to handle the call. In this instance, the call may be terminated by the Calling Party, and the Called Party receives silence “dead air” or a tone from the SP indicating the call has been dropped.

In the United States, the Federal Trade Commission (FTC) uses the term "abandoned call" instead of “silent call” in its regulations applying to telemarketing. Abandoned calls in non-FTC contexts may refer to a caller who decides not to wait for an answer before hanging up.

Although there are FTC and FCC regulations and/or requirements; there is no means to ascertain if these requirements are followed by generators of auto dialed type calls, or even if consumers are aware that they are receiving auto dialer type calls.

Additional information on auto dialers is available in ATIS-0300105, *Next Generation Interconnection Interoperability Forum (NGIIF) Auto Dialers Reference Document*.

5.4.2.1.2 Failure to Receive Calls from Emergency Notification, Public Service, Political, or Other Type of Automated Announcement Systems

Consumers may generate customer complaints or trouble reports when they are aware of an automated announcement being sent out in their area and which they did not receive.

Emergency notification, public service, political, or other types of automated announcement system users may send out announcement calls at a rate greater than available network capacity in a given time period and subsequently not all calls will complete. There are additional factors that go into the determination of ENS call completion including, but not limited to: time of day, holidays, trunk capacity, host or remote switching configurations, traffic patterns, length of announcement, if the ENS call was originated locally or from another area traversing between multiple networks, completeness or accuracy of the calling system TN database, reaction of calling systems to answering machines, voice mail, no answer or busy line conditions, and consumers who may utilize call blocking or call selection type features that prevent receiving calls from unknown calling systems.

Terminating carriers may wish to identify entities that engage in this type of calling activity on a regular basis in their service territory, such as local school districts. The carrier may be able to work with the calling entity so that the calling activity is structured in a manner that reduces the likelihood for network congestion, for example, by spacing calls out to a greater degree; calling at different times, or rotating through called NPA-NXXs in a way that better distributes the calling load across the terminating carrier's network.

5.4.3 Fraud

Call completion may also be impacted by fraudulent activity in the network. Individuals or entities may purchase wireless service and use the associated subscriber identity module (SIM) cards together in devices through which they offer to terminate LD traffic by re-originating it as wireless calls. The concentration of wireless calls originating within a cell site area may congest the wireless network, resulting in poor call completion for the traffic offered to the vendors using the SIM boxes. As this usage violates wireless terms of service, carriers will shut the associated service down, but not necessarily before congestion-induced blocking occurs. Even after shutdown, calls may continue to route to the entity that had set up the SIM box and engender call completion problems.

Wireline-based fraud schemes also exist and likewise impact call completion when their turndown takes out routes that carriers may have unwittingly counted on.

Terminating carriers and wireless providers may want to explore ways of detecting such potential fraud schemes, for example, by looking at calling patterns from their retail customers that might be indicative of fraud.

5.4.4 Force Majeure & Disasters

The performance of a network may also be negatively impacted by a disaster. These events not only cause physical damage to a network, but also compound the situation by also generating excessive customer calling attempts:

- Weather.
- Earthquake.
- Volcanic eruption.
- Solar activity.
- Fire, flooding, etc.
- Terrorism.

5.4.5 Human-Related Issues

Human-related issues are another area that have the opportunity to not only cause physical damage to a network, but also exacerbate the situation by generating excessive customer calling attempts leading to network congestion. Examples of these issues can include: accidents and human error (.e.g, planning or forecasting miscalculations).

5.4.6 Traffic Pumping & Access Stimulation

Access stimulation occurs when a LEC with high switched access rates enters into an arrangement with a provider of high call volume operations such as chat lines, adult entertainment calls, and "free" conference calls. The arrangement inflates or stimulates the access minutes terminated to the LEC, and the LEC then shares a portion of the increased access revenues resulting from the increased demand with the "free" SP, or offers some other benefit to the "free" SP (¶656 of the *Universal Service Fund (USF)/Intercarrier Compensation (ICC) Reform Report and Order*).

One condition of access stimulation is when a LEC has had a greater than 100% increase in interstate originating and/or terminating switched access Minutes of Use (MOU) in a month compared to the same month in the preceding year (¶667 of the *USF/ICC Reform Order*). Such a sudden increase in traffic could cause network congestion if trunk groups are not properly sized for this volume of traffic. At least initially, until such time trunks can be augmented and/or some of the traffic rerouted, this network congestion may result in call completion/call termination issues.

6 Management of Intermediate Providers

Some carriers have suggested that reported call completion/call termination problems involve the use of intermediate providers, so-called "least cost routers", by the carriers that actually have the retail LD relationship with the Calling Party. Least cost routing has been used in the industry for many years, including by rural carriers. As a result of this experience, carriers have developed ways to effectively manage intermediate providers. This section identifies best practices for management of intermediate provider networks.

6.1 Contractual Arrangements

The responsibilities of intermediate providers pertinent to call completion/call termination can be defined in an agreement between the SP and the intermediate provider with which it contracts. This contractual arrangement between the SP and the intermediate provider may determine and specify procedures for testing, updating, implementing, and maintaining the geographic area(s) and/or NPA/NXXs for which a given intermediate provider has the responsibility for completing calls to the appropriate end destination. Terms and conditions in the contract can also define acceptable service levels and the SP can ensure the intermediate provider complies with the performance expectations and hold the intermediate provider accountable for its performance. Should the intermediate provider not be performing at the agreed upon service level, appropriate action can be taken as defined in the contract and/or agreed to by the parties. Such actions could include, but are not limited to, temporarily or permanently removing the intermediate provider from the routing path.

6.2 Manage the Number & Identity of Intermediate Providers

As the number of providers handling a call increases, there is the potential for lengthier call setup delay and other impairments. Troubleshooting may also prove more difficult. Some carriers have found it useful to limit intermediate providers to include no more than one additional provider (not including the terminating carrier) in the call. Some carriers have also found it useful to insist on transparency with respect to who is handling their traffic. Intermediate providers may be required through contractual arrangements to disclose the identity of any additional underlying carriers that they use either in advance or as part of call completion troubleshooting and investigation. If SPs are aware of which downstream SPs are involved in handling their traffic, they can perform due diligence and possibly better manage call completion issues.

6.3 Management of Direct & Indirect Looping

There may be cases where an intermediate provider may purchase wholesale service from the IXC that is initially handing off the call to the intermediate provider. This behavior may result in looping as well as adding delay and other impairments in the call setup. Effective network management, such as frequent review of routing tables, can help identify this issue and all SPs involved should then work to eliminate the issue.

6.4 Crank-Back on Failure to Find a Route

If an intermediate provider cannot find a route to the termination, it should not drop the call but should release the call back to the original IXC in a manner that allows the IXC to attempt to complete the call over its own facilities.

6.5 Maintain Sufficient Direct Termination Capacity

In conjunction with crank-back, it is important for the original IXC to maintain sufficient termination facilities that it can complete its own traffic when an intermediate provider cannot complete the call. Following are two reasons why this is important:

- Given the cost challenges faced by intermediate providers to maintain a lean network and the aggregation of loads from multiple IXCs they must handle, there is a greater chance that, on a moment-to-moment basis, they will not have capacity to complete a call.
- Maintaining its own termination capacity gives an IXC flexibility to quickly stop using an intermediate provider should performance problems develop.

6.6 Do Not Terminate & Re-Originate Calls

Intermediate providers should not process calls so as to terminate and re-originate them. Doing so may affect both the signaling information delivered to the called network/party and the likelihood of successful completion. Additionally, if termination/re-origination results in sending an answer indication back to the original IXC before the final Called Party answers, the caller may receive a ringing indication well before the Called Party is alerted, which should not happen until the terminating provider has signaled that the Called Party is being alerted to an incoming call.

6.7 Direct Measures of Quality

IXCs need to establish Direct Measures of Quality (DMoQs) for their vendors to meet and need to require vendors to report on these metrics. IXCs also need to monitor these DMoQs directly. The following table provides some metrics that have been found useful.

Table 6.1 – Examples of Direct Measures of Quality Metrics

Call Completion	Voice Quality	FAX	Voiceband Data
Call Completion Rate	One-way voice path delay	Echo Cancellation	Support of Low Baud Rate Modems, i.e., Telecommunications Devices for the Deaf (TDD) and Packet over SONET (POS)
Call Cut-Off Rate	Echo Cancellation	Packet Loss	V.90 modem performance
Post Dial Delay	Mean Opinion Score	Completion Rate	V.34 modem performance
Post Answer Delay	Loss	Error-Free Pages	Echo Cancellation
	Idle Channel Noise	Percentage of pages sent at top speed for completed transmissions	Signal to C-Notched Noise Ratio
	Signal to C-Notched Noise Ratio		Phase Jitter
	Crosstalk		Envelop Delay Distortion
	Clipping		Signal to Total Distortion
			Intermodulation Distortion
	Signal to Total Distortion		Frequency Shift
			Phase Hits
			Dropouts
			Impulse Noise

6.8 Do Not Manipulate Signaling

Intermediate providers should not manipulate signaling information, especially the CPN, so as to obscure proper jurisdiction for settlements, such as through inappropriate out of country routing. Also, intermediate providers must pass the signaling information from downstream carriers on the terminating side, unaltered, to originating providers in the call path indicating the terminating provider is alerting the called party. Additional information can be found in Clause 8, *Regulatory Environment*.

6.9 Inheritance of Restrictions

Where an intermediate provider makes use of an additional intermediate provider to reach the terminating carrier, the first intermediate provider contracting with the IXC should in turn manage the intermediate provider to the same standards required by the original IXC.

6.10 Intercarrier Process Requirements

Maintenance responsibilities for the service, including contact points and escalation lists, should be defined in advance. Expectations for repair times, status reporting intervals, and trouble ticket handling procedures should also be agreed to as part of the contacting process.

6.11 Require Acceptance Testing

Before offering live traffic to an intermediate provider, an IXC should conduct acceptance testing with the intermediate provider to ensure compliance with call processing requirements and DMoQs.

7 Trouble Reporting & Contact Directories

This section provides information on trouble reporting and the ATIS NGIIF Service Provider Contact Directory (SPCD) which includes IXC carrier-to-carrier contacts. Among other things, this section lays out trouble reporting responsibilities of carriers that provide originating or terminating access for LD calls and their local service customers, the IXCs.

Rural LECs have pointed out the difficulties involved in resolving troubles that largely present themselves in the form of calls that do not reach their customers or even their networks. Effective trouble isolation depends on identifying the carrier(s) that actually handle a given call. Originating callers' LD traffic may not be handled by or through their local SP or its affiliate, and where callers are PIC'd to an independent entity, the originating local SP may be restricted from providing that information to a terminating LEC reporting a completion issue. The terminating LEC may need the wireline originating caller to confirm their IXC carrier by dialing 700-555-4141 from the calling TN or identifying that they used any other means to complete the call (e.g., dial-around, calling card, or some other means). Once the carrier with responsibility for the call has been identified, the reporting and sectionalization processes can be invoked to achieve a resolution.

It is imperative that a case of trouble be reported at the time or near the time when the trouble call occurs. It is recommended that all SPs accept a trouble report at least up to 72 hours from the time of the call in question. Delays in reporting a case of trouble degrades the ability of the carrier to identify, isolate, and investigate the cause of the trouble reported. Untimely trouble reporting can result in confusion and delays due to network interconnections and routing tables that have since changed, retention periods for trouble logs may have passed, etc., thus the ability to duplicate the specific trouble situation may no longer be possible. These are just a few examples of why it is important to place a trouble report after the problem occurs to enable the carrier to successfully investigate the case of trouble. Collaboration is important; also key is promptly involving all parties in the call path to investigate and resolve the issue.

The NGIIF has multiple documents addressing trouble detection, reporting, management, and more, for different aspects of telecommunications. Such documents include:

- ATIS-0300009, *NGIIF Reference Document Part I- Installation and Maintenance Responsibilities for Special Access Services, WATS Access Lines, and Switched Access Services Feature Group "A"*.
- ATIS-0300010, *NGIIF Reference Document Part II- Installation and Maintenance Responsibilities for Switched Access Services Feature Groups "B," "C," and "D"*.
- ATIS-0300011, *NGIIF Reference Document Part III - Installation and Maintenance Responsibilities for SS7 Links and Trunks*.
- ATIS-0300030, *NGIIF Reference Document Part IX- Installation, Testing, and Maintenance Responsibilities for Facilities*.
- ATIS-0300032, *Next Generation Interconnection Interoperability (NGIIF) Reference Document: Part X, Interconnection Between LECS Operations Handbook – Local Interconnection Service Arrangement*.
- ATIS-0300035, *NGIIF Reference Document Part XII- Toll Free Industry Test Plan*.
- ATIS-0300082, *Guidelines for Reporting Local Number Portability Troubles in a Multiple Service Provider Environment*.

The following series of documents cover aspects of SS7:

- ATIS-0300011, *NGIIF Reference Document Part III - Installation and Maintenance Responsibilities for SS7 Links and Trunks*.
- ATIS-0300012, *NGIIF Reference Document Part III- Attachment A- MTP Compatibility Tests*.

- ATIS-0300013, *NGIIF Reference Document Part III- Attachment B- ISUP Compatibility Tests*.
- ATIS-0300014, *NGIIF Reference Document Part III- Attachment C- SCCP Protocol Class 0 Compatibility Tests*.
- ATIS-0300015, *NGIIF Reference Document Part III- Attachment D- Test Severity Analysis Criteria*.
- ATIS-0300016, *NGIIF Reference Document Part III- Attachment E- SS7 Network Gateway Screening*.
- ATIS-0300017, *NGIIF Reference Document Part III- Attachment F- SS7 ISUP Tests for ISDN Network Interconnection*.
- ATIS-0300018, *NGIIF Reference Document Part III- Attachment G- SS7 Link Diversity Validation Guidelines*.
- ATIS-0300020, *NGIIF Reference Document Part III- Attachment I- SS7 Security Base Guidelines*.
- ATIS-0300021, *NGIIF Reference Document Part III- Attachment J- SS7 Software Validation*.
- ATIS-0300022, *NGIIF Reference Document Part III- Attachment K- Dual STP Failure Prevention Procedures*.
- ATIS-0300023, *NGIIF Reference Document Part IV- Installation and Maintenance Responsibilities for X.75 Gateway Services*.

There are common aspects of trouble detection, reporting, and management which have been captured in Clause 6.1.

7.1 Trouble Reporting

It is recommended that non-circuit-specific troubles be reported immediately in order to facilitate the rapid restoral of service.

Each company will provide contact information for customer trouble reporting.

Existing trouble handling procedures for interexchange calls focus on the case where a trouble is reported by calling customers to their carrier and where there is a direct connection between the IXC and the terminating local SP. In many of the scenarios of concern in this document, the party reporting trouble is a Called Party who has failed to receive a call. If the Calling Party can be induced to report the trouble to their IXC[50], normal procedures can be used to resolve the issue. Where this is not possible, the Called Party's local SP will seek to contact the carrier they believe to be the Calling Party's serving IXC[51]. Except by report of the Calling Party directly or, as reported by the Calling Party to the Called Party, the terminating SP will not be able to identify the responsible IXC directly. Instead, it may determine the caller's local SP and contact it. Where the local SP is also the Calling Party's LD provider, the trouble can be addressed by the LD entity on behalf of the Calling Party. If the terminating carrier tries to report the issue over the normal LD repair line of the presumed IXC, the trouble may not be accepted, because industry guidelines expect each carrier to only work troubles reported by their customer.

If the report is made by a separate carrier-to-carrier channel, which some IXCs have set up in response to the RCC situation, and the caller's local SP also happens to be the caller's IXC as well, the IXC may be able to address the problem, although CPNI restrictions may prevent the IXC from working the trouble without first contacting their customer and obtaining permission. Customer Proprietary Network Information (CPNI) restrictions may also prevent sharing full details of resolution with the Called Party's carrier. Where the caller's local SP is not the caller's IXC, CPNI restrictions will prevent the caller's local SP from revealing the PIC'd IXC's identity. It is possible that changes/clarifications to CPNI rules would facilitate the helpful sharing of information between carriers related to trouble resolution.

[50] To confirm the identity of their IXC, the Calling Party should dial 1-700-555-4141 for wireline originations.

[51] Carriers should contact the appropriate IXC via the NGIIF's SPCD.

Carriers are responsible for the acceptance of trouble reports from their end user. The carrier accepting and responsible for the case of trouble should first test to determine if a trouble is in their network. If the trouble is found in their network, the responsible carrier will clear the trouble and no referral to other carriers is necessary. If the trouble is sectionalized by the responsible carrier towards another carrier, then the trouble report will be referred to that receiving carrier. The receiving carrier will clear the trouble or will work cooperatively with any other carriers to sectionalize the trouble where necessary.

The following information should be exchanged when handing off or referring the trouble:

- Trouble report number or equivalent;
- Contact TN;
- Contact ID (i.e., name or initials);
- Time and date report was received from the responsible carrier;
- Responsible carrier testing information (If requested by any receiving carrier(s);
- Circuit ID [41-Character Common Language® Message Trunk Circuit Codes (CLCI™ MSG Code)];
- Non-circuit specific (Circuit ID may not be appropriate);
- Trouble reported;
- Other information that may be of assistance (e.g., history, subsequent reports); and
- Dispatch authorization.

7.1.1 Trouble Reporting Detection Responsibilities & Processes

Clause 7.1 provides operation personnel of interconnecting carriers with guidelines for trouble reporting; however, it does not replace or supersede any tariffs, contracts, or other legally binding documents. In case of conflict between this document and any legally binding document, such other document will prevail.

7.1.2 Responsibilities

Carriers receiving a trouble report have the following baseline responsibilities when investigating their trouble report with other carriers.

7.1.2.1 Carriers Generating Trouble Reports

- Provide trained personnel;
- Advise the relevant carriers when there is a potential service-affecting network failure;
- Provide contact information for trouble reporting;
- Maintain complete and accurate installation and repair records;
- Provide access to test lines where appropriate;
- Accept trouble reports from their end users;
- Accept trouble reports from other carriers;
- Ensure the test equipment used is compatible with the other relevant carrier’s test equipment;
- Assume control functions for maintenance of its trunk(s);
- Consult with other relevant carriers before requesting any changes, except under emergency conditions;
- Sectionalize and clear any trouble in its own network;

- Test cooperatively with other relevant carriers to identify and clear a trouble, when the trouble has been sectionalized to a network;
- Keep their end user advised of the status of all trouble report(s);
- Perform cooperative analysis to determine if a trouble pattern exists;
- Refer troubles to other carriers using the trouble reporting procedures;
- Dispatch its own maintenance forces;
- Perform verification tests to ensure that trouble has been cleared;
- Participate cooperatively with other carriers to further isolate and clear the trouble when trouble exists and cannot be sectionalized to a particular carrier portion; and
- Where it is technically feasible, signaling for all internetwork calls to a 10-digit TN should always be sent or received using 10-digits for the Called Party number, independent of how the call is dialed.

7.1.2.2 Carriers Receiving Trouble Reports

- Provide trained personnel;
- Advise the relevant carriers when there is a potential service affecting network failure;
- Provide contact information for trouble reporting;
- Maintain complete and accurate installation and repair records;
- Consult with other relevant carriers before requesting any changes, except under emergency conditions;
- Provide access to test lines where appropriate;
- Notify the receiving carrier of any changes affecting the service requested, including the service due date;
- Accept trouble reports from carriers generating trouble reports;
- Sectionalize and clear any trouble in its own network;
- Test cooperatively with other relevant carriers to identify and clear a trouble when the trouble has been sectionalized to the other carrier's network;
- Perform cooperative analysis to determine if a trouble pattern exists;
- Refer troubles to other relevant carriers using the trouble reporting procedures;
- Dispatch its own maintenance forces;
- Perform verification tests to ensure that trouble has been cleared;
- Participate cooperatively with other carriers to further isolate and clear the trouble when trouble exists and cannot be sectionalized to a particular carrier portion; and
- Provide status reports to the carrier who generated the trouble report.

7.1.2.3 CPNI

CPNI must be protected as carriers work cooperatively to resolve trouble reports related to call completion/call termination. Refer to Clause 8.5 for further explanation of CPNI.

7.1.2.4 Sectionalization

Sectionalization is a joint responsibility of the carriers, with control for sectionalization under the direction of the carrier that generated the trouble report. It is anticipated that sectionalization may involve cooperative testing; both entities are expected to participate in this activity when requested.

7.1.2.5 Non-Trunk Specific Troubles

Non-trunk specific troubles are those that are not directly attributable to a given trunk. Non-trunk specific troubles generally fall into the following categories:

- Reorder;
- No ring;
- Wrong number or misdirected;
- Transmission impairment;
- Cut-off;
- No answer supervision; and
- Other.

When the non-trunk specific trouble has been detected and sectionalized, the trouble report will be referred to the appropriate company's trouble reporting center or equivalent.

7.1.2.6 Trouble Report Clearing Information

When the trouble has been cleared by either carrier, the trouble report will be closed out with the originating company and generic status information will be updated bearing in mind CPNI rules.

7.2 End-To-End/Intercarrier Testing

Circuit networks comprising carrier services may experience trouble conditions that cannot be isolated by each carrier testing and maintaining its own services. Although the call delivery provided by each carrier may show in each carrier's respective network as performing properly, trouble may be identifiable on an end-to-end test, i.e., from origination to termination of the call. In such cases, the carrier generating the trouble report may require coordinated intercarrier testing.

7.2.1 Use of Test Lines for Call Completion Trouble Resolution

One way in which terminating SPs may be able to expedite trouble resolution, in cases where the trouble has been reported by the called rather than the Calling Party, is to provide a test line number for the destination end office in their trouble report. As discussed in Clause 7.1.2.3, CPNI issues can complicate working troubles in the called-party-complains scenario. An IXC can call a test line without involving its customer. Moreover, a test line call will eliminate any issues that may be specific to the Called Party's access and CPE arrangements.

As a best practice, per the following NGIIF Guidelines, SPs should publish test numbers associated with specific NPA/NXX in the LERG Routing Guide, so that originating carriers can make test calls to test call quality proactively and to test when any customer or carrier refers a call quality issue to the originating provider. Without such capability, the originating provider can only test its portion of the network and must rely upon the third party IXC to test its portion of the network that may be involved in the call flow.

- From NGIIF Guideline ATIS-0300024*, NGIIF Reference Document Part V- Test Line Guidelines*: All telecommunications companies (wireline, cable, IP, wireless etc.) applying to the NANPA administrator and receiving a new NPA/NXX or Thousands block(s) are expected to follow testing procedures as Code Holder. More information can be found in the full Guideline.
- From NGIIF Guideline ATIS-0300024: The company opening a new NPA/NXX shall establish a working test number for call through purposes. The test number shall be established for a minimum period of 180 days. More information can be found in the full Guideline.

7.2.2 Types of End-to-End/Intercarrier Testing

RCC best practices may include end-to-end/intercarrier testing. This testing for call completion can include manual testing, automated testing, or a combination of both manual and automated to resolve the RCC issue(s).

7.2.2.1 Manual Testing

Manual test calls may be required to properly isolate and investigate the issue, and could include any or all of the following steps, depending on the scope and nature of information observed and identified during trouble reporting.

- Coordinated Intercarrier testing may include two or more of the SPs involved in the end-to-end call path.
    - Originating carrier.
    - IXC, if different from the originating carrier.
    - Tandem provider.
    - Intermediate Provider(s)[52].
    - Terminating carrier (i.e., Rural LEC).
- Use of applicable signaling call trace methods/equipment.
    - To monitor the exchange of signaling information in real time.
    - To confirm signaling messages are coming from all downstream SP(s).
- As a result of manual testing, SPs may find it necessary to confirm the following:
    - Correct routing arrangements;
    - Trunk groups are augmented for appropriate level of capacity; and
    - Network translations are properly configured.

Any issues found during manual testing should be promptly corrected and the call path retested until all parties involved conclude no trouble is found and the call(s) completes properly.

7.2.2.2 Automated Testing

Best practices for automated testing LD call completion to Rural OCNs include utilizing existing data sets and call review processes as well as internal testing resources.

Call Detail Records (CDRs), routing tables, and daily traffic information provide a baseline on which providers can build automated algorithms, and internal analysis tools, to determine OCNs and routes which could have cause for investigation. This can be done by applying specific system coding, designed for selecting components of call paths where network performance could be impacted due to network traffic, and which may have effects on NER, and ASR – the FCC designated primary statistics. The provider's internal analysis tool can then filter trouble tickets into the provider's normal trouble ticketing system for normal trouble ticket processes to be applied against. Technicians then have the CDR details, routing information, timing of the issues and information to troubleshoot and test, in order to determine the cause of the issue. Specific manual (or automated) testing can then be done using established milliwatt test line numbers to call route destinations.

It is expected that when this is done daily, that over a month's period of time several OCNs will be tested, including (as programmed up front) testing areas with negative spikes. This approach to daily, routine, automated analysis, and testing provides a reliable and controlled process, and delivers targeted, statistically correct, fixed testing, using established processes, in a near real time approach, to address the network performance.

[52] As defined in 47 C.F.R. § 64.1600(f).

7.3 Call Setup Time Trouble Reporting & Sectionalization

ATIS-0300010 defines installation and maintenance responsibilities of LECs providing switched access service [Access Service Providers (ASPs)] and IXCs obtaining switched access service from them [Access Service Customers (ASCs)]. The ASP and ASC terms used in this section are the same as in ATIS-0300010. The document thus focuses on situations in which IXCs and LECS are directly connected. However, Intermediate Providers may also be customers of ASPs. Further, in many problem cases calls may not even reach the terminating ASP, yet it is the ASP's customers who are initiating the trouble reports. ATIS-0300010 nonetheless clarifies the IXC's responsibilities in and procedures for resolving end-to-end troubles such as overlong post dial delay.

- ASC: The ASC has the overall installation and maintenance responsibility for the total service to its end user. It is responsible for the overall coordination of installation and testing of its services.
- ASP: The ASP is responsible for ensuring that the Switched Access Services (SAS) furnished to an ASC are installed and function properly. In addition, the ASP should work cooperatively with the ASC in the acceptance testing of the SAS it provides.

Where the ASC is unable to perform cooperative testing at its POT, the ASP will provide test results from the nearest ASP test access point, toward the ASC's POT. An Access Service Provider Coordinator (ASPC) will perform the control function for the installation of Feature Group (FG) B, C, and D SAS provided to the ASCs.

End user reported troubles of excessive call setup time, for interLATA FG-D originating and/or interLATA FG B/D terminating will be analyzed by the ASC. If the ASP receives a call setup time trouble from an end user for an interLATA call(s), the end user will be referred to the ASC.

NOTE: See flowchart – Figure 7.1- CST Testing Methodology.

Upon receiving a call setup time trouble report, the ASC will obtain specific information from the end user to aid in the trouble analysis process. The dialogue should include, but is not limited to, the following questions:

- Type of CPE, etc.;
- Type of access (e.g., 101XXXX, DDD);
- Directionality of the call(s) on which trouble was reported;
- Calling and called TN;
- Time of day the reported problem is experienced;
- End user's estimation of call setup time; and
- Any other pertinent information that can be supplied by the end user.

Contributing factors to call setup time troubles could include:

- Manual/auto dialing;
- Customer call forwarding options;
- Private Branch eXchange (PBX) equipment; and
- Dial repeating tie lines.

The ASC is responsible for sectionalizing the call setup time trouble to the:

- Terminating CPE;
- Terminating ASP;
- ASC network;
- Originating ASP; and
- Originating CPE.

Should the sectionalization/analysis require that a test call(s) be made, it is recommended that the test call be made to the 102 type test line. Testing to a 105 type test line may distort the intended call setup time results.

Originating ASP and/or ASC test calls to the ASC's first point of switching should be placed to 1-700-958-1102 or 1-700-959-1020 as appropriate (see Figures 7.2 and 7.3).

Access performance limits have been established based on the information contained in the Local Switching System Generic Requirements (LSSGR) [see GR-317-CORE, *Lssgr: Switching System Generic Requirements For Call Control Using The Integrated Services Digital Network User Part (isdnup)* and GR-394-CORE, *Lssgr: Switching System Generic Requirements For Interexchange Carrier Interconnection (ici) Using The Integrated Services Digital Network User Part (isdnup)*] and other performance criteria, to aid in the isolation of any suspected trouble associated with call setup time. The ASC should specifically identify any parameters that have been exceeded when referring the trouble.

The ASP will accept a trouble report from the ASC when sectionalized to the ASP's network. The trouble report should include, but is not to be limited to, the following information:

- ASC determined ASP call setup time;
- Call direction;
- FG B-D;
- Direct versus tandem routing;
- End Office Common Language Location Code (CLLI™); and
- Test line TN used.

Upon receipt of the trouble report from the ASC, the ASP will initiate its own analysis and treat the report as an impaired trunk report. This analysis will include the following components as necessary:

- *Pattern analysis* – the process of analyzing known information to determine particular scenarios where certain events are repeated.
- *Translations verification* – particularly trunk group routing, timing, and overlap outpulsing operation.
- *Placing of test calls* – including those identified in Figures 7.2 and 7.3. A description of those tests follows:
    - The ASP places a call from the line side of the originating end office to a 102 test line in the ASC Switch (first point of switching in the ASC Network). It is recommended that dialing 1-700-958-1102 or 1-700-959-1020 as appropriate to access the ASC 102 test line.

NOTE: See Call Setup Time: 7.2 – Originating Test Procedures.

    - The ASC places a call from a test access point in the last point of switching in the ASC network to the 102 test line in the terminating ASP end office. Terminating ASC-ASP test calls should be placed to 7-digit directory number of the end office 102 test line.

NOTE: See Call Setup Time: Figure 7.3 – Terminating Test Procedures.

If the ASP determines there is a problem in its network, it will exercise diligence in repairing the out-of-limits parameters. If the trouble cannot be found in the ASP's network, this information will be communicated to the ASC. If the ASC and ASP agree there appears to be no call setup time problem, the ASC will discuss this with the end user. If the end user is still encountering a call setup time trouble, further analysis/joint testing may be conducted between the ASC and ASP.

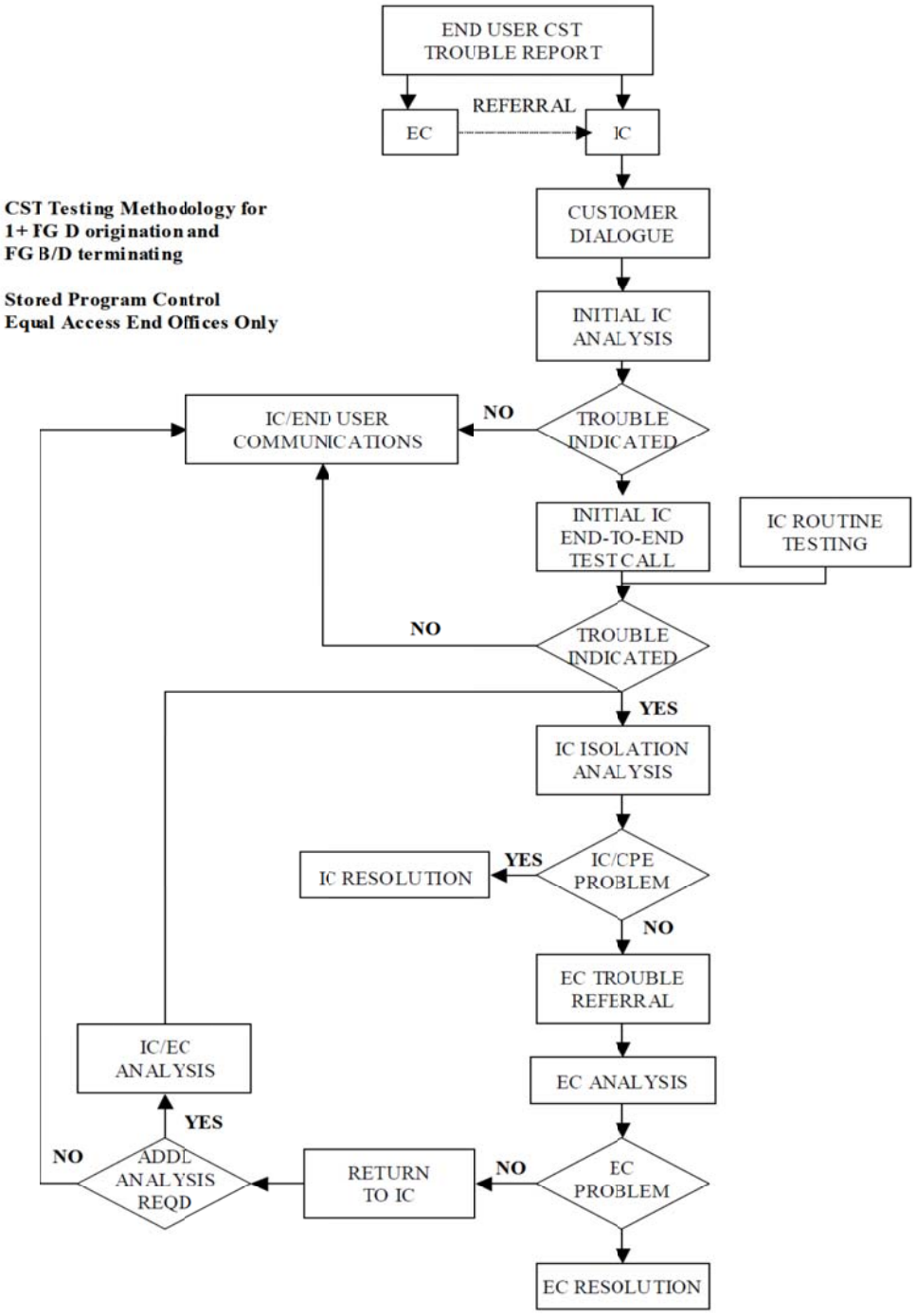

Figure 7.1 – CST Testing Methodology

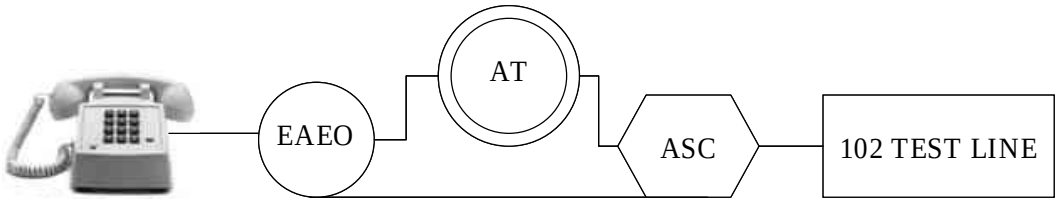

Figure 7.2 – Call Setup Time

7.3.1 Originating Test Procedure

1. Place call from line side of originating end office to 102 test line in ASC switch. It is recommended that the ASC 102 test line be accessed by dialing 1-700-958-1102 or 1-700-959-1020, as appropriate.
2. Time stamp:
   - Start at end of last digit dialed.
   - Stop at network response.

   This may be accomplished with personal computer, stopwatch, or other test equipment, as available.

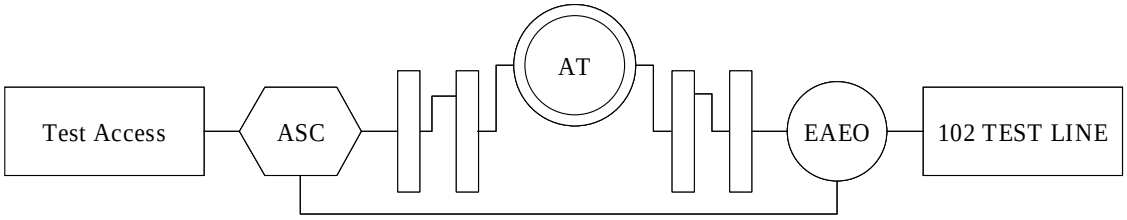

Figure 7.3 – Call Setup Time

7.3.2 Terminating Test Procedures

1. Place call from Test Access in the ASC switch to 102 test line in EO:
2. Time stamp:
   - Start at ASP trunk seizure.
   - Stop at network response.

   This may be accomplished with personal computer, stopwatch, or other test equipment, as available.
3. ASC switch time not included.

7.4 Contact Directories

Industry-accessible Contact Directories are available to SPs for trouble reporting.

7.4.1 ATIS NGIIF SPCD & National LNP Contact Directory

The ATIS NGIIF developed and maintains two contact directories, the SPCD and National LNP Contact Directory. The Directories are available at no charge to the telecommunications industry. ATIS sends an annual invitation requesting new and/or updated contact information; however, submissions are accepted at any time during the year.

7.4.1.1 Service Provider Contact Directory (SPCD)

The purpose of the SPCD document is to provide contact numbers to the telecommunication industry for requesting interconnecting company assistance on service-related situations, applying to emerging technology, consolidated centers, multiple platforms (TDM, wireless, IP), or company specific departments.

The SPCD identifies intercompany contact points for providing information in a multi-platform technology arena. Any information that may be of concern to the interconnecting company's network (i.e., modifications, outages, network survivability, network congestion, testing and/or maintenance, IXC carrier-to-carrier information) should be included in the SPCD. Of particular relevance to resolving RCC issues is inclusion of IXC carrier-to-carrier information, such that SPs have a readily available source for appropriate contacts at other SPs. Some SPs have established dedicated toll free numbers and/or e-mail addresses related to RCC, and have provided them in the SPCD. It is a recommendation by the NGIIF that all SPs list and update their contacts on a regular basis.

7.4.1.2 National LNP Contact Directory

The purpose of the LNP Contact Directory is to provide contact numbers to the telecommunication industry for requesting interconnecting company assistance on service-related situations relating to LNP. Any associated LNP contact information related to TDM, wireless, or IP should be included in the LNP Contact Directory. It is a recommendation by the NGIIF that all SPs list and update their contacts on a regular basis.

7.4.1.3 How to Gain Access

The SPCD and the National LNP Contact Directories can be accessed via the NGIIF webpage at < http://www.atis.org/ngiif/contactdir.asp>.

7.4.1.4 How to Add or Update Contact Information

To include and/or update your company's information in the SPCD and/or National LNP Contact Directory, SPs must provide their information in the SPCD and/or LNP form found in the *NGIIF CD Entry Instructions* document request form, located online via the NGIIF webpage at < http://www.atis.org/ngiif/contactdir.asp >. SPs then need to submit their completed form (s) to the NGIIF Administrator via email at < ngiif-admin@atis.org >.

7.4.2 Updating Contact Information and Test Numbers in the LERG Routing Guide

The LERG Routing Guide provides a useful vehicle for SPs to provide up-to-date technical contact information and test equipment numbers for their switches. Specifically, Table 6 contains a data field for switch test numbers and Table 1 contains data fields for contact information for SP personnel. SPs should maintain up-to-date information in the LERG Routing Guide identifying technical points of contact that LD carriers can work with on call completion issues. SPs should also publish their test line TNs in the LERG Routing Guide [i.e., 102 Milliwatt, 105 remote office test lines (ROTL)]\, etc.] in order to facilitate LD testing to their switches. Being able to quickly test connectivity and establish contact with SP technical personnel often facilitates trouble-shooting and remediation of RCC issues.

8 Regulatory Environment

This section describes various FCC rules and regulations, as of the date of publication of this document, with the intent to assist in investigating and/or resolving some of the LD call completion/call termination issues addressed herein. Noted references are not all inclusive nor intended to provide legal guidance and, based on date of this document, may have been subsequently revised. State commissions may also have issued rules and regulations on the subject addressed by this document.

8.1 Rural Call Completion (RCC) Order

The FCC's *R&O and Further Notice of Proposed Rulemaking (FNPRM),* FCC 13-135, WC Docket No.13-39, adopted October 28, 2013 and released November 8, 2013 (the "RCC Order") created reporting and retention requirements for certain carriers related to call completion. The *RCC Order* was published in the Federal Register on March 4, 2015, with an effective date of April 1, 2015, to implement the reporting and retention requirements.

The *RCC Order* amended Part 64, *Miscellaneous Rules Relating to Common Carriers*, of the FCC's rules (as set forth in Appendix A to the RCC Order), including:

- Definitions of terms used throughout the *RCC Order*, such as Call Attempt, Covered Provider, Intermediate Provider, Rural OCN;
- Retention and Reporting Requirements ("Appendix C" or "Form 480");
- Safe Harbor;
- Disclosure of Data; and
- Ringing Indication Requirements.

8.2 USF/ICC Reform Order

The FCC's *R&O* and *FNPRM* in CC Docket Nos. 96-45 and 01-92; GN Docket No. 09-51; WC Docket Nos. 03-109, 05-337, 07-135 and 10-90, and WT Docket No. 10-208, adopted October 27, 2011 and released November 18, 2011 (FCC 11-161), and as amended by the FCC on December 23, 2011 (FCC 11-189) (the "*USF/ICC Reform Order*") modified FCC rules related to the USF and ICC system. Thus, carriers should be mindful of affected rules relating to LD call completion/call termination.

8.2.1 Phantom Traffic

In ¶703 of the *USF/ICC Reform Order*, the FCC states that "phantom traffic" refers to traffic that terminating networks receive that lacks certain identifying information. Amended FCC rules relating to phantom traffic are found in 47 CFR § 64.1600 and 47 CFR § 64.1601 (a). Specifically, new ¶(f) in §64.1600 adds the term "Intermediate Provider." The term Intermediate Provider means any entity that carries or processes traffic that traverses or will traverse the PSTN at any point insofar as that entity neither originates nor terminates that traffic. The FCC revised §64.1601 (a) to read as follows:

> *§ 64.1601 Delivery requirements and privacy restrictions.*
>
> (a) Delivery. Except as provided in paragraphs (d) and (e) of this section:
>
> (1) Telecommunications carriers and providers of interconnected Voice over Internet Protocol (VoIP) services, in originating interstate or intrastate traffic on the public switched telephone network (PSTN) or originating interstate or intrastate traffic that is destined for the PSTN (collectively "PSTN Traffic"), are required to transmit for all PSTN Traffic the telephone number received from or assigned to or otherwise associated with the calling party to the next provider in the path from the originating provider to the terminating provider. This provision applies regardless of the voice call signaling and transmission technology used by the carrier or VoIP provider. Entities subject to this provision that use Signaling System 7 (SS7) are required to transmit the calling party number (CPN) associated with all PSTN Traffic in the SS7 ISUP (ISDN User Part) CPN field to interconnecting providers, and are required to transmit the calling party's charge number (CN) in the SS7 ISUP CN field to interconnecting providers for any PSTN Traffic where CN differs from CPN. Entities subject to this provision who use multi-frequency (MF) signaling are required to transmit CPN, or CN if it differs from CPN, associated with all PSTN Traffic in the MF signaling automatic numbering information (ANI) field.
>
> (2) Intermediate providers within an interstate or intrastate call path that originates and/or terminates on the PSTN must pass unaltered to subsequent providers in the call path signaling information identifying the telephone number, or billing number, if different, of the calling party that is received with a call. This requirement applies to SS7 information including but not limited to CPN and CN, and also applies to MF signaling information or other signaling information intermediate providers receive with a call. This requirement also applies to VoIP signaling messages, such as calling party and charge information

identifiers contained in Session Initiation Protocol (SIP) header fields, and to equivalent identifying information as used in other VoIP signaling technologies, regardless of the voice call signaling and transmission technology used by the carrier or VoIP provider.

Of particular importance, footnote 1196 says: "…Although 47 C.F.R. §64.1601 requires that the CPN be transmitted where technically feasible, the technical content and format of SS7 signaling is governed by industry standards rather than by Commission rules."

IP signaling is addressed in ¶717: "the rules we adopt today also apply to interconnected VoIP traffic." Note that the signaling rules do not yet apply to one-way VoIP. Finally, ¶723 and footnote 1249 advise: "Parties seeking limited exceptions or relief in connection with the call signaling rules we adopt can avail themselves of established waiver procedures at the Commission. To that end, we delegate authority to the Wireline Competition Bureau to act upon requests for a waiver of the rules adopted herein in accordance with existing Commission rules."; 47 C.F.R. § 1.3.

8.2.2 Caller ID

In addition to the rules set forth in the *USF/ICC Reform Order*, in the *Report and Order*, In the Matter of Rules and Regulations Implementing the Truth in Caller ID Act of 2009, WC Docket No. 11-39, FCC 11-100, adopted June 20, 2011 and released June 22, 2011 ("Truth in Caller ID *Order*"), the FCC revised CPN rules to be modeled on the Communications Act of 1934, as amended ("the Act") prohibition against knowingly engaging in caller ID spoofing with fraudulent or harmful intent.. Additionally, the FCC stated at ¶20 of the Truth in Caller ID *Order* that the person or entity that knowingly causes caller ID services to transmit or display misleading or inaccurate information may, in some cases, be a carrier, spoofing provider or other SP, and the FCC does not exempt such conduct from the purview of the FCC rules. New §64.1604 was added as a result of the Truth in Caller ID *Order*. Specifically §64.1604 (a) reads as follows.

§ 64.1604 Prohibition on transmission of inaccurate or misleading caller identification information.

(a) No person or entity in the United States shall, with the intent to defraud, cause harm, or wrongfully obtain anything of value, knowingly cause, directly or indirectly, any caller identification service to transmit or display misleading or inaccurate caller identification information.

8.2.3 Calling Party Number (CPN)

The *USF/ICC Reform Order*, at ¶ 704, modifies call signaling rules as follows.

- SPs that originate interstate or intrastate traffic on the PSTN, or that originate inter- or intrastate-interconnected VoIP traffic destined for the PSTN, will now be required to transmit the TN associated with the calling party to the next provider in the call path.
- Intermediate providers must pass calling party number or charge number signaling information they receive from other providers unaltered, to subsequent providers in the call path.

8.3 FCC Decisions on Call Delivery Areas

The FCC has established rules related to call delivery, and are highlighted in the *USF/ICC Reform Order* in the following sections.

- Footnote 1234: "Carriers are generally prohibited from blocking calls." See *Establishing Just and Reasonable Rates for Local Exchange Carriers; Call Blocking by Carriers,* WC Docket No. 07-135, 22 FCC Rcd 11629 (2007) (*Call Blocking Declaratory Ruling*).
- Paragraph 734 and footnote 1279: "In the *2007 Call Blocking Order*, the Wireline Competition Bureau emphasized that…'Commission precedent provides that no carriers, including interexchange carriers, may block, choke, reduce or restrict traffic in any way.'"; *Call Blocking Declaratory Ruling* 22 FCC Rcd 11631, ¶6.

- Paragraph 973: "*No Blocking.* In addition to the protections discussed above to prevent unilateral actions disruptive to the transitional VoIP-PSTN Intercarrier compensation regime, we also find that carriers' blocking of VoIP calls is a violation of the Communications Act and, therefore, is prohibited just as with the blocking of other traffic."

Further, the FCC's Wireless Competition Bureau issued a *Declaratory Ruling* to clarify the scope of the Commission's prohibition on blocking, choking, reducing, or restricting telephone traffic: *Declaratory Ruling*, *In the Matter of Developing an Unified Intercarrier Compensation Regime* (CC Docket No. 01-92) *and Establishing Just and Reasonable Rates for Local Exchange Carriers* (WC Docket No. 07-135), adopted and released February 6, 2012 (DA 12-154) ("Declaratory Ruling"). In this *Declaratory Ruling*, the FCC reminds carriers of the Commission's longstanding prohibition on carriers blocking, choking, reducing, or otherwise restricting traffic. The FCC also clarifies that this prohibition extends to routing practices that have the effect of blocking, choking, reducing, or otherwise restricting traffic.

8.4 Practices to Support Proper Jurisdictionalization of Traffic

The Called Party's SP's expected termination path, for the routing designation, is based on the regulatory requirements in 47 C.F.R. §51.701(b), as well as the SP's filed tariff(s), if any.

Additional information regarding jurisdiction of traffic is spelled out in the Local Competition *First Report and Order, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* (CC Docket 96-98) *and Interconnection between LECs and Commercial Mobile Radio Service (CMRS) Providers* (CC Docket No. 95-185), adopted August 1, 1996 and released August 8, 1996 (FCC 96-325) ("Local Competition First R&O").

8.5 CPNI

In the regulatory environment, one key area to be mindful of in investigating information regarding LD calls between SPs is the regulatory construct related to CPNI. The CPNI rules are called out below.

In the Act, "customer proprietary network information" consists of information relating to the "quantity, technical configuration, type, destination, location, and amount of use of a telecommunications service subscribed to by any customer of a telecommunications carrier." 47 U. S. C. § 222(h)(1). This statutory definition of "customer information" encompasses customers' particular calling plans and special features, the pricing and terms of their contracts for those services, and details about who they call and when.

8.6 LNP

Where the Called Party's TN has been ported, an LNP dip is required to be done. Notably, the "N-1" carrier, specifically the IXC on a toll call, is responsible for performing or arranging for any needed LNP query. In addition, Code Holders should query and route calls that are default routed to them without a query having been performed. Regulations related to LNP can be found in 47 C.F.R. §52.26.

9 Summary

This handbook is intended for all carriers involved in LD call completion. It attempts to identify the existing standards and guidelines that may be relevant to call completion problems that have been reported by rural telephone companies and to delineate the responsibilities of different industry segments in using these standards and guidelines to avoid call completion failures. The handbook also outlines trouble handling procedures and discusses how the new call scenarios in today's more diverse, converged, and complex networks may complicate trouble resolution. It offers best practices for management of underlying or intermediate carriers. Finally, it summarizes some of the applicable current regulatory environment and identifies obligations.

It is important to understand that the PSTN is not engineered for 100% call completion at all times and that variations in completion rates will occur subject to variations in offered load on a diurnal and seasonal basis and

due to extraordinary circumstances such as disasters and media stimulated calling. Despite the redundancy engineered into many components of the network, there will be occasional failures resulting in outages and despite the care that most providers take to prevent them, there will be human errors that result in calls failing. It is important to distinguish transient variations in call completion rates due to these factors from the persistent difficulties that rural LECs have reported and not treat all instances of call failure as indicative of discrimination.

It is intended that this handbook will help mitigate the more serious issues that led to its development. This handbook is viewed as a living document that will be updated over time to reflect further learnings and any changes to pertinent standards and regulations that may arise.

EXHIBIT JM-GG

In the Matter of Rural Call Completion, Report and Order and FNPR,

WC Docket No. 13-39 (Nov. 8, 2013)

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

In the Matter of	)	
	)	
Rural Call Completion	)	WC Docket No. 13-39

REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING

Adopted: October 28, 2013 **Released: November 8, 2013**

Comment Date: (30 days after date of publication in the Federal Register)
Reply Comment Date: (60 days after date of publication in the Federal Register)

By the Commission: Acting Chairwoman Clyburn and Commissioners Rosenworcel and Pai issuing separate statements.

TABLE OF CONTENTS

I. INTRODUCTION

1. In this Order, we adopt rules to address significant concerns about completion of long-distance calls to rural areas. Doing so will help ensure that long-distance calls to *all* Americans, including rural Americans, are completed. The record in this proceeding leaves no doubt that completion rates for long-distance calls to rural areas are frequently poor—whether the call is significantly delayed, the called party's phone never rings, the caller hears false busy signals, or there are other problems.[1] These failures have significant and immediate public interest ramifications, causing rural businesses to lose customers, cutting families off from their relatives in rural areas, and creating potential for dangerous delays in public safety communications in rural areas.[2]

2. The rules that we adopt today are a critical step to eliminating this significant problem by improving the Commission's ability to monitor the delivery of long-distance calls to rural areas, aiding enforcement action in connection with providers' call completion practices as necessary, as well as aiding consumers and industry by adopting a rule prohibiting false ring signaling. In the Further Notice of Proposed Rulemaking (Further Notice), we seek comment on additional measures that may help the Commission ensure a reasonable and nondiscriminatory level of service to rural areas.

II. BACKGROUND

3. The Commission initiated this rulemaking in February 2013 to help address problems in the completion of long-distance telephone calls to rural customers. This followed a series of Commission actions to address rural call completion concerns over the past several years. As discussed in greater detail below, since 2007 the Commission has:

- Adopted the *USF/ICC Transformation Order*, which, among other things, reaffirmed the prohibition on call blocking; made clear that carriers' blocking of VoIP-PSTN traffic is prohibited; clarified that interconnected and one-way VoIP providers are prohibited from blocking voice traffic to or from the PSTN; and adjusted over a period of time many terminating switched access charges[3] as part of transition to a bill-and-keep regime;[4]

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[1] *See Developing a Unified Intercarrier Compensation Regime, Establishing Just and Reasonable Rates for Local Exchange Carriers*, CC Docket No. 01-92, WC Docket No. 07-135, Declaratory Ruling, 27 FCC Rcd 1351, 1356, para. 12 n.37 (Wireline Comp. Bur. 2012) (*2012 Declaratory Ruling*). The problems manifest themselves in a variety of ways, including lengthy periods of dead air on the calling party's end after dialing a number, audible ringing tones on the calling party's end when the called party's telephone never rings at all, false busy signals, inaccurate intercept messages, the inability of one or both parties to hear the other when the call does go through, and calls simply not arriving at their destinations. *See, e.g.*, Letter from Richard A. Askoff, Counsel for the National Exchange Carrier Association (NECA), Michael Romano, Counsel for National Telecommunications Cooperative Association (NTCA), Stuart Polikoff, Vice President of Regulatory Policy and Business Development, Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), and Derrick Owens, Director of Government Affairs, Western Telecommunications Alliance, to Theresa Z. Cavanaugh and Margaret Dailey, Investigations and Hearings Division, Enforcement Bureau, FCC (filed June 13, 2011) (*June 2011 NECA, et al. Letter*).

[2] *See, e.g.*, Letter from Shirley Bloomfield, Chief Executive Officer, National Telecommunications Cooperative Association, to Hon. Julius Genachowski, Chairman, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51 at 2-3 (filed Sept. 20, 2011) (*September 2011 NTCA Letter*).

[3] The terms "access charge" or "access rates" as used in this Order refer to "Access Reciprocal Compensation" as that term is defined in section 51.903(h) of the Commission's rules. *See* 47 C.F.R. § 51.903(h).

[4] *See Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing an Unified Intercarrier Compensation Regime, Federal-State Joint Board on Universal Service, Lifeline and Link-Up, Universal Service Reform-Mobility Fund*, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-32, 96-45, GN Docket No. 09-51, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd

(continued . . .)

- Issued two Declaratory Rulings clarifying that carriers are prohibited from blocking, choking, reducing, or restricting traffic in any way, including to avoid termination charges,[5] and clarifying the scope of the Commission's prohibition on blocking, choking, reducing, or restricting telephone traffic which may violate section 201 or 202 of the Communications Act of 1934, as amended (the Act);[6]
- Established a Rural Call Completion Task Force to investigate the growing problems associated with calls to rural customers;[7]
- Held a workshop to identify specific causes of rural call completion problems and discuss potential solutions with key stakeholders;[8]
- Established dedicated avenues for rural consumers and carriers to inform the Commission about call completion problems; and
- Investigated and pursued enforcement of providers not complying with the statute and/or our rules, including a consent decree as well as an enforcement advisory regarding rural call completion problems.[9]

We describe in greater detail the Commission's most significant actions, which inform the legal and policy actions that we take in this Order.

4. *USF/ICC Transformation Order.* On November 18, 2011, the Commission released the *USF/ICC Transformation Order*, which, among other things, established a number of new rules requiring carriers to adjust, over a period of years, many of their terminating switched access charges effective every July 1, as part of a transition to a bill-and-keep regime.[10] The Commission capped the vast majority of interstate and intrastate switched access rates as of December 29, 2011.[11] Price cap and rate-of-return carriers were required to make comparable reductions to certain intrastate switched access rates in 2012 and 2013 if specified criteria were met.[12] Beginning in 2014, price cap and rate-of-return carriers begin a series of rate reductions to transition certain terminating interstate and intrastate switched access rates to

(Continued from previous page)
17663 (2011) (*USF/ICC Transformation Order*), *pets. for review pending sub nom. In re: FCC 11-161*, No. 11-9900 (10th Cir. filed Dec. 8, 2011).

[5] *Establishing Just and Reasonable Rates for Local Exchange Carriers; Call Blocking by Carriers*, WC Docket No. 07-135, Declaratory Ruling and Order, 22 FCC Rcd 11629 (Wireline Comp. Bur. 2007) (*2007 Declaratory Ruling*).

[6] *2012 Declaratory Ruling*; *see also* 47 U.S.C. §§ 201-202.

[7] *See FCC Launches Rural Call Completion Task Force to Address Call Routing and Termination Problems in Rural America*, News Release (rel. Sept. 26, 2011).

[8] *See FCC Announces Agenda for October 18 Rural Call Completion Workshop*, Public Notice, 26 FCC Rcd 14351, n.6 (2011) (*Workshop Public Notice*), recording *available at* http://www.fcc.gov/events/rural-call-completion-workshop (last accessed Oct. 25, 2013).

[9] *See*, *e.g.*, *Level 3 Communications, LLC*, EB-12-IH-0087, Order, 28 FCC Rcd 2274 (*Level 3 Consent Decree*); Rural Call Completion, FCC Enforcement Advisory, 28 FCC Rcd 10347 (Enforcement Bur. 2013) (*Rural Call Completion Enforcement Advisory*).

[10] *See USF/ICC Transformation Order*, 26 FCC Rcd at 17934-35, para. 801 (stating that although many of the switched access rate elements are subject to the transition adopted, other rates are not being specifically reduced at this time); *see also id.* at 18109-15, paras. 1297-1314 (seeking comment on the appropriate transition for rate elements not reduced in the *USF/ICC Transformation Order*).

[11] *Id.* at 17934-35, para. 801 and Figure 9. For price cap carriers, all intrastate rates are capped as of the effective date, while for rate-of-return carriers, only terminating intrastate access rates are capped. *Id.*

[12] *See* 47 C.F.R. §§ 51.907(b)-(c), 51.909(b)-(c).

bill-and-keep.[13] The price cap transition occurs over six years and the rate-of-return transition over nine years.[14]

5. The *USF/ICC Transformation Order* also re-emphasized the Commission's longstanding prohibition on call blocking.[15] The Commission reiterated that call blocking has the potential to degrade the reliability of the nation's communications network and that call blocking harms consumers.[16] The Commission also made clear that the general prohibition on call blocking by carriers applies to VoIP-to-PSTN traffic.[17] Finally, the Commission prohibited call blocking by providers of interconnected VoIP services as well as providers of "one-way" VoIP services.[18]

6. In addition, the Commission adopted rules to address so-called "phantom traffic," that is, traffic that terminating networks receive that lacks certain identifying information for calls. The lack of such basic information to accompany calls has also resulted in calls being delivered without the correct caller identification, which is a common call quality complaint in rural areas. In the *USF/ICC Transformation Order*, the Commission found that service providers in the call path were intentionally removing or altering identifying information to avoid paying the terminating rates that would apply if the call were accurately signaled and billed.[19] The Commission adopted rules requiring telecommunications carriers and providers of interconnected VoIP service to include the calling party's telephone number in

[13] *See id.* §§ 51.907(d), 51.909(d).

[14] *See id.* §§ 51.907, 51.909. The price cap transition and the rate-of-return transition do not reach precisely the same pricing points for terminating tandem-switched transport. *Id*.

[15] *USF/ICC Transformation Order*, 26 FCC Rcd at 17903, 18028-29, paras. 734, 973-974

[16] *Id*. at 17903, para. 734. In a January 5, 2012 blog post on the Commission's web site, the chiefs of the Wireline Competition Bureau and Public Safety and Homeland Security Bureau described ways that the Commission has been working on rural call completion issues. Sharon Gillett and Jamie Barnett, *New Year Solutions for Rural Call Completion Problems*, FCC (Jan. 5, 2012), *available at* http://www.fcc.gov/blog/new-year-solutions-rural-call-completion-problems (last accessed Oct. 25, 2013).

[17] *USF/ICC Transformation Order*, 26 FCC Rcd at 18028-29, paras. 973-974. For purposes of the *USF/ICC Transformation Order*, "VoIP-PSTN traffic" is traffic exchanged over PSTN facilities that originates and/or terminates in IP format. The Commission used the term "VoIP-PSTN" as shorthand, recognizing that carriers have been converting portions of their networks to IP technology for years. *See, e.g.*, *USF/ICC Transformation Order*, 26 FCC Rcd at 18005-06, para. 940 & n.1891; *IP-Enabled Services; E911 Requirements for IP-Enabled Service Providers*, WC Docket Nos. 04-36, 05-196, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 10245, 10257-59, para. 24 & n.77 (2005) (*VoIP 911 Order*), *aff'd sub nom. Nuvio Corp. v. FCC*, 473 F.3d 302 (D.C. Cir. 2006); *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report to Congress, 13 FCC Rcd 11501, 11541-43, para. 84 (1998).

[18] *Id.* at 18029, para. 974; *see also* 47 U.S.C. § 153(25) (stating that "interconnected VoIP service" has the meaning provided in section 9.3 of the Commission's rules); 47 C.F.R. § 9.3 (defining interconnected VoIP service as a service that, *inter alia*, allows users "to receive calls that originate on the [PSTN] *and* to terminate calls to the [PSTN]" (emphasis added)); *USF/ICC Transformation Order*, 26 FCC Rcd at 18029, para. 974 (noting that one-way VoIP services allow customers to receive calls from, or place calls to, the PSTN, but not both). The Communications Act defines "non-interconnected VoIP service" as a service that enables real-time voice communications that originate from or terminate to the user's location using Internet protocol or any successor protocol, requires Internet protocol compatible customer premises equipment, and does not include any service that is an interconnected VoIP service. 47 U.S.C. § 153(36). Our use of the term "one-way VoIP" in this Order is consistent with the definition of "non-interconnected VoIP service" in the Communications Act, to the extent such service offers the capability to place calls to or receive calls from the PSTN.

[19] *USF/ICC Transformation Order*, 26 FCC Rcd at 17890, para. 703.

all call signaling, and required intermediate providers to pass this signaling information, unaltered, to the next provider in a call path.[20]

7. *2012 Declaratory Ruling.* In 2012, the Wireline Competition Bureau issued a declaratory ruling to clarify the scope of the Commission's prohibition on blocking, choking, reducing, or restricting telephone traffic in response to continued complaints about rural call completion issues from rural associations, state utility commissions, and consumers.[21] The *2012 Declaratory Ruling* made clear that practices used for routing calls to rural areas that lead to call termination and quality problems may violate the prohibition against unjust and unreasonable practices in section 201 of the Act[22] or may violate the carriers' section 202 duty to refrain from unjust or unreasonable discrimination in practices, facilities, or services.[23] The *2012 Declaratory Ruling* also noted that carriers may be subject to liability under section 217 of the Act for the actions of their agents or other persons acting for or employed by the carriers.[24] The Bureau stated that the practices causing rural call completion problems "adversely affect the ubiquity and reliability of the nation's communications network and threaten commerce, public safety, and the ability of consumers, businesses, and public health and safety officials in rural America to access and use a reliable network."[25]

8. *The Notice.* In February 2013, the Commission adopted a Notice of Proposed Rulemaking (*Notice*) seeking comment on proposed reporting and data retention requirements. The *Notice* proposed rules requiring facilities-based originating long-distance voice service providers to collect, retain, and report to the Commission data on call answer rates.[26] The *Notice* also proposed rules requiring facilities-based originating long-distance voice service providers to collect and retain information on call attempts and to periodically analyze call completion data and report the results to the Commission. The *Notice* proposed rules requiring facilities-based originating long-distance providers with more than 100,000 retail long-distance subscribers (business or residential)[27] to file quarterly reports

[20] *Id.* at 17894, 17897-98, paras. 711, 719-720; *see also* 47 C.F.R. § 64.1601(a). The *USF/ICC Transformation Order* also applied the calling party number signaling rules to interconnected VoIP traffic, stating that "[f]ailure to include interconnected VoIP traffic in our signaling rules would create a large and growing loophole as the number of interconnected VoIP lines in service continues to grow." *Id.* at 17896, para. 717. Accordingly, the *USF/ICC Transformation Order* requires VoIP service providers to transmit the telephone number of the calling party for all traffic destined for the PSTN that they originate. If they are intermediate providers in a call path, they must pass, unaltered, signaling information they receive indicating the telephone number, or billing number if different, of the calling party. *Id.* at 17896, para. 717. Service providers originating interstate or intrastate traffic on the public switched telephone network (PSTN), or originating interstate or intrastate interconnected VoIP traffic destined for the PSTN, are required to transmit the telephone number associated with the calling party number (CPN) or charge number (CN) to the next provider in the call path. Intermediate providers must pass signaling information they receive from other providers unaltered, to subsequent providers in the call path.

[21] *2012 Declaratory Ruling*, 27 FCC Rcd 1351.

[22] 47 U.S.C. § 201(b) ("All charges, practices, classifications, and regulations for and in connection with such communication service, shall be just and reasonable, and any such charge, practice, classification, or regulation that is unjust or unreasonable is declared to be unlawful . . . .").

[23] *Id.* § 202(a) ("It shall be unlawful for any common carrier to make any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services . . . .").

[24] *2012 Declaratory Ruling*, 27 FCC Rcd at 1352, para. 4; 47 U.S.C. § 217.

[25] *2012 Declaratory Ruling*, 27 FCC Rcd at 1355, para. 11.

[26] *Rural Call Completion*, WC Docket No. 13-39, Notice of Proposed Rulemaking, 28 FCC Rcd 1569, 1575, para. 20 (2013) (*Notice*).

[27] *Id.* at 1579, para. 31.

that measure the call answer rate for each rural operating company number (OCN)[28] to which 100 or more calls were attempted during a calendar month, and to report on specific categories of call attempts.[29] The *Notice* also proposed requiring originating long-distance providers to measure the overall call answer rate for nonrural call attempts[30] to permit comparisons between long-distance calls in rural versus nonrural local exchanges.

9. *Public Notice Seeking Comment on List of Rural OCNs*. On April 18, 2013, the Wireline Competition Bureau released a Public Notice seeking comment on which rural OCNs covered providers should include in the proposed quarterly reports on call completion performance.[31] The Public Notice invited comment on the completeness and suitability of a list of rural OCNs compiled by the National Exchange Carrier Association (NECA) and posted on NECA's web site.[32]

10. *Enforcement Activity*. The Commission's Enforcement Bureau is also actively responding to rural call completion problems. In March 2013, Level 3 Communications, LLC (Level 3) entered into a consent decree terminating the Enforcement Bureau's investigations into possible violations of sections 201(b) and 202(a) of the Act with respect to Level 3's call completion practices to rural areas, including its use and monitoring of intermediate providers.[33] On July 19, 2013, the Enforcement Bureau issued an advisory to long-distance providers to take consumer complaints about rural call completion seriously.[34] The advisory gave examples of plainly insufficient provider responses and warned that "[g]oing forward, the FCC may take enforcement action against providers that submit such patently deficient responses to informal complaints."[35]

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[28] *Id.* at 1575, para. 20 n.44. An operating company number is a four-place alphanumeric code that uniquely identifies providers of local telecommunications service. *See* Alliance for Telecommunications Industry Solutions, *ATIS Telecom Glossary* (*ATIS Telecom Glossary*), *available at* http://www.atis.org/glossary/definition.aspx?id=2065 (last accessed Oct. 25, 2013).

[29] *Notice*, 28 FCC Rcd at 1575-77, paras. 20-25. A "call attempt" (or "attempted call") is a call that results in transmission by the reporting entity toward the terminating provider of the initial call setup message, regardless of the voice call signaling and transmission technology used. *Id.* at 1576, para. 20 n.45. The *Notice* proposed to categorize long-distance call attempts according to call source type and terminating provider type, and proposed that data collection requirements cover, at a minimum, the following source-termination categories of long-distance call traffic: originating provider to rural telephone company (including rural CLEC), originating provider to nonrural LEC (including nonrural CLEC), first facilities-based provider to rural telephone company (including rural CLEC), and first facilities-based provider to nonrural LEC (including nonrural CLEC). *Id.* at 1577, para. 25. The *Notice* proposed to use a "call answer rate" as the basic measure of call completion performance. An "answered call attempt" means a call attempt that is answered by the called party, including, for example, by voicemail, answering machine, or fax machine. *Id.* at 1578, para. 27. Subject to certain exclusions, the Commission proposed to calculate a call answer rate as "the number of call attempts that result in an answer divided by the total number of calls attempted, expressed as a percentage." *Id.* at 1578-79, paras. 27-30.

[30] *Id.* at 1576, para. 20.

[31] *See Wireline Competition Bureau Announces Deadlines for Comments on Rural Call Completion Notice of Proposed Rulemaking, Invites Comment on List of Rural Operating Carrier Numbers*, WC Docket No. 13-39, Public Notice, 28 FCC Rcd 5190 (Wireline Comp. Bur. 2013) (*List of OCNs Public Notice*). The *List of OCNs Public Notice* was published in the Federal Register on May 7, 2013. 78 Fed. Reg. 26572.

[32] *List of OCNs Public Notice*, 28 FCC Rcd at 5190-91. The list of OCNs on NECA's website can be found at: http://www.neca.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=8874&libID=8894 (last accessed Oct. 25, 2013).

[33] *Level 3 Consent Decree*, 28 FCC Rcd at 2274, para. 1.

[34] *Rural Call Completion Enforcement Advisory*, 28 FCC Rcd at 10347, para. 1.

[35] *Id.* at 2-3 (citing as examples of such patently insufficient responses: "[The rural complainant] does not have an account with [our company]. Additionally, the number experiencing problems is also not [our] number; it is her (continued . . .)

11. In addition to conducting ongoing investigations of several long-distance providers, the Commission has been addressing daily operational problems reported by rural customers and carriers so that incoming long-distance calling to customers of rural incumbent local exchange carriers (LECs) is promptly restored. We have established dedicated avenues for rural customers and carriers to inform the Commission about these call completion problems. A web-based complaint intake focuses on the rural call completion problems of residential and business customers, instructs such customers how to file complaints with the Commission, and links to the Commission's standard 2000B complaint form.[36] Separately, a dedicated email intake provides a "hot email line" for rural telephone companies to alert the Commission of systemic problems receiving calls from a particular originating long-distance provider and facilitates provider-to-provider resolution.

12. Many key stakeholders acknowledge that call termination issues to rural service areas are serious and widespread and have collaborated to propose industry solutions. For example, in October 2011, stakeholders attended the Commission's Rural Call Completion Task Force's workshop to identify and discuss potential solutions.[37] In 2012, the Alliance for Telecommunications Industry Solutions (ATIS) released the *Intercarrier Call Completion/Call Termination Handbook* outlining standards and practices of the industry relevant to ensuring call completion.[38] In August 2013, ATIS and NECA announced a voluntary Joint National Call Testing Project offering providers the opportunity to test call completion issues identified on calls destined to many areas served by rural local exchange carriers.[39] The testing project will facilitate cooperative trouble resolution efforts with originating, intermediate and terminating carriers.[40] Finally, we note that some providers have devoted substantial time and resources to analyzing rural call completion performance. We applaud these and other efforts by stakeholders and encourage the continued support of the industry to undertake further efforts to diagnose problems in call routing, cooperate on finding solutions, and adopt best practices aimed at solving the rural call completion problem.

III. DISCUSSION

13. Even with the significant Commission actions described above, the record leaves no doubt that the problems of completing calls to rural areas, particularly areas served by rural incumbent

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landline number;" and "We have contacted the [rural complainant] and have successfully resolved this matter by advising [her] that due to living in a rural area she will experience service issues."); *see also* 47 U.S.C. § 208; 47 C.F.R. § 1.717.

[36] *See Rural Call Completion: Problems with Long Distance or Wireless Calling to Rural Areas*, *FCC Encyclopedia*, http://www.fcc.gov/encyclopedia/problems-long-distance-or-wireless-calling-rural-areas (last accessed Oct. 25, 2013).

[37] *See FCC Announces Agenda for October 18 Rural Call Completion Workshop*, Public Notice, 26 FCC Rcd 14351, n.6 (2011) (*Workshop Public Notice*), recording *available at* http://www.fcc.gov/events/rural-call-completion-workshop (last accessed Aug. 23, 2013).

[38] *See* Alliance for Telecommunications Industry Solutions, *Intercarrier Call Completion/Call Termination Handbook* (2012) (*ATIS Handbook*), *available at* https://www.atis.org/docstore/product.aspx?id=26780 (last accessed Oct. 25, 2013). For example, among other things, the *ATIS Handbook* proposes ways to better manage intermediate providers and prohibit looping (not handing the call to the same carrier who sent the call); suggests that originating carriers should maintain capacity to complete calls using their own networks; discourages false signaling information; recommends that any additional intermediate provider should be bound to the same standards as the first; provides recommendations on reporting; and encourages the development of a service provider contact directory (which includes IXC carrier-to-carrier contact points).

[39] *See* Press Release, ATIS and NECA Join Forces to Help Address Call Completion Issues (Aug. 23, 2013), available at http://www.atis.org/PRESS/pressreleases2013/082313.asp.

[40] *Id.*

local exchange carriers (ILECs) continue to be frequent and pervasive throughout rural America.[41] The inability to complete calls reliably threatens public safety and contravenes the public interest. We conclude that additional Commission action and enforcement are necessary to address these problems.

14. *Scope of the problems*. The record indicates that rural call completion problems are serious and widespread. NTCA has argued that "the call completion epidemic results in 'dire consequences' to consumers, economic development, and public safety across the nation."[42] The problems manifest themselves in lengthy periods of dead air on the calling party's end after dialing a number, audible ringing tones on the calling party's end when the called party's telephone never rings at all, false busy signals, inaccurate intercept messages, and the inability of one or both parties to hear the other when the call does go through.[43] The record contains substantial evidence that these problems persist; some state that they are worsening.[44] We also continue to receive information on the nature and extent of the rural call completion problem. For example, we have received examples of life-threatening call failures, including a situation where an on-call surgeon was unable to receive a call from a hospital for emergency surgery and a 911 call center was unable to do emergency call backs.[45] We also continue to take in individual complaints from consumers and rural telephone companies affected by these issues.[46]

[41] For purposes of this Order, "rural area" is defined as the service area of an incumbent local exchange carrier that is a rural telephone company, as defined in 47 U.S.C. § 153.

[42] NTCA et al. Reply at 1; *see also, e.g.*, Iowa Network Services, Inc. Reply at 2-3 (stating that "the integrity of our nation's telecommunications network is under attack and that a strong Commission response is urgently required in order to avoid dire economic and human injury"); Letter from Richard A. Askoff, Counsel for the National Exchange Carrier Association (NECA), Michael Romano, Counsel for NTCA, Stuart Polikoff, Vice President of Regulatory Policy and Business Development, Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), and Derrick Owens, Director of Government Affairs, Western Telecommunications Alliance, to Theresa Z. Cavanaugh and Margaret Dailey, Investigations and Hearings Division, Enforcement Bureau, FCC (filed June 13, 2011) (*June 2011 NECA, et al. Letter*); *September 2011 NTCA Letter* at 1, 3; Letter from James Bradford Ramsey, Counsel for the National Association of Regulatory Utility Commissioners, to Hon. Julius Genachowski, Chairman, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51 at 2 (filed Sept. 29, 2011) (*September 2011 NARUC Letter*) (noting that "[o]ne hundred and seventy six rural incumbent local exchange companies in 35 States have reported call termination issues for both voice calls and faxes"); Letter from Tim Schram, Chairman, Nebraska Public Service Commission, Kevin Gunn, Chairman, Missouri Public Service Commission, Ellen Anderson, Chair, Minnesota Public Utilities Commission, Travis Kavulla, Chairman, Montana Public Service Commission, Gary Hanson, Chairman, and Chris Nelson, Vice Chairman, South Dakota Public Utilities Commission, John Quackenbush, Chairman, Orjakor Isiogu, Commissioner, and Greg White, Commissioner, Michigan Public Service Commission, and Christopher Petrie, Secretary and Chief Counsel, Wyoming Public Service Commission, to Hon. Julius Genachowski, Chairman, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51 at 2 (filed Dec. 1, 2011) (*December 2011 State PSCs Letter*).

[43] *See, e.g.*, Letter from Richard A. Askoff, Counsel for the National Exchange Carrier Association (NECA), Michael Romano, Counsel for National Telecommunications Cooperative Association (NTCA), Stuart Polikoff, Vice President of Regulatory Policy and Business Development, Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), and Derrick Owens, Director of Government Affairs, Western Telecommunications Alliance, to Theresa Z. Cavanaugh and Margaret Dailey, Investigations and Hearings Division, Enforcement Bureau, FCC (filed June 13, 2011) (*June 2011 NECA, et al. Letter*).

[44] *See, e.g.*, Independent LECs Comments at 4-6; NARUC Comments at 2-3; INS Reply at 2; PSCW Comments at 1-2; Joint State Commissions Comments at 1-2; Rural Associations Comments at 2-5; NASUCA Comments at 1, 5; COMPTEL Comments at 1-2; NJ Rate Counsel Comments at ii, 3-5; ACA Comments at 2; California PUC Comments at 2-4; Western Telecom Associations Comments at 3-4; ANPI Reply at 5; Inteliquent Reply at 2-3.

[45] *See* Letter from Jill Canfield to Marlene H. Dortch, Secretary, FCC, WC Docket No. 13-39 at 1-2 (filed Aug. 19, 2013) (describing ongoing rural call completion problems); *see also* Letter from Helen E. Disenhaus to Marlene H. Dortch, Secretary, FCC, WC Docket No. 13-39 (filed July 22, 2013) (providing presentation on HyperCube's analysis of four rural areas experiencing call completion problems); Letter from Jill Canfield to Marlene H. Dortch,

(continued . . .)

15. Although some commenters question whether the problems are serious or widespread and whether there is a need for Commission action, these comments are largely unsubstantiated and are inconsistent with the significant evidence and real-world Commission experience to the contrary.[47] We find the views of rural carriers and our state partners more persuasive, given their direct experience with complaints about call completion performance.[48] We therefore find a sufficient basis for proceeding with the rules we adopt today, and can revisit these rules in the future as warranted by the data we will be collecting, which should provide evidence regarding the scope and extent of call completion problems over time.

16. *Causes of the Problems.* There appear to be multiple factors that cause rural call completion problems. Rural associations posit that the call completion problems may arise from the manner in which originating providers set up the signaling and routing of their calls, and that many of these call routing and termination problems can be attributed to intermediate providers.[49] They argue that

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Secretary, FCC, WC Docket No. 13-39 (filed Apr. 19, 2013) (providing presentation on different instances of rural call completion problems and potential causes of failed calls); *see also* Rural Associations Reply at 8 (noting that "consumer complaints are only the 'tip of the iceberg'").

[46] The Commission has also established an email box for carriers to alert the Rural Call Completion Task Force about call completion problems in real-time and has established a web page for consumers with information about rural call completion issues and online intake for complaints. *See* http://www.fcc.gov/encyclopedia/problems-long-distance-or-wireless-calling-rural-areas (last visited Oct. 25, 2013).

[47] As of September 30, 2013, the Commission has received 728 consumer complaints related to rural call completion problems in 2013, many involving multiple originating providers. The Commission also has ongoing investigations and a consent decree with Level 3. *See Level 3 Consent Decree*, 28 FCC Rcd at 2274, para. 1; Sprint Comments at 5; *see also* XO Communications Reply at 3-4 ("the proposed rules, which were based on anecdotal evidence, are premature and their value is far from clear"); Verizon Comments at 3 ("More businesses may reside in non-rural locations, and those entities will almost always have a voicemail or other answering service to answer every call not answered by a person, thus impacting call answer rates. Many wireless callers in rural areas may be roaming on another carrier's network or may be more distant from the nearest cell tower, thus leading to a greater frequency of call set-up delay or dropped calls."); *see also* HyperCube Comments at 2; VON Coalition Comments at 8; TWC Comments at 4-5; Sprint Comments at 4-9; AT&T Comments at 2; Verizon Comments at 2-3 (all claiming that the rural call completion problem is not serious and that there is no need for the proposed rules).

[48] *See, e.g.*, Rural Associations Reply at 6-7; Letter from Colin Sandy, Government Relations Counsel, National Exchange Carrier Association, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 07-135, 11-39, CC Docket No. 01-92 at 1-2 (filed Nov. 15, 2012); Letter from James Bradford Ramsay, Counsel for National Association of Regulatory Utility Commissioners, to Hon. Julius Genachowski, Chairman, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51 at 2 (filed Sept. 26, 2012) (*September 2012 NARUC Letter*); *May 2012 NECA, et al. Letter* at 1-2; *December 2011 State PSCs Letter* at 1-3; *September 2011 NARUC Letter* at 1-3 (noting that rural telecommunications providers have also reported complaints from a hospital having difficulty contacting patients)*; September 2011 NTCA Letter* at 1-3; Letter from Richard A. Askoff, Counsel for the National Exchange Carrier Association (NECA), Michael Romano, Counsel for National Telecommunications Cooperative Association (NTCA), Stuart Polikoff, Vice President of Regulatory Policy and Business Development, Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), and Derrick Owens, Director of Government Affairs, Western Telecommunications Alliance, to Theresa Z. Cavanaugh and Margaret Dailey, Investigations and Hearings Division, Enforcement Bureau, FCC at 3-4 & Appx. A (filed June 13, 2011) (*June 2011 NECA, et al. Letter*); Letter from Michael Romano, Counsel for the National Telecommunications Cooperative Association, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 07-135, 11-39, CC Docket No. 01-92, at 7 (filed Mar. 11, 2011).

[49] *See* Rural Associations Reply at 7 (providing examples of reasons why calls "were failing, delayed, or completed with poor quality, [as] including call looping, improper routing, faulty routing table set-up, and improper compression," and noting that "[t]hese are now widely understood by the industry as significant contributing factors to rural call completion problems"). The Commission also previously has cited evidence that completion rates of long-distance calls to some rural telephone company service areas can be poor, even where overall performance of the intermediate provider appears acceptable. *See 2012 Declaratory Ruling* 27 FCC Rcd at 1356, para. 12 n.37.

least cost routing carriers offer terminating services at low rates, and that some least cost routing carriers may provide inferior service for a low rate.[50]

17. One key reason for the increased problems in rural areas is that a call to a rural area is often handled by numerous different providers in the call's path. Given the particularly high rates long-distance providers incur to terminate long-distance calls to rural rate-of-return carriers,[51] long-distance providers have additional incentives to reduce the per-minute cost of calls. For example, the disparity between interstate rates can be 5-6 cents per minute for rate-of-return areas and just over half a cent per minute for price cap areas.[52] As a result, there is greater incentive for the long-distance provider to hand off the call to an intermediate provider that is offering to deliver it cheaply —and potentially less incentive to ensure that calls to rural areas are actually completed properly. The prevalence of these problems accords with providers' incentives to engage in blocking or degrading traffic, or similar behavior, in an effort to minimize their intercarrier compensation payments, which has been long recognized by the Commission.[53] While the Commission's comprehensive reform of intercarrier compensation will alleviate some of these price differences in the long-term, it likely will continue to be more costly to complete calls to rate-of-return carriers while the transition to bill-and-keep is implemented over the next several years.

18. The Commission has determined that call blocking is an unjust and unreasonable practice under section 201(b) of the Act, and the Wireline Competition Bureau has made clear that carriers' rural call routing practices that lead to call termination and quality problems may violate the prohibition against

[50] *See, e.g.*, *June 2011 NECA, et al. Letter* at 3; *September 2011 NTCA Letter* at 3; Letter from David Lewis, Chief Executive Officer for ANPI, LLC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 03-109, 05-337, 07-135, 10-90, CC Docket Nos. 96-45, 01-92, WT Docket No. 96-45, GN Docket No. 09-51 at 1 (filed Dec. 21, 2012).

[51] A rate-of-return carrier is "any incumbent local exchange carrier not subject to price cap regulation." 47 C.F.R. § 54.5; *see also* 47 C.F.R. § 61.3(ff) (defining price cap regulation).

[52] *See*, *e.g.*, Letter from Joe A. Douglas, Vice President Government Relations, NECA, to Marlene Dortch, Secretary, FCC, CC Docket Nos. 96-45, 80-286, GN Docket No. 09-51 (filed Dec. 30, 2010) (providing a table of interstate rates and minutes of use for rate-of-return carriers); *see also USF/ICC Transformation Order*, 26 FCC Rcd at 17929-30, para. 791 (describing the widely varying range of interstate and intrastate terminating access rates and the resulting incentive for "arbitrage and pervasive competitive distortions within the industry"). Prior to the rate freeze under the *USF/ICC Transformation Order*, interstate rates could vary considerably between carriers subject to rate-of-return versus price cap regulation. *Compare Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers*, CC Docket Nos. 96-262 and 94-1, Sixth Report and Order, *Low-Volume Long-Distance Users*, CC Docket No. 99-249, Report and Order, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Eleventh Report and Order, 15 FCC Rcd 12962 (2000) (adopting access reforms for price cap carriers), *aff'd in part, rev'd in part, and remanded in part*, *Texas Office of Public Util. Counsel et al. v. FCC*, 265 F.3d 313 (5th Cir. 2001) (subsequent history omitted) *with Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers, Federal-State Joint Board on Universal Service, Access Charge Reform for Incumbent Local Exchange Carriers Subject to Rate-of-Return Regulation, Prescribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers*, CC Docket Nos. 96-45, 98-77, 98-166, 00-256, Second Report and Order and Further Notice of Proposed Rulemaking Fifteenth Report and Order in CC Docket No. 96-45, and Report and Order in CC Docket Nos. 98-77 and 98-166, 16 FCC Rcd 19613 (2001) (adopting access reforms for rate-of-return carriers). The rules adopted in the *USF/ICC Transformation Order* will reduce these rate differences by adjusting over a period of time the terminating switched access charges as part of a transition to a bill-and-keep regime. *See USF/ICC Transformation Order*, 26 FCC Rcd at 17934-35, para. 801. The series of terminating interstate switched access rate reductions will begin in July 2014. *See* 47 C.F.R. §§ 51.907(d), 51.909(d).

[53] *See, e.g.*, *2007 Declaratory Ruling*, 22 FCC Rcd at 11629, para. 1; *2012 Declaratory Ruling*, 27 FCC Rcd at 1354, para. 7; *see also 2012 Declaratory Ruling*, 27 FCC Rcd at 1354, para. 9 ("In September 2011, the Commission created the Rural Call Completion Task Force to address and investigate the growing problem of calls to rural customers that are being delayed or failing to connect.").

unjust and unreasonable practices in section 201(b) of the Act.[54] In the *USF/ICC Transformation Order*, the Commission extended its longstanding prohibition on call blocking to providers of interconnected and one-way VoIP service.[55] We emphasize that interconnected and one-way VoIP service providers may violate this prohibition if they block, choke, reduce, or restrict traffic on calls placed to customers of rural telephone companies.

A. Recording, Retention, and Reporting of Data

1. Scope

19. *Summary*. We adopt recording, retention, and reporting requirements to substantially increase our ability to monitor and redress problems associated with completing calls to rural areas. These rules will also enhance our ability to enforce restrictions against blocking, choking, reducing, or restricting calls. For the reasons set forth below, we find that the recording, retention, and reporting rules should apply to providers of long-distance voice service that make the initial long-distance call path choice for more than 100,000 domestic retail subscriber lines, counting the total of all business and residential fixed subscriber lines and mobile phones and aggregated over all of the providers' affiliates (referred to herein as "covered providers"). In most cases, this is the calling party's long-distance provider. As discussed below, covered providers include LECs, interexchange carriers (IXCs), commercial mobile radio service (CMRS) providers, and VoIP service providers.[56] Finally, we do not apply these rules to intermediate providers.

20. *Covered Providers*. The *Notice* proposed to require facilities-based, originating long-distance voice service providers to comply with recording, retention, and reporting obligations.[57] The *Notice* proposed that if the originating long-distance voice service provider were not facilities-based, the first facilities-based provider in the call-delivery path would be subject to the rules.[58] The Commission's proposal to limit application of the rules to facilities-based providers was premised on the belief that those providers would have the greatest access to call detail information.[59] In response to the proposed categories of covered providers, several commenters urged the Commission to clarify or expand what is considered a covered provider, noting that the first facilities-based provider in a call path is not always the entity with the most direct access to call delivery data.[60] Upon reviewing the record, we agree and

[54] *See, e.g.*, *2012 Declaratory Ruling*, 27 FCC Rcd at 1352, 1355-56, paras. 3-4, 11-13; *USF/ICC Transformation Order*, 26 FCC Rcd at 18028-29, paras. 973-974; *2007 Declaratory Ruling*, 22 FCC Rcd at 11629, para. 1; *see also* 47 U.S.C. § 201(b).

[55] *USF/ICC Transformation Order*, 26 FCC Rcd at 18028-29, paras. 973-974.

[56] The recording, retention, and reporting rules we adopt today apply to providers of interconnected VoIP service, as that term is defined in section 9.3 of the Commission's rules, 47 C.F.R. § 9.3, and to providers of VoIP service that permits users generally to terminate calls to the PSTN, but not to receive calls from the PSTN (one-way VoIP). For ease of reference, in this Order, the terms "VoIP service" or "VoIP services" are sometimes used to refer collectively to interconnected VoIP service and one-way VoIP service.

[57] *See Notice*, 28 FCC Rcd at 1574-75, 1577, paras. 13, 17, 24. For ease of reference, in this Order originating long-distance voice service providers are sometimes referred to simply as "originating providers."

[58] *See Notice*, 28 FCC Rcd at 1575, 1577, paras. 17, 24.

[59] *See Notice*, 28 FCC Rcd at 1575, para. 17.

[60] *See, e.g.*, ACA Comments at 5-6 (arguing that the rules should apply to providers that have a direct role in routing long-distance calls and have access to complete call tracking data); CenturyLink Comments at 13 (stating that focusing on facilities-based providers is too narrow); INS comments at 14 (stating that its non-facilities-based reseller makes the initial routing decisions, only the reseller knows the identity of the intermediary carrier that is responsible for completing the call, and such non-facilities-based entities should be required to report); Missouri PSC Comments at 2 (arguing that responsibilities should lie with the retail long-distance voice service provider, regardless of whether the providers is facilities-based); *see also* Cbeyond *et al*. Comments at 2-3; RCN Reply at 9 (noting that in the process of aggregating traffic before handing it to a provider for long distance carriage, the

(continued . . .)

EXHIBIT JM-HH

Order Instituting Investigation to Address Intrastate Rural Call Completion Issues,

CPUC Docket No. I.14-05-012 (May 15, 2014)

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Investigation to Address Intrastate Rural Call Completion Issues.	FILED PUBLIC UTILITIES COMMISSION MAY 15, 2014 SAN FRANCISCO, CALIFORNIA INVESTIGATION 14-05-012

ORDER INSTITUTING INVESTIGATION TO ADDRESS INTRASTATE RURAL CALL COMPLETION ISSUES

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ORDER INSTITUTING INVESTIGATION ADDRESSING INTRASTATE RURAL CALL COMPLETION ISSUES

1. Introduction

With this Order Instituting Investigation (OII), the California Public Utilities Commission (Commission) begins a review of intrastate call completion issues[1] in California, particularly call completion failures in rural areas of the state.

In this OII, we seek comments to better understand causes of rural call completion failures, evaluate how intrastate call completion failures can be addressed at the state level, how carriers can be encouraged to address call completion failures, what existing rules could be revised or amended, and what new rules might be adopted. We will also explore areas where there should be a coordinated effort among the Commission, its counterparts in neighboring states, and the Federal Communications Commission (FCC), so that all Californians can send and receive phone calls without discrimination or delay. Contingent upon findings in this OII, we will then consider opening an Order Instituting Rulemaking (OIR) proceeding to propose remedies to address problems identified in this Investigation.

2. Commission Jurisdiction

Telephone corporations are public utilities under the Commission's jurisdiction. The Commission regulates their rates, operations, practices, programs, and services, plus the reliability, safety, and adequacy of facilities,

[1] In the context of this OII, call completion problems, call termination issues, and/or call completion failure can be used interchangeably and have the same meaning.

pursuant to California Public Utilities (Pub. Util.) Code §§ 451, 701, and other statutes.

Under Pub. Util. Code § 451, the Commission is responsible for ensuring safe and reliable service at just and reasonable rates:

> All charges demanded or received by any public utility...shall be just and reasonable.
>
> Every public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities...as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public.

Pub. Util. Code § 701 provides that:

> The Commission may supervise and regulate every public utility in the State and may do all things, whether specifically designated in this part or in addition thereto, which are necessary and convenient in the exercise of such power and jurisdiction.

In addition, it is consistent with the goal of universal telephone service that the telecommunications network must be ubiquitously available to all telephone end users. Pub. Util. Code § 558 states:

> Every telephone corporation and telegraph corporation operating in this State shall receive, transmit, and deliver, without discrimination or delay, the conversations and messages of every other such corporation with whose line a physical connection has been made.

All carriers, whether wholesale, intermediate, or retail traffic haulers, must terminate traffic for one another and from an end user to another end user in every instance. In Decision (D.) 97-11-024, the Commission stated, "[n]o carrier has the right to block or misdirect calls to their intended destination because the

carrier believes that it is not being properly compensated for such calls."[2] Additionally, "[t]he obligation to complete calls applies not just to Incumbent Local Exchange Carriers (ILECs) , but equally to all carriers involved in the origination, routing, and completion of calls."[3] Even though carriers may have a variety of call routing options and methodologies, the originating call carrier, the intermediate router and the terminating carrier are all responsible for ensuring call delivery to the end user, regardless of any financial or otherwise business decision made by the involved carriers.[4]

3. Call Completion Problems in California

Rural California telephone customers are experiencing call completion problems. These problems negatively affect the lives of rural telephone customers, in particular, as they may result in the loss of potential business opportunities, adversely impact customers' lives (e.g. missed employment opportunities, appointments, notices), and possibly interfere with security and personal health and/or safety contact efforts (e.g. 911). Given the potentially adverse impact that call completion failure can have on rural Californians, we believe the Commission needs to undertake a more detailed and formal investigation of intrastate call completion failure to better understand the root causes, and to find remedies or solutions to minimize call completion failure frequency.

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[2] Order Instituting Rulemaking on the Commission's Own Motion Into Competition for Local Exchange Service; Order Instituting Investigation on the Commission's Own Motion Into Competition for Local Exchange Service [D.97-11-024] (1997), 76 Cal.Pub. Util.C.2d 458, at 460.

[3] *Ibid.*

[4] *Id.,* at 461.

To quantify the extent of these problems, the Commission's Communications Division (CD) surveyed rural and urban carriers in California from November 2012 to February of 2013. In Section 3.1., we present our findings of this brief exploratory survey of carriers. In Section 3.2., we review how rural telephone customers encountering call completion failure can file their complaints using the Commission web site. In Section 3.3., we discuss our support for the FCC's efforts to combat call completion problems. Finally, in Section 3.4., we discuss adverse effects of the call completion problems on providing Universal Service.

3.1. The Survey of Selected Carriers in California

CD surveyed 20 rural and major urban telephone carriers during November 2012 through February 2013. CD asked the carriers to report their intrastate call completion failures. At that time, 14 carriers were rural "Rate of Return" carriers eligible to receive California High Cost Fund-A (CHCF-A) subsidies,[5] four were major urban area carriers, and two were rural but non-Rate of Return carriers who are not eligible for CHCF-A subsidies. CD learned that:

- None of the responding urban major carriers reported call completion failure.
- None of the non-Rate of Return carriers reported call completion failure.
- Eleven of the fourteen rural CHCF-A-eligible carriers reported call completion failure.

[5] D.13-02-005, adopted May 23, 2013, approved the merger of Frontier Communications West Coast Inc. (Frontier-West Coast) with the larger Incumbent Local Exchange Carrier Citizens Telecommunications Company of California Inc. doing business as Frontier Communications of California (Frontier-California). This reduced the number of Rate of Return carriers eligible to receive CHCF-A subsidies from 14 to 13.

- Carriers reporting call completion failures suspect that many occurrences go unreported.[6]

The CD survey confirms the failures of call completions reported by rural California customers. However, it also raises further questions. Perhaps the most intriguing question: Why rural customers in territories of non-CHCF-A eligible rural carriers do not seem to experience call completion failure, while CHCF-A eligible rural carriers do?

3.2. Customer Complaints

The Commission has a web page available for rural telephone customers to file complaints about utility services.[7] However, the Commission has advised customers to first contact their respective carrier when encountering call completion failures. If the problem cannot be resolved by carriers, customers can then file a complaint with the Commission.[8]

3.3. Commission Support for the FCC's Efforts to Combat Call Completion Failures

The Commission supports the FCC's recent efforts to combat call completion failures through better tracking and enforcement. The Commission filed comments on May 13, 2013 addressing the FCC's *In the Matter of Rural Call Completion* Notice of Proposed Rulemaking (NPRM), WC Docket 13-39, (rel. February 7, 2013) (*Rural Call Completion NPRM*). As the Commission is responsible for reviewing intrastate telephone traffic for California, we have

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[6] The carriers did not provide specific details to explain why occurrences might go unreported.

[7] *See*, http://www.cpuc.ca.gov/puc/cec/e_complaint/.

[8] *See*, https://ia.cpuc.ca.gov/cimsapp/.

requested that the FCC give states access to intrastate data that service providers are required to file with the FCC to facilitate enforcement efforts. If actual intrastate data shows a consistent call completion issue, then the Commission can take action to control and eliminate call completion failures as it pertains to intrastate carrier traffic.

3.4. Background on Universal Service

Universal Service is a principle that all members of society should have affordable basic telephone service. This is a longstanding cornerstone of the California Legislature's and the Commission's telecommunications policy. Rural call completion problems disrupt providing universal service to the rural California telephone customers.

Historically, providing service in rural and sparsely populated areas was much more expensive than in urban areas. Pub. Util. Code § 275.6 provides for "rate-of-return regulation in furtherance of the state's universal service commitment to the continued affordability and widespread availability of safe, reliable, high-quality communications services in rural areas of the state." It requires the Commission to "maintain the California High-Cost Fund-A Program to provide universal service rate support to small independent telephone corporations in amounts sufficient to meet the revenue requirements established by the commission through "rate-of-return regulation" in lieu of market-based pricing.

Over the past one hundred years, during which telephone service became an invaluable tool of communications, it has been a national policy that all Americans have the universal right to have access to telephone service at

reasonably affordable rates regardless of where they live.[9] The regulatory environment based on the concept of universal service has defined call delivery architecture relevant to rural call completion problems. To implement the principle of universal service in rural areas, the FCC established a subsidy mechanism through which urban telephone carriers were required to pay "termination fees" and "access charges" to rural telephone carriers when calls were placed from an urban telephone network to rural customers. This process which in its most basic form involves an originating carrier (e.g., an urban telephone company), a long distance provider, and a terminating carrier (e.g., a rural telephone company), functioned effectively for much of the last century.

Since the Telecommunications Act of 1996 promoted entry by new competitors, a variety of companies and technologies have been used to connect calls through the Public Switched Telephone network (PSTN). Many new Internet Protocol (IP)-based long distance intermediate providers[10] have entered the market, offering new methods to carry long distance services from the end users of urban carriers to customers of the rural telephone companies.

To the originating carriers, long distance calls are not free of cost. These originating carriers must pay intermediate providers for interconnections, and they often contract with third-party IP-based intermediate providers known as

[9] SEC. 1. [47 U.S.C. 151] in the Telecommunications Act 1934 as amended.

[10] "[A]ny entity that carries or processes traffic that traverses or will traverse the Public Switch Telephone network (PSTN) at any point insofar as that entity neither originates nor terminates that traffic." 47 C.F.R. § 64.1600(f).

Least Cost Routers (LCRs), who might be long distance wholesalers.[11] The LCRs might then subcontract with retail long distance IP providers to lower interconnection costs and sometimes circumvent the regulated intercarrier compensation (ICC) mechanism applicable to the legacy PSTN. Through their routing tables[12] and evolving software and hardware technologies, the LCRs continuously and on a real-time basis identify and offer the most economically profitable calling routes. If not properly supervised and executed, incomplete or uncompleted calls, or calls that are delayed or are delivered with poor quality, may result. Possible reasons for call failures may include "bugs"[13] in routing system applications, use of outdated routing tables, transmission of robo-calls,[14] or environmental and/or socio-political events causing concentrated call volume. It is also conceivable that some parties attempt to deliberately assign less

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[11] A long distance wholesaler is an entity that negotiates a contract with telephone carriers to carry long distance communications traffic through routes that typically offer the lowest rates using Least Cost Routing tables.

[12] A routing table is a set of rules to define movement of packets of data over an P network. It holds the information necessary to forward a packet along the best path to its destination. Each packet contains information about its origin and destination. When a packet is received, a network device examines the packet and matches it to the routing table entry providing the best match for its destination. The table then provides the device with instructions for sending the packet to the next hop on its route across the network. *See*, http://searchnetworking.techtarget.com/definition/routing-table.

[13] "[A] software or hardware error that adversely affects operations or user interaction." *See*, The Telecommunications Illustrated Dictionary, 2nd Edition, CRC Press, Boca Raton, 2002.

[14] Robo-call refers to a telephone call from an automated computerized source that delivers a pre-recorded message to a large number of people, as if the call is made by a robot and hence the name. The messages may be associated with political, telemarketing phone campaigns, public services, schools, or emergency announcements. Cal. Pub. Util. Code §§ 2871 *et seq.*, prohibits any robo-call unless there is an existing relationship with the called party.

profitable rural calls lower priority compared to more profitable urban connections.

The FCC declared that:

> It is an unjust and unreasonable practice in violation of section 201 of the Act for a carrier that knows or should know that it is providing degraded service to certain areas to fail to correct the problem or to fail to ensure that intermediate providers, least-cost routers, or other entities acting for or employed by the carrier are performing adequately. This is particularly the case when the problems are brought to the carrier's attention by customers, rate-of-return carriers serving rural areas, or others, and the carrier nevertheless fails to take corrective action that is within its power.[15]

The FCC emphasized that "[c]arriers do have tools to manage termination suppliers, and it would be unreasonable for a carrier not to make appropriate use of such tools to ensure calls that its customers make to rural areas terminate reliably."[16]

The FCC's decision highlights the responsibilities of carriers under federal law for intermediaries involved in the call path, and that carriers are to take steps to ensure that rural calls properly terminate. The FCC has jurisdiction over interstate calls. The Michigan Public Service Commission has advised and offered to assist consumers in filing complaints with the FCC about call completion failures and rural call quality concerns.[17] The State of Oregon adopted a rule in December 2012 to "ensure that carriers fulfill their obligations

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[15] *Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, WC Docket No. 07-135, Declaratory Ruling, 27 FCC Rcd 1351, 1355-56, para. 12 (rel. February 6, 2012) (*2012 Declaratory Ruling*).

[16] *Ibid*.

[17] Michigan Public Service Commission, Rural Call Completion, January 2012. *See*, https://www.michigan.gov/documents/mpsc/rural_call_373366_7.pdf.

to complete calls placed to customers in rural exchanges within the state."[18] The Public Utilities Commission of Ohio (PUCO) stated "to determine the magnitude of the problem in Ohio, the PUCO asks for customers to contact the PUCO Call Center at (800) 686-PUCO (7826) to report problems experienced while placing or receiving long distance and wireless calls in Ohio."[19] The Missouri Public Service Commission opened a proceeding to investigate intrastate call completion issues, TW-2012-0112.[20]

To determine the scope of the problem we need to identify the extent to which and how rural California[21] experiences call completion failures or call degradation, and what actions the Commission has taken or can take to combat this issue. Additionally, we will examine actions being taken at the federal and state levels and by industry associations. The results of these inquiries will be instrumental in determining whether to move forward with an OIR.

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[18] Public Utility Commission of Oregon, In the Matter of Amendments to OAR 860-032-0007, To Address Call Termination Issues, AR 566, December 17, 2012. *See*, http://apps.puc.state.or.us/orders/2012ords/12-478.pdf.

[19] Public Utilities Commission of Ohio, Rural Call Completion Issues. *See*, http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/rural-call-completion-issues/.

[20] Missouri Public Service Commission, TW-2012-0112, Oct. 19, 2011. *See*, https://www.efis.psc.mo.gov/mpsc/Docket.asp?caseno=TW-2012-0112.

[21] The US Census Bureau defines a rural area by negation, i.e. an area that is not an urban area. *See*, https://www.census.gov/geo/reference/urban-rural.html. The Cal. Pub. Util. Code, § 739.3 (b) in the process of defining "small independent telephone corporation", leaves to the Commission the definition of rural areas.

4. Federal Communications Commission Actions

During the past several years, the FCC has undertaken efforts to identify, control, and reduce the frequency of call completion failures. The following section describes these efforts.

4.1. Declaratory Ruling

The FCC's Wireline Competition Bureau issued a Declaratory Ruling on February 6, 2012 **(DA 12-154)**, to clarify the scope of the FCC's prohibition on blocking, choking, reducing or restricting telephone traffic.[22]

This Declaratory Ruling made the following key points:

- Practices …that lead to call termination and call quality problems may constitute unjust and unreasonable practices in violation of section 201 of Communications Act of 1934, as amended (the 'Act') and/or may violate a carrier's section 202 duty to refrain from unjust or unreasonable discrimination in practices, facilities, or services.[23]
- Under § 217 of the Act, carriers are responsible for the actions of their agents or other persons acting for or employed by the carriers.[24]
- [The FCC] can take appropriate enforcement actions under statutory authority, including cease-and-desist orders, forfeitures, and revocations.[25]

The FCC stopped short of recommending specific enforcement mechanisms to control those service providers that do not comply with the referenced statutory obligations.

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[22] *2012 Declaratory Ruling, supra*.

[23] *Id.*, at para. 4 [citations omitted].

[24] *Ibid*.

[25] *Id.*, at para. 16.

4.2. The Rural Call Completion NPRM

In the *Rural Call Completion NPRM* released on February 7, 2013, the FCC proposed ideas and sought comments on:

- [R]ules to help address problems in the completion of long-distance telephone calls to rural carriers.[26]
- [M]easures to improve the FCC's ability to monitor the delivery of long-distance calls to rural areas and aid enforcement action in connection with providers' call-completion practices as necessary.[27]
- [How] to minimize the burden of compliance with the FCC's proposed rules, particularly for originating providers whose call-routing practices do not appear to cause significant call-completion problems.[28]

In the NPRM, the FCC proposes:

- [R]ules to require facilities-based originating long distance voice service providers [subject to some limitations] to collect and retain basic information on call attempts and periodically undertake a basic call completion summary analysis and report the results to the [FCC].[29]
- If the originating long distance voice service provider is not facilities-based, the FCC proposes to apply the obligations [aforementioned in the previous bullet point] to the first facilities-based provider in the call delivery chain.[30]
- [A]rule that would to prohibit both originating and intermediate providers from causing audible ringing to be sent to the caller

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[26] *Rural Call Completion NPRM*, *supra*, at para. 1.

[27] *Id.* at para. 3.

[28] *Ibid*.

[29] *Id.* at para. 17.

[30] *Ibid*.

> before the terminating provider has signaled that the called party is being alerted.[31]

Notably, in this NPRM proceeding, the FCC does not propose, "call communications quality standards".[32] Additionally, the FCC states "[t]o the extent that these proposed rules would apply to Voice over Internet Protocol (VoIP) providers; [it] proposes to exercise [its] ancillary authority to the extent that VoIP services are information services."[33] Finally, the FCC reiterates that call-routing malpractices may violate its rules but does not propose a specific mechanism to reduce or control call completion failures or to enforce its rules. However, it set an example of one enforcement option when it chose the ad-hoc investigation of individual providers that led to entering into two separate consent decrees with providers.[34]

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[31] *Id.* at para. 14.

[32] *Id.* at para. 15.

[33] *Id.* at paras. 19 and 20.

[34] Level 3 Communications, LLC, agreed to meet rigorous, verifiable call completion standards and to provide extensive records that would assist FCC enforcement of rules protecting against failed calls to rural areas. Level 3 also agreed to make a $975,000 voluntary contribution to the U.S. Treasury, and agreed to make additional $1 million voluntary contributions going forward if it misses specified quarterly benchmarks. *See*, *In the Matter of Level3 Communications, LLC,* File No.: EB-12-IH-0087, Consent Decree, DA 13-371, Order (rel. March 12, 2013).

In a second case, on February 20, 2014, the FCC and Windstream Corp. (a company licensed to operate in California) agreed to pay $2.5 million to resolve an investigation by the FCC's Enforcement Bureau into the company's rural call completion practices. Windstream also agreed to implement a three-year plan to ensure compliance with FCC requirements designed to combat the serious problem of long-distance calls failing to complete in rural areas. *See*, *In the Matter of Windstream Corporation* File No.: EB-12-IH-000011781, Consent Decree, DA 14-152, Order (rel. February 20, 2014).

4.3. Latest Steps to Combat Call Completion Problems

On November 8, 2013, the FCC released a Report and Order and Further NPRM in the *Rural Call Completion NPRM* (Report and Order) that included new rules to address rural call completion issues and enforce restriction against blocking, chocking, reducing, or restricting calls.[35]

The Report and Order adopts rules and requirement on reporting, recording and retention of call data, including the following:

- Providers of long-distance voice service with over 100,000 domestic retail subscribers lines aggregated over all of the providers' affiliates including LECs, Interexchange carriers (IXCs), commercial mobile radio service (CMRS) providers, and VoIP service providers that make the initial long-distance call path choice, are required to file call-detailed reports regardless of whether those providers are facilities-based.[36]
- Data reporting requirements include interstate and intrastate traffic. Providers must report data on intrastate and interstate calls separately.[37]
- The only call attempts that need to be retained are those to rural Incumbent LECs.[38]
- Providers must include autodialers' traffic in their recording, retention, and reporting.[39]

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[35] *In the Matter of Rural Call Completion*, WC Docket No. 13-39, Report and Order and Further Notice of Proposed Rulemaking, FCC 13-135, (rel. November 8, 2013) (*Rural Call Completion Report and Order and FNPRM*).

[36] *Id.* at paras. 19 and 20.

[37] *Id.* at para. 45.

[38] *Id.* at para. 49.

[39] *Id.* at para. 54.

- Providers must retain call data for six months.[40] Providers must submit their report quarterly.[41]
- Providers could use a safe harbor[42] provision to reduce their data-reporting obligation. The safe harbor will require a provider to "have no more than two intermediate providers in a given path before the call reaches the terminating provider."[43]
- If a provider uses the safe harbor provision, the reporting requirements remain the same as for those providers not using safe harbor for a period of one year, but the retention period is reduced to three months.[44]

The Report and Order also set rules to address ring signaling and prohibited false audible ringing to the caller before the called party is alerted.[45] In this practice, after the caller completes dialing the called party's number, the caller hears a ringing sound, indicating to the caller that the called party's telephone is ringing, while at the receiving end, the called party does not yet hear a ringing sound. This may prompt the caller to terminate the call before a connection is made. This rule prohibiting false audible ringing applies to all originating providers, intermediate providers, including local exchange carriers, interexchange carriers, CMRS providers, interconnected VoIP, and one-way VoIP providers. These rules apply to both interstate and intrastate calls, as well as to both originating and terminating international calls while they traverse United

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[40] *Id.* at paras. 61-64.

[41] *Id.* at para. 65.

[42] Safe harbor is a set of standards and provisions by which providers need to meet to avoid or reduce their reporting and retention obligations.

[43] *Rural Call Completion Report and Order and FNPRM, supra,* at para. 85.

[44] *Id.* at para. 89.

[45] *Id.* at para. 115.

States networks.[46] As to the reporting data, the FCC stated that it would release information to states upon request, if those states were able to maintain the confidentiality of this information.[47]

4.3.1. Court Ruling Partially Vacating the FCC's Requirements on Broadband Providers

On January 14, 2014, the United States Court of Appeals for the District of Columbia Circuit (D.C. Court of Appeals) vacated portions of the FCC's Open Internet Order[48] addressing the FCC's anti-discrimination and anti-blocking rules "to compel broadband providers to treat all Internet traffic the same regardless of source—or to require, as it is popularly known, 'net neutrality.'"[49] In this same Order, the D.C. Court of Appeals decided:

> Given that the Commission has chosen to classify broadband providers in a manner that exempts them from treatment as common carries, the Communications Act expressly prohibits the Commission from nonetheless regulating them as such. Because the Commission has failed to establish that the anti-discrimination and anti-blocking rules do not impose *per se* common carrier obligations, we vacate those portions of the *Open Internet Order*.[50]

The FCC is examining the effect of the *Verizon v. FCC* decision on its jurisdiction over IP-based providers of voice services, including its use of

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[46] *Ibid.*

[47] *Id.* at para. 109.

[48] *In re Preserving the Open Internet; Broadband Industry Practices,* GN Docket No. 09-191, WC Docket No. 07-52, 25 F.C.C.R. 17905 (rel. Dec. 23, 2010).

[49] *Verizon v. FCC, et al.* (D.C. Cir. Jan. 14, 2014, Case No. 11-1355) 740 F.3d 623.

[50] *Ibid.*

ancillary jurisdiction to require collecting and reporting information about call blocking and otherwise restricting calls to telephone customers.

4.4. Consumer Complaints

The FCC has a page on its website addressing rural call completion that includes frequently asked questions and has a link to its regulatory responses to call completion failures[51] with long distance or wireless calling to rural areas. Consumers can also find a link to an online complaint form where they may address interstate call completion failures.[52]

5. Other State Utilities Regulatory Agencies

Some states' utilities regulatory agencies have taken steps to address or are in the process of addressing call completion failures on the intrastate portion of call connections, although such steps taken have varied. Oregon and Nebraska have opened proceedings to consider specific rules and regulations to address the call failure issue at the state level. Other states such as Michigan[53] and Wisconsin[54] have posted a page on their respective websites acknowledging the

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[51] Rural Call Completion: Problems with Long Distance or Wireless Calling to Rural Areas. *See*, http://www.fcc.gov/encyclopedia/problems-long-distance-or-wireless-calling-rural-areas.

[52] The form is not designed specifically for complaints regarding call completion failure and seems to be a general form for billing disputes at the end of which has a blank box section for non-billing complaints. *See*, http://transition.fcc.gov/eb/rcc/RCC_Form2000B.html.

[53] Consumer Tips, Alert 12-1, Consumer Support Section-Michigan Public Service Commission, January 2012. *See*, http://www.michigan.gov/mpsc/0,4639,7-159-16372-268981--,00.html.

[54] Rural Call Completion page. *See*, http://psc.wi.gov/utilityinfo/tele/teleConsumer/ruralCustomers.html.

existence of or concerns with the issue.[55] To determine the magnitude of the problem in Ohio, the PUCO asks customers to contact the PUCO Call Center to report problems experienced while placing or receiving long distance and wireless calls in Ohio. It also urges customers to inform their respective local and long distance carriers, the PUCO and the FCC of such problems.[56]

5.1. Oregon

The Oregon Public Utility Commission (OPUC) issued Order 12-478 [57] on December 17, 2012, which adopted rules to address and resolve call completion failures including calls not being connected, dead air, long "set up" durations, and poor voice quality within the state of Oregon. The OPUC Order:

- Prohibits intrastate carriers from call blocking, choking, reducing, or restricting traffic in any way.[58]
- Obligates carriers to take reasonable steps to avoid practices that can lead to "lower quality of service to an exchange with higher terminating access rates than like service to an exchange with lower terminating access rates."[59]
- Bars carriers from "engaging in deceptive or misleading practices, including but not limited to informing a caller that a

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[55] *See*, http://www.puco.ohio.gov/puco/index.cfm/Search/?Keywords=rural+call+completion&display=search&newSearch=true&noCache=1.

[56] *See*, http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/rural-call-completion-issues/.

[57] In the Matter of Amendments to OAR 860-032-0007 to Address Call Termination Issues, AR 566, Oregon Public Utility Commission, Order No. 12-478, (Dec. 17, 2012).

[58] *Id.* Appendix A at2.

[59] *Ibid.*

number is not reachable or is out of service when the number is in fact reachable and in service."[60]

- Carriers must ensure that the actions of any underlying carrier, agent, contractor, and subcontractor to deliver traffic on behalf of the carrier do not violate the OPUC rules and as such carriers are liable for their actions.[61]

These rules provide the OPUC with authority to levy fines on violators of up to $50,000.[62]

5.1.1. Customer Complaints

The OPUC has a web page dedicated to "Call Completion Investigation,"[63] with a link to a call completion fact sheet, which provides the telephone number of the Consumer Services section, and urges consumers to contact this section with their complaints.

5.2. Nebraska

On July 17, 2012, the Nebraska Public Service Commission (NPSC) opened a proceeding to amend and add rules regarding service adequacy provided by telecommunications carriers, and prohibit call blocking and choking. The NPSC proposes, in this still-open proceeding, to amend its rules regarding intrastate telecommunications services as follows:

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[60] *Ibid.*

[61] *Ibid.*

[62] Commission Adopts Rules to Tackle Rural Call Completion Problems, OPUC, December 19, 2012 (2012-2014) (AR 566). *See*, http://www.oregon.gov/puc/Pages/news/2012/2012014.aspx. *See also*, http://www.puc.state.or.us/Pages/news/2012/2012014.aspx.

[63] Call Completion Investigation. *See,* http://www.oregon.gov/puc/Pages/telecom/call_termination_issues/call_termination_issues_workshop.aspx.

- Adequate service shall include not subjecting any particular person, class of persons, or locality to any undue or unreasonable prejudice or disadvantage in the provisioning of service by means of blocking, choking, reducing or restricting traffic in any way, or otherwise engaging in unjust or unreasonable conduct with regard to intrastate telecommunications service prohibited by Nebraska law or the rules and regulations of the [NPSC].[64]
- No exchange carrier shall engage in any practice, including blocking, choking, reducing, or otherwise restricting telecommunications traffic to particular locations in an unjust or unreasonable manner, that has the effect of degrading service to a particular location, include for purpose of avoiding any applicable rate, charge, or fee. This shall not apply if traffic restriction is caused by a *force majeure* event that is beyond the reasonable control of the exchange carrier. Each exchange carrier shall be responsible for the acts, omissions, or failure of their officers, agents or other persons acting for or employed by the carrier, acting within the scope of their employment, including but not limited to third parties contracted by carriers to assist in the provision of service.[65]

6. Industry Associations

Industry associations can play a significant role in the regulatory arena by collecting data and providing information on issues of concern; on behalf of carriers, commenting on and suggesting changes to current or proposed rules and regulations; and providing input to define industry's technical standards. These associations include:

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[64] In the Matter of the Commission, on its own motion, seeking to amend Title 291, Chapter 5, Telecommunications Rules and Regulations, to add rules regarding adequacy of service and prohibiting call blocking and chocking, Nebraska Public Service Commission, February 26, 2013. *See*, http://www.sos.state.ne.us/rules-and-regs/regtrack/details.cgi?proposal_id=0000000000001254.

[65] *Ibid.*

- Alliance for Telecommunications Industry Solutions (ATIS).[66] ATIS is an organization that develops telecommunications standards and solutions. Among its members are AT&T, Verizon, Time Warner Cable, T-Mobile USA, Century Link, and Sprint Nextel Corporation.[67]
- The National Exchange Carrier Association (NECA). NECA administers complex regulatory and financial programs. It administers the FCC's access charge plan. More than 1,000 local telephone companies participate in access charge revenue pools.[68]
- Western Telecommunications Alliance (WTA). WTA represents more than 250 rural telecommunications carriers providing voice, video and data services in the 24 states west of the Mississippi River. It advocates the interests of its member companies and their customers in Washington, D.C.[69]
- NTCA-The Rural Broadband Association. It was formed by the recently merged National Telecommunications Cooperative Association (NTCA) and the Organization for Promotion and Advancement of Small Telecommunications Companies (OPASTCO),[70] representing over 900 independent and community-based telecommunications companies. It advocates on behalf of its members in the legislative and regulatory arenas,

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66 *See*, http://www.atis.org.

67 ATIS Standard on Intercarrier Call Completion/Call Termination Handbook (ATIS-0300106), Approved August 2012 as attached to ATIS letter to the FCC dated September 5, 2012. The handbook is available at http://www.atis.org/docstore/product.aspx?id=26780.

68 *See*, https://www.neca.org/Core_Business.aspx.

69 *See*, http://w-t-a.org/about/.

70 The NTCA merged with the OPASTCO effective March 1, 2013. The two merged entities are now known as NTCA-The Rural Broadband Association. *See*, http://www.fiercetelecom.com/story/ntca-opastco-merge-one-common-organization/2013-02-07.

and also provides training and development; issues publications, and holds industry events.[71]

6.1. ATIS Call Completion/Call Termination Handbook

The ATIS handbook describes new and existing industry standards and practices to assist in ensuring long distance call completion in light of call completion failure issues experienced by rural carriers. These standards are classified by the following technical areas, which includes examples of potential call completion failures points:

- Signaling- including identification of calling party, cause codes, tones and announcements, interconnection parameters and looping, inter network trunk signaling testing, and call set-up delay.
- Transmission Quality-including fax, voice, and data.
- Routing-including Numbering Plan Areas (NPA)/Central Office Code (NXX) routing, interconnection agreements, homing arrangements, routing implementation.
- Considerations in the code routing process-including potential call completion failure points, looping, and Location Routing Number (LNP) implications.
- Network congestion-including network element degradation, mass calling, fraud, force majeure and disasters, human-related issues, and traffic pumping and access stimulation.

The ATIS handbook also suggests best practices useful in addressing call completion failures, especially for management of intermediate or underlying carriers.[72]

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[71] *See*, http://www.ntca.org/index.php/.

[72] ATIS, *Op. cit.*, at 1.

6.2. NECA (and other rural telecom industry associations) Joint Survey

On November 15, 2012, NECA, NTCA, OPASTCO, and WTA released the findings of a joint call completion survey conducted to determine the volume of consumer complaints related to calls that are not successfully terminated to the rural customers. Two hundred nine (209) rural local exchange carriers in 39 states responded to the survey, which was conducted over a three-week period in October 2012. The survey found that:

- [C]all completion issues continue to occur at alarming rates, further highlighting the need for some meaningful enforcement of existing rules governing essential communications services, and the development of new solutions to combat this issue.[73]
- Respondents in 38 out of 39 states reported complaints.[74]
- Respondents reported 4,691 complaints between March and August 2012.[75]
- When comparing call completion complaints for March through September 2012 against the August 2011 through February 2012 period, 41% of respondents reported an increase in call completion failure complaints, 21% found that complaints remained steady, and only 21% noticed a decrease in the number of complaints.[76]

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[73] NECA letter to FCC re: Establishing Just and Reasonable Rates to Local Exchange Carriers, WC Docket No. 07-135; Developing a Unified Intercarrier compensation Regime, CC Docket No. 01-92; Rules and Regulations Implementing the Truth in Caller ID Act of 2009, WC Docket No. 11-39, dated November 15, 2012 (NECA Letter).

[74] *Ibid. See*, NECA letter-Attached October 2012 Rural Call Completion Survey Results.

[75] *Ibid.*

[76] *Ibid.*

- While the percentage of incomplete calls decreased, there were higher percentages of poor service quality calls in 2012 vs. 2011 (See Appendix A for NPRM rural Test Call Results.)

7. Symptoms and Probable Causes of Call Completion Failures

In this section, we discuss symptoms and allegations of probable causes of call completion failures.

7.1. Call Completion Failures

A call completion failure can happen at any point, including at the calling party's equipment interconnection with interexchange carrier switches, the intermediate provider's transmission network, terminating switches and lines, and the called party's equipment (see Appendix B –Simplified Long Distance Connection Model). However, for the purpose of this Order Instituting Investigation (OII), we are primarily concerned with call completion failures that prevent successful termination of voice communications from callers, typically from an urban telephone network to a rural telephone customer.

7.1.1. Symptoms of Call Completion Failures

Generally, call completion failures can have any of the following types of symptoms:[77]

- No ring tone: the calling party hears ringing tones but voice mail of the called party does not activate and the called party does not hear a ring tone.
- Busy tone: the calling party hears a busy tone but the called party line is not engaged.

[77] The list is not an exhaustive one. For instance, one can include call-drop issue: when parties experience mid-conversation dropped calls or when a fax transmission fails before it is completed.

- Long delay: the calling party experiences long delays before hearing a ring tone or before the called party answers.
- Dead air: the telephone of the called party rings but the called party hears nothing when answering the phone.
- Wrong caller ID: the called party receives inaccurate caller ID. This is known as "spoofing".[78] Specifically, spoofing occurs when the actual calling number is masked or is a misleading number that is not familiar to the called party.
- Inaccurate information tones or messages: the calling party hears fast network busy signals or inaccurate announcements such as "number not in service."
- Poor quality connection: the calling and/or called party experience poor communications transmission between them, which may include voice echo, excessive noise, and only one-way audible conversation. (See Appendix C for illustration).

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[78] See delivery requirements and privacy restrictions as stated below in the Code of Federal Regulations, 47 C.F.R. § 64.1601:

(a) Delivery. Except as provided in paragraphs (d) and (e) of this section:

(1) Telecommunications carriers and providers of interconnected Voice over Internet Protocol (VoIP) services, in originating interstate or intrastate traffic on the public switched telephone network (PSTN) or originating interstate or intrastate traffic that is destined for the PSTN (collectively "PSTN Traffic"), are required to transmit for all PSTN Traffic the telephone number received from or assigned to or otherwise associated with the calling party to the next provider in the path from the originating provider to the terminating provider. This provision applies regardless of the voice call signaling and transmission technology used by the carrier or VoIP provider. Entities subject to this provision that use Signaling System 7 (SS7) are required to transmit the calling party number (CPN) associated with all PSTN Traffic in the SS7 ISUP (ISDN User Party) CPN field to interconnecting providers, and are required to transmit the calling party's charge number (CN) in the SS7 ISUP CN field to interconnecting providers for any PSTN Traffic where CN differs from CPN. Entities subject to this provision who use multi-frequency (MF) signaling are required to transmit CPN, or CN if it differs from CPN, associated with all PSTN Traffic in the MF signaling automatic numbering information (ANI) field.

- Machine gun effect: call fails repeatedly and re-tries in rapid succession faster than a person can redial.[79]

7.1.2. Probable Causes of Call Completion Failures

Call completion failures have been documented in multiple states with different demographic and topographic characteristics.[80] The probable causes of call completion failure may be categorized as:

- Technical:
    - Software bugs
    - Hardware failures
    - Inadequate use of best practices or observing standards.
- Environmental:
    - Acts of nature like lightening striking a telephone line, flooding, and mudslides.
    - Power outage, etc. that may damage parts of the network.
    - Fraudulent nonfinancial activities and human errors.[81]
- Financial:
    - Some have cited the ICC mechanism for creating incentives for call completion failures, contending that if the FCC implements ICC reform, carriers in turn will have less incentive to channel their long-distance calls to lower-cost

[79] Machine gun effect refers to a call setup repeated fails/re-attempts in rapid succession, so switch call records may show multiple attempts from the same telephone number to a single telephone number in rapid succession. Recipient's phone may never ring or ring once or intermittently. Source: In Minutes of OPUC Call Termination Workshop held on June 24, 2011.

[80] NECA Letter, *supra*, in attached October 2012 Rural Call Completion Survey Results.

[81] See the Inter-carrier Call completion /Call termination Handbook (ATIS -0300106) for comprehensive list possible technical and non-technical causes.

IP-based routes, resulting in fewer call completion failure occurrences.[82]

- Robocalling, including calls for marketing blitz or socio-political events may cause temporary call-volume overload.
- Traffic Pumping also known as Access Stimulation.[83] Some providers attribute this practice to call completion failures.[84]
- Call blocking or call choking: Where the originating carrier or its agents limit or prevent a call to reach the rural

[82] Gillett, Sharon and Jamie Barnett, Chiefs of the Wireline Competition Bureau and Public Safety and Homeland Security Bureau "New Year Solutions for Rural Call Completion Problems," Official FCC Blog, January 5, 2012. See, http://www.fcc.gov/blog/new-year-solutions-rural-call-completion-problems. We note that D.97-11-024 stated, "[n]o carrier has the right to block or misdirect calls to their intended destination because the carrier believes that it is not being properly compensated for such calls." Pub. Util. Code § 558 which requires that "Every telephone corporation and telegraph corporation operating in this State shall receive, transmit, and deliver, without discrimination or delay, the conversations and messages of every other such corporation with whose line a physical connection has been made," contains no exception for carriers who object to the ICC mechanism or tariffs for terminating calls.

[83] Access stimulation, also referred to as "traffic pumping," occurs when a local carrier with high access charge rates enters into an arrangement with another company with high call volume operations, such as chat lines, adult entertainment calls, or "free" conference calls. The arrangement inflates or stimulates the number of calls into the local carrier's service area, and the local carrier then shares a portion of its increased access revenues with the "free" service provider, or provides some other benefit to that company. The local company's profits from such an arrangement are typically so great that its charges become unreasonable and unlawful under FCC regulations. *See*, http://www.fcc.gov/encyclopedia/traffic-pumping.

[84] Comments of Bandwidth.com, Inc., *In the Matter of Rural Call Completion*, WC Docket No. 13-39 (May 13, 2013).

customer so that carriers can use their network to route and complete more profitable calls.[85]

- Intermediate Providers: In attempting to provide the lowest-cost calling route, LCRs or intermediate providers which include both wholesalers and retailers, may cause calls to not reach the intended party, or when it reaches the party, may cause excess delay or poor service quality negatively affecting the purpose of the call (e.g., fax fails or voice cannot be easily understood by parties to the call).
- Regulatory Arbitrage:[86] Originating carriers try to use IP-based intermediate long distance providers who are less stringently regulated, and may attempt to avoid regulatory restraints of ICC rates.
- Others: Activities such as "spoofing" that might be against the law.

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[85] The FCC prohibits this practice. "If an underlying provider is blocking, choking, or otherwise restricting traffic, employing other unjust or unreasonable practices in violation of section 201, engaging in unjust or unreasonable discrimination in violation of section 202, or otherwise not complying with the Act or Commission rules, the carrier using that underlying provider to deliver traffic is liable for those actions if the underlying provider is an agent or other person acting for or employed by the carrier." *In the Matter of Developing a Unified Intercarrier Compensation Regime Establishing Just and Reasonable Rates for Local Exchange Carriers*, CC Docket No. 01-92, WC Docket No. 07-135, FCC DA 12-154, at para. 15.

[86] A practice whereby firms capitalize on loopholes in regulatory systems in order to circumvent unfavorable regulation. Arbitrage opportunities may be accomplished by a variety of tactics, including restructuring transactions, financial engineering and geographic relocation. Regulatory arbitrage is difficult to prevent entirely, but its prevalence can be limited by closing the most obvious loopholes and thus increasing the costs associated of circumventing the regulation. *See*, http://www.investopedia.com/terms/r/regulatory-arbitrage.asp.

In any call completion failure occurrence, one or any combination of these causes may be present.[87]

7.2. Least Cost Routers and Their Associated Problems

LCRs have been identified as the major cause of call completion failures by rural carriers,[88] trade associations such as NECA,[89] the FCC,[90] and a number of state utilities regulatory agencies such as Oregon,[91 and 92] Nebraska,[93] and Michigan.[94] If implemented correctly, Least Cost Routing provides a flexible and cost efficient way to route long distance calls. However, errors, human

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[87] For example, in a hypothetical situation a call completion failure may occur when a Least Cost Router uses a faulty routing table, while at the same time, a provider chokes the flow of telephone traffic and robo-calls are made to customers in the rural area, which in turn may cause the telephone network to overload.

[88] For example, *see*, Zupancic, Brandon, "Least Cost Routing Analysis," Canby Telcom, May 2011; *see also*, Law, Denny," Rural Call Completion Issues Consumer Impacts," Golden West Telecommunications.

[89] Gnapp, Bob, "Rural Call Completion Issues Update," ver. WTA V1, NECA, 2013.

[90] *See*, http://www.fcc.gov/encyclopedia/problems-long-distance-or-wireless-calling-rural-areas.

[91] *See*, In the Matter of Amendment to OAR 860-032-007, AR 566, Order No. 12 -478, Oregon Public Utilities Commission, December 17, 2012. *See also*, Call Completion Investigation workshop held on June 24, 2011. Available at http://www.oregon.gov/puc/pages/telecom/call_termination_issues/call_termination_issues_workshop.aspx.

[92] Call Completion Investigation workshop held on June 24, 2011. *See*, http://www.oregon.gov/puc/pages/telecom/call_termination_issues/call_termination_issues_workshop.aspx .

[93] *See*, Rules and Regulation No. 187, Nebraska Public Service Commission, Aug.17, 2012.

[94] *See*, http://www.michigan.gov/mpsc/0,4639,7-159-16372-268981--,00.html.

intentional actions, and unintended consequences have caused an alarming number of call completion failures blamed on LCRs. In the following paragraphs, we address some of these issues.

7.2.1. What is Least Cost Routing? And How Does It Work?

Least Cost Routing, also known as Automatic Route Selection (ARS), is a programmable switching system software feature that enables the system to route a call to the appropriate carrier based on factors such as the type of call (e.g., local, local long distance, or long-haul long distance), the Class of Service[95] of the user, the time of day (e.g., prime time and non-prime time), and the day of the year (e.g., weekday, weekend day, or holiday).[96] As shown in Appendix B, a simplified model to complete a call from an urban caller to a rural end user involves three networks, 1) the originating communication provider (e.g., interexchange carrier, wireless, VoIP); 2) the intermediate long distance provider (this is where Least Cost Routing occurs); and 3) the terminating carrier (i.e., rural ILECs). If Least Cost Routing is implemented properly, everyone benefits. While it seems simple, in reality many factors contribute to the complexity of the Least Cost Routing selection. For instance, often the originating carrier negotiates a wholesale contract with a long distance least cost router. In turn, the wholesaler subcontracts with retail LCRs, and those retailers

[95] Real-time, uncompressed voice, fax, and video traffic, for example, typically are assigned the highest priority level, as they are not tolerant of latency and loss. E-mail and certain types of signaling and control messages typically are assigned the lowest priority level, as they are highly tolerant of latency and loss.

[96] In practice, ARS generally is based on a table lookup rather than a hierarchical parsing of a dialed telephone number and calculation of a least cost route.

CONFIDENTIAL EXHIBIT JM-II

Chart Showing ASR and PDD Rates for Indirect Routing to AT&T Mobility

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-JJ

Chart Showing Costs of Different Forms of Interconnection

[REDACTED PUBLIC VERSION]

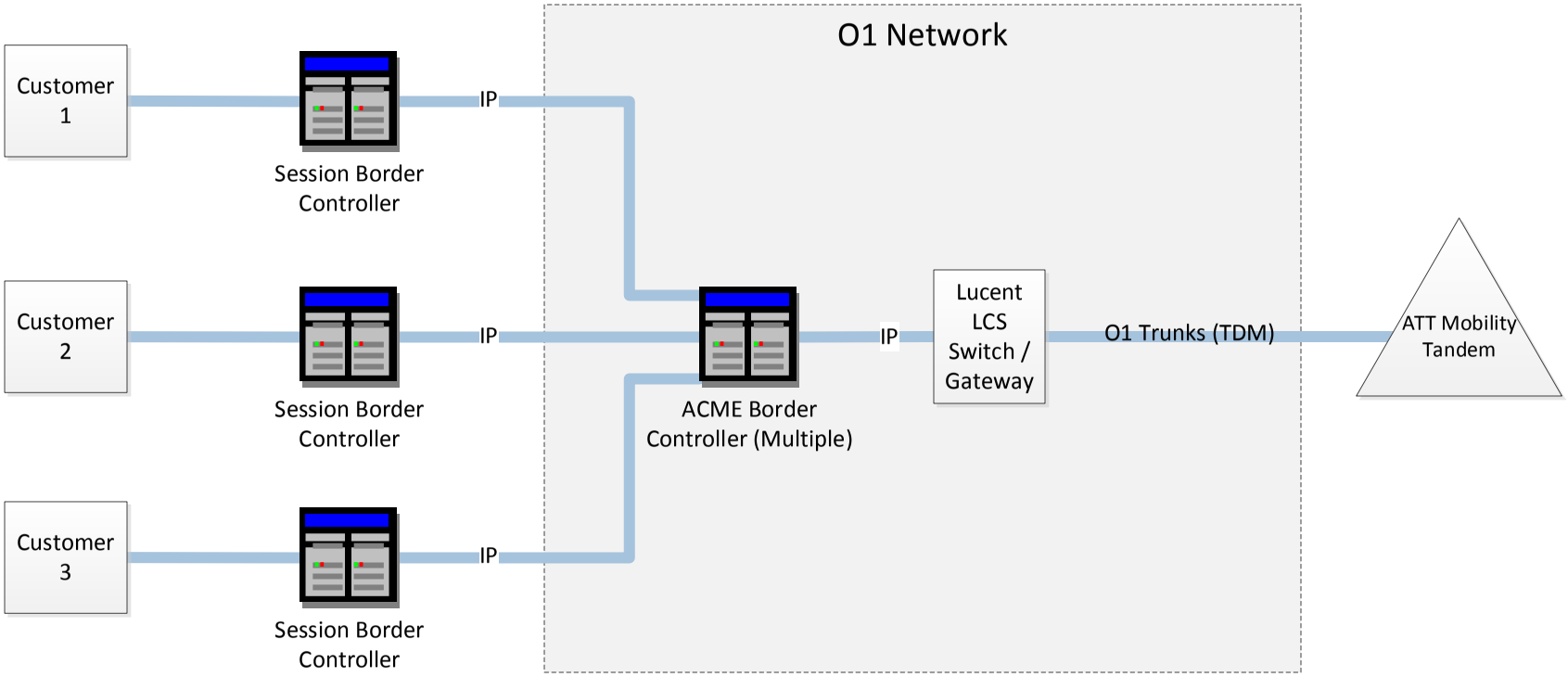
EXHIBIT JM-KK

Diagrams Showing Routing of Traffic to AT&T Mobility

Through Different Forms of Interconnection

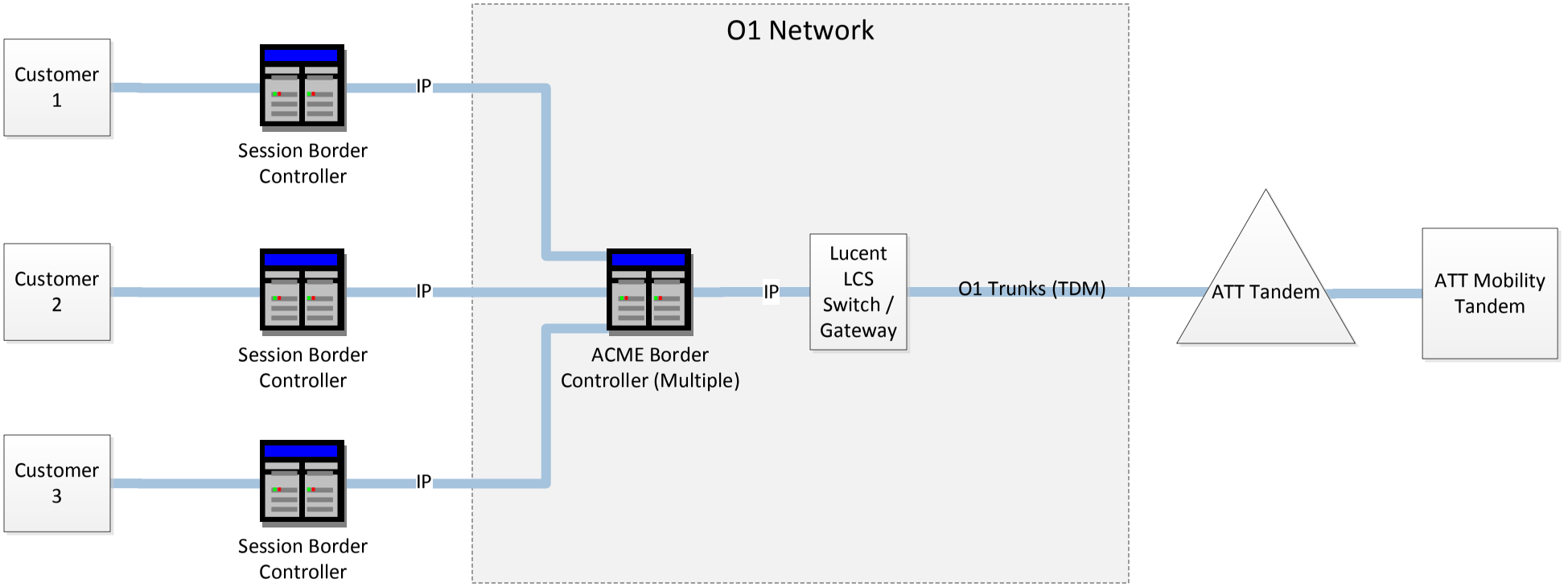
O1 Network

Delivery of traffic to ATT Mobility TDM direct connect



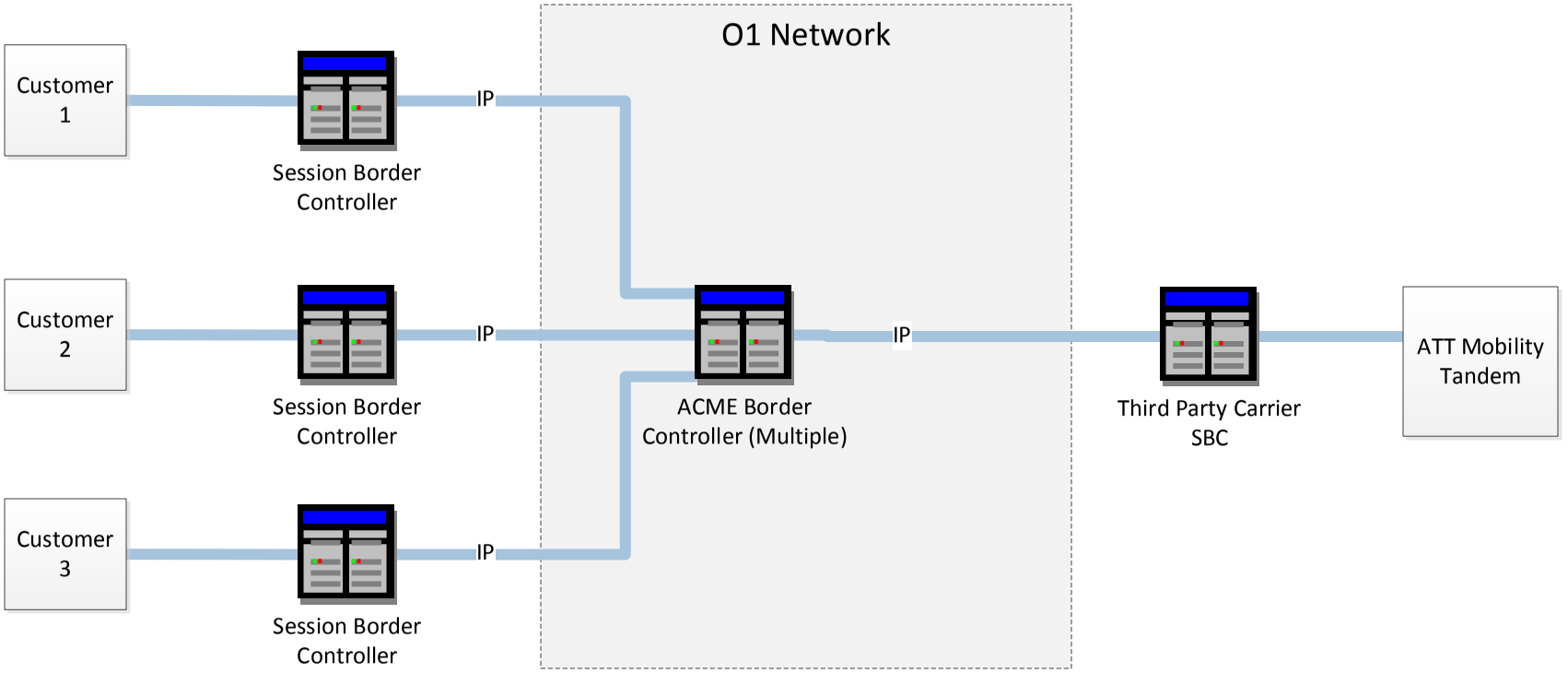
O1 Network

Delivery of traffic to ATT Mobility transit out ATT tandems



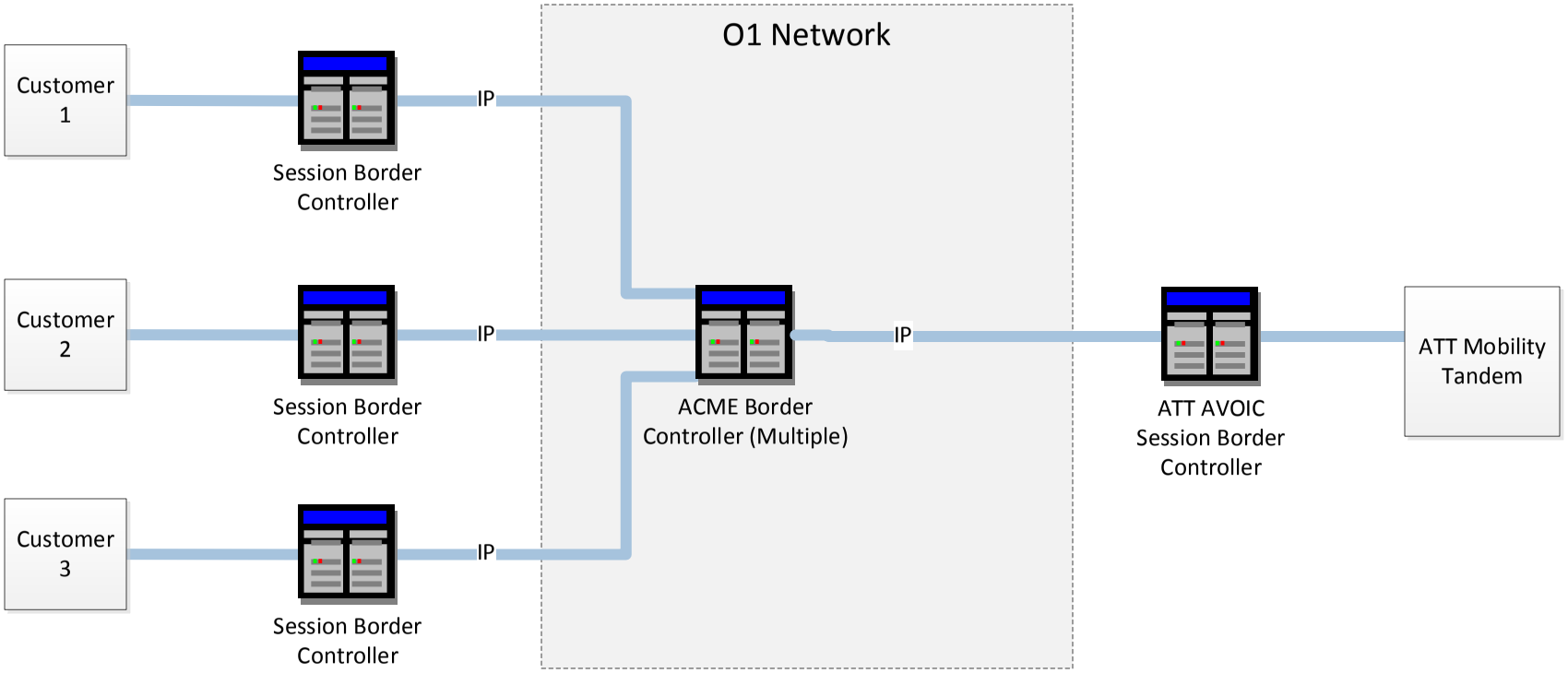
O1 Network

Delivery of traffic to ATT Mobility all vendors except AVOIC



O1 Network

Delivery of traffic to ATT Mobility using AVOIC



CONFIDENTIAL EXHIBIT JM-LL

Chart Showing the Number of MOUs Terminated to AT&T Mobility

Over Direct Connections, including jurisdiction

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-MM

Email correspondence between AT&T Mobility and O1 establishing direct connections

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-NN

8/21/12 Email from AT&T employee, Ola Oyefusi to L. Bax

[REDACTED PUBLIC VERSION]

EXHIBIT JM-OO

Excerpts of In the Matter of Developing an Unified Intercarrier Compensation Regime, Order on Reconsideration, WC Docket No. 01-92 (rel. Dec. 23, 2011)

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

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	
Developing an Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Lifeline and Link-Up	)	WC Docket No. 03-109
	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208

ORDER ON RECONSIDERATION

Adopted: December 23, 2011 **Released: December 23, 2011**

By the Commission:

1. In this Order, the Commission modifies on its own motion two aspects of the *USF/ICC Transformation Order.*[1]

2. In the *USF/ICC Transformation Order*, the Commission eliminated its former list of nine supported services and amended section 54.101 of the Commission's rules to specify that "voice telephony service" is supported by federal universal service support mechanisms.[2] The Commission found this to be a more technologically neutral approach that focuses on the functionality offered instead of the technologies used, while allowing services to be provided over any platform.[3] This approach also recognizes that many of the services enumerated in the previous rule are universal today and that the

[1] *See In the Matter of Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing an Unified Intercarrier Compensation Regime, Federal-State Joint Board on Universal Service, Lifeline and Link-Up, Universal Service Reform – Mobility Fund*, WC Docket No. 10-90, GN Docket No. 09-51, WC Docket No. 07-135, WC Docket No. 05-337, CC Docket No. 01-92, CC Docket No. 96-45, WC Docket No. 03-109, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, FCC 11-161 (rel. Nov. 18, 2011) (*USF/ICC Transformation Order*).

[2] *Id.* at para. 78; *see also id.* App. A at 536 (revising section 54.101(a) of the Commission's rules); *see* 76 FR 73830, 73870 (Nov. 29, 2011) (revising 47 C.F.R. § 54.101(a) with an effective date of December 29, 2011).

[3] *See USF/ICC Transformation Order* at para. 77.

importance of operator services and directory assistance, in particular, has declined with changes in the marketplace.[4] A number of parties have raised questions about how the amended rule should be understood to affect Lifeline-only ETCs and their compliance with section 214(e)(1)(A) of the Act, which requires a carrier to provide supported services using its own facilities, in whole or in part, in order to be eligible to receive support.[5] Several have urged the Commission to take action to ensure that there is no disruption to the services currently being provided to millions of eligible Lifeline consumers by ETCs that have already been designated based on their provision of supported services as previously defined by the Commission.[6]

3. We note that, in adopting the new definition of "voice telephony" in section 54.101, the Commission eliminated certain services and functionalities from the list of supported services, consistent with its findings regarding the evolution of the marketplace.[7] To more clearly reflect our intent to specify the attributes of "voice telephony" in the new definition, we amend section 54.101 to read: "Services designated for support. Voice telephony services shall be supported by federal universal service support mechanisms. Eligible voice telephony services must provide voice grade access to the public switched network or its functional equivalent; minutes of use for local service provided at no additional charge to end users; access to the emergency services provided by local government or other public safety organizations, such as 911 and enhanced 911, to the extent the local government in an eligible carrier's service area has implemented 911 or enhanced 911 systems; and toll limitation for qualifying low-income consumers (as described in subpart E of this part)."[8]

4. Additionally, we hereby affirm that only carriers that provide "voice telephony" as defined under section 54.101(a) as amended using their own facilities will be deemed to meet the requirements of section 214(e)(1). Thus, a Lifeline-only ETC does not meet the "own facilities" requirement of section 214(e)(1) if its only facilities are those used to provide functions that are no longer supported "voice telephony service" under amended rule 54.101, such as access to operator service or directory assistance.[5] Therefore, to be in compliance with our rules, Lifeline-only carriers that seek ETC designation after the December 29, 2011 effective date of the *USF/ICC Transformation Order,* as well as such carriers that had previously obtained ETC designation prior to December 29, 2011 on the basis of

[4] *See id.* para. 78 & n.114.

[5] Nexus Communications, Inc. Petition for Clarification and/or Reconsideration. WC Docket No. 10-90, GN Docket No. 09-51, WC Docket No. 07-135, WC Docket No. 05-337, CC Docket No. 01-92, CC Docket No. 96-45, WC Docket No. 03-109 (filed Dec. 14, 2011) (Nexus Petition); Letter from Mitchell F. Brecher, Greenberg Traurig, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-42 (filed Dec. 12, 2011); Letter from John J. Heitmann, Link Up for America Coalition, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 11-42, 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 96-45 and WT Docket No. 10-208 (filed Dec. 12, 2011) (Link Up Coalition Ex Parte); Letter from Mary C. Albert, CompTel, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 11-42, 03-109 and CC Docket No. 96-45 (filed Dec. 8, 2011); *see also* 47 U.S.C. § 214(e)(1)(A) (stating that an ETC receiving federal universal service support shall, throughout its designated service area, offer services that are supported by federal universal service mechanisms either using its own facilities or a combination of its own facilities and resale of another carrier's services).

[6] Nexus Petition at 4; Link Up Coalition Ex Parte at 1.

[7] The prior rule enumerated nine supported services in functional terms. *USF/ICC Transformation Order*, para. 76. Consistent with the marketplace findings in the *USF/ICC Transformation Order*, the new rule shifts away from terminology based on the "specific technology used to provide the supported service," *id.* at para. 77, and also did not include certain functionalities that had been in the prior rule. *See, e.g., id.* at para. 77 n.114 ("we do not mandate that ETCs provide operator services or directory assistance; we find the importance of these services to telecommunications consumers has declined with changes in the marketplace").

[8] *See* Appendix. We eliminate language stating that voice telephony service "include[s]" certain functionalities to eliminate the possibility that the list could be interpreted as non-exhaustive.

facilities associated solely with, for example, access to operator service or directory assistance, must either use their own facilities, in whole or in part, to provide the supported "voice telephony service," or obtain forbearance from the "own facilities" requirement from the Commission.[9] As discussed more fully below,[10] the effective date of this minor modification to the language in amended section 54.101 is the date of Federal Register publication of this Order on Reconsideration. To avoid disruption to consumers of previously designated ETCs, however, we set July 1, 2012 as the effective date of amended rule 54.101 for Lifeline-only ETCs in the service areas for which they were designated prior to December 29, 2011. We anticipate that the Commission may address the "own facilities" requirement for Lifeline providers in the near future in a subsequent order addressing the Commission's Lifeline program. In the event that this *Order on Reconsideration* is not published in the Federal Register before December 29, we will consider the amended rule as adopted in the *USF/ICC Transformation Order* suspended with respect to this limited class of ETCs, so that our actions in the *USF/ICC Transformation Order* do not impact existing state designations.

5. In the *USF/ICC Transformation Order*, the Commission adopted bill-and-keep as the default intercarrier compensation methodology for non-access traffic exchanged between local exchange carriers (LECs) and Commercial Mobile Radio Service (CMRS) providers. Rather than implementing a more gradual transition, the *USF/ICC Transformation Order* made the default bill-and-keep methodology applicable as of the effective date of the rules (December 29, 2011).[11] This timing reflected the Commission's balancing of the benefits of providing clarity and addressing arbitrage and, in particular, traffic pumping,[12] against the apparently small risk of marketplace disruption from doing so.[13] There was little, if any, evidence in the record that there would be significant harmful effects on any LECs as a result of this timing.[14] One factor supporting our conclusion with regard to incumbent LECs was the understanding that such carriers would be eligible to receive recovery as part of the transitional recovery mechanism for reductions in net reciprocal compensation payments.[15] Another factor was adoption of an interim rule that limited the responsibility for transport costs applicable to non-access traffic exchanged between CMRS providers and rural, rate-of-return incumbent LECs.[16]

6. We now reconsider the balancing of benefits and burdens in this context. We find it more appropriate to make the default bill-and-keep compensation methodology for LEC-CMRS non-access traffic consistent with the start of the transitional intercarrier compensation recovery mechanism for carriers that were exchanging LEC-CMRS traffic under existing interconnection agreements prior to the adoption date of the *USF/ICC Transformation Order*. Under the recovery rules as adopted, the transitional recovery mechanism does not begin until July 1, 2012, and it is unclear whether incumbent

[9] This action is consistent with our conclusions that, taking into account changes in technologies and services, the importance of functions such as access to operator services and directory assistance has declined. *See supra* para. 2. *See also USF/ICC Transformation Order*, paras. 77-78 & n.114; 47 U.S.C. § 254(c)(1) (directing the Commission to establish a definition of universal service "taking into account advances in telecommunications and information technologies and services").

[10] *See infra* para. 12.

[11] *See USF/ICC Transformation Order* at paras. 995-97. This rule, 47 C.F.R. § 51.705(a), was published in the Federal Register on November 29, with an effective date of December 29, 2011. *See* 76 FR 73830, 73855 (Nov. 29, 2011).

[12] *USF/ICC Transformation Order* at para. 995. We found for several reasons that this problem was more acute with respect to this traffic than with respect to other LEC traffic. *Id.*

[13] *Id.* at paras. 996-97.

[14] *Id.*

[15] *Id.* at para 997; *see also id.* at para. 847; 47 C.F.R. §§ 51.915(d), 51.917(d), 54.1101.

[16] *See USF/ICC* Transformation *Order* at para. 998-99 & App. A, 47 C.F.R. § 51.709 (c)

LECs will be eligible to receive recovery for reductions in revenues from December 29, 2011 through July 1, 2012.[17] The Commission had anticipated carriers would continue to receive payment at the rates in place under existing interconnection agreements while they were being renegotiated.[18] However, we believe that this assumption is over-inclusive and not entirely accurate since interconnection agreements are negotiated between two parties and contain different terms and conditions for implementing change of law provisions – indeed, some may relate back to the effective date of the new rule, rather than when the renegotiated agreement is in place.[19] Moreover, the Commission believed that, as a general matter, LEC-CMRS agreements contained rates at $0.0007 or less as their reciprocal compensation rate.[20] Parties indicate, however, that many existing LEC-CMRS agreements reflect reciprocal compensation rates "much higher than $0.0007."[21] Thus, the supplemental record suggests that the Commission did not accurately assess the impact of its decision to immediately move to bill-and-keep for all LECs for this category of traffic.

7. Enabling carriers that have effective interconnection agreements governing the exchange of LEC-CMRS non-access traffic as of the adoption date of the *USF/ICC Transformation Order* to continue to exchange traffic and receive compensation pursuant to those existing agreements until July 1, 2012 will minimize market disruption, while enabling carriers to begin the process of revising such agreements immediately.[22] In contrast, carriers exchanging LEC-CMRS non-access traffic without an interconnection agreement do not receive such compensation today, so we find no likelihood of

[17] Commenters interpreting the Commission's rules question the ability to recover through the recovery mechanism lost revenues that occur between December 29, 2011 and June 30, 2012 *See, e.g.,* Letter from Michael R. Romano, Senior Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 1-2 (filed Dec. 14, 2011) (NTCA Dec. 14 *Ex Parte* Letter); Letter from Karen Brinkmann, Counsel for CenturyLink, Fairpoint Communications, Inc., Frontier Communications Corp., and Windstream Communications, Inc., to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 2 (filed Dec. 16, 2011) (Mid-Sized LECs Dec. 16 *Ex Parte* Letter).

[18] *See USF/ICC Transformation Order* at para. 1000.

[19] *See* Letter from Jeffrey Lanning, Assistant Vice President, Regulatory, CenturyLink, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92 (filed Dec. 20, 2011).

[20] *See USF/ICC Transformation Order* at para. 997.

[21] Mid-Sized LECs Dec. 15 *Ex Parte* Letter at 2; Letter from Thomas Jones and Nirali Patel, Counsel for Integra Telecom, Inc. and tw telecom inc., to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 2 (filed Dec. 19, 2011) (providing additional evidence that reciprocal compensation rates for LEC-CMRS non-access traffic exchanged pursuant to interconnection agreements are substantially higher than $0.0007). *See also* Letter from Yaron Dori and Matthew S. DelNero, Counsel to TDS Telecom, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 2 (filed Dec. 19, 2011) (submitting data "confirming the relative significance" of this revenue for LECs).

[22] As one *ex parte* filing notes, the Commission has before it requests to "... delay the implementation of bill and keep for intraMTA CMRS-LEC traffic exchange or, in the alternative, to ensure the incumbent LECs are able to offset any 'lost' revenue through the Access Recovery Mechanism." Letter from Steven F. Morris, Vice President and Associate General Counsel, National Cable & Telecommunications Association, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 1 (filed Dec. 19, 2011) (citing NTCA Dec. 14 *Ex Parte* Letter; Mid-Sized LECs Dec. 14 *Ex Parte* Letter). We conclude it is appropriate to harmonize the beginning or the transition to bill-and-keep for such traffic exchanged subject to interconnection agreements with the beginning of associated recovery because that was the intent of the *Order*. Moreover, we decline to allow the rule to go into effect and provide incumbent LECs with additional recovery for the period from December 29, 2011 and June 30, 2012. Because the Commission lacks sufficient data at a granular level for us to quantify the impact of any such "true up", adopting a "true up" approach likely could enable carriers to get additional recovery from the CAF that was not anticipated in the budget. Given our commitment to keeping within the CAF budget and our inability to quantify with certainty the impact of any such "true up", we decline to adopt this "true up" approach.

marketplace disruption that would support reconsideration of our decision in that context.[23] Accordingly, intercarrier compensation for non-access traffic exchanged between LECs and CMRS providers pursuant to an interconnection agreement in effect as of the adoption date of this Order, will be subject to a default bill-and-keep methodology on July 1, 2012 rather than on December 29, 2011.[24] In the event that this Order is not published in the Federal Register before December 29, 2011, we also find good cause to waive these requirements to the extent necessary to preserve the status quo until such time that this Order goes into effect. The Commission may waive its rules for good cause shown.[25] We find that waiver, if needed to preserve the status quo for a limited period consistent with this Order, will serve the public interest by protecting against the potential marketplace disruption, described above, that the Commission sought to avoid through the intercarrier compensation rule changes adopted in this Order. We expect that, unless parties mutually agree otherwise, traffic will continue to be exchanged pursuant to existing interconnection agreements between the adoption date of this Order and June 30, 2012. We caution that parties should not use this Order as an opportunity to abuse the distinction between traffic subject to an interconnection agreement as of the adoption date of the *USF/ICC Transformation Order* and traffic not subject to an interconnection agreement in order to engage in arbitrage to avoid payment of intercarrier compensation charges. Indeed, the Commission will be monitoring the situation and will not hesitate to take action if it appears any such arbitrage is occurring.

8. We strongly urge all parties with such agreements to immediately begin preparations for the July 1 effective date of the transitional recovery mechanism, including by commencing discussions regarding change-of-law provisions, if applicable.[26] LECs should not view this Order as an excuse for delaying negotiations or deferring preparations.[27] To ensure that the change we adopt does not create incentives to engage in such delay, and consistent with the balance of interests discussed above, we provide that, unless parties mutually agree otherwise, starting on July 1, 2012, compensation for traffic

[23] We acknowledge that under the *T-Mobile Order*, a LEC may receive interim compensation absent an interconnection agreement after making a request for interconnection. *See Developing a Unified Intercarrier Compensation Regime; T-Mobile et al. Petition for Declaratory Ruling Regarding Incumbent LEC Wireless Termination Tariffs*, CC Docket No. 01-92, Declaratory Ruling and Report and Order, 20 FCC Rcd 4855, 4865, para. 16 (2005), *petitions for review pending, Ronan Tel. Co. et al. v. FCC*, No. 05-71995 (9th Cir. filed Apr. 8, 2005); 47 C.F.R. section 20.11(e). Given our adoption of a default bill-and-keep methodology for all non-access LEC-CMRS traffic, we decline to permit LECs to receive an increase in compensation after the adoption date of this Order. Indeed, we are harmonizing the effective date of the rule to July 1, 2012 (where carriers had an interconnection agreement in place as of the adoption date of this Order) to avoid market disruption and harmonize rate reductions with the recovery rules. Permitting LECs to receive increased compensation during this time would be in tension with these principles. We therefore amend subsection section 20.11 of the Commission's rules to ensure consistency between our decision in the *USF/ICC Transformation Order* and our rules. *See* Appendix.

[24] We similarly adjust the timing of the rural transport rule because the basis for this rule was a gradual transition for these carriers to the default bill-and-keep methodology and therefore the timing for the two rules should be the same. *See USF/ICC Transformation Order* App. A at 509 (amending § 51.709(c)). We emphasize that, by providing for a default bill-and-keep methodology to apply on July 1, 2012 rather than on December 29, 2011, we do not extend the terms of existing contracts until July 1, 2012 that would otherwise expire before that time.

[25] *See* 47 C.F.R. § 1.3. *See also Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (*citing WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969) (petitioners for waiver must show special circumstances warranting a deviation from the general rule, and show such deviation will serve the public interest)).

[26] *See* Letter from Norina T. Moy, Director, Government Affairs, Sprint, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 01-92, at 2 (filed Dec. 16, 2011).

[27] Indeed, evidence of such delay could be tantamount to a violation of a LEC's obligation to negotiate interconnection agreements in good faith. *See* 47 U.S.C. § 251(c)(1) (requiring that incumbent LECs engage in good faith negotiations); *Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services*, GN Docket No. 93-252, Second Report and Order, 9 FCC Rcd 1411, 1497 paras. 229-30 (1994) (requiring LEC-CMRS interconnection agreements to be negotiated in good faith).

exchanged during the re-negotiation of interconnection agreements with change-of-law provisions[28] will be subject to true-up at the level of reciprocal compensation for non-access LEC-CMRS traffic established in the resulting interconnection agreement, whether the default of bill-and-keep or other pricing negotiated by the carriers. We find that this limited departure from the Commission's prior determination not to override compensation arrangements in existing contracts is justified to ensure that the onset of bill-and-keep is not unilaterally delayed beyond the intended transition period due to delayed or extended re-negotiations under contractual change-of-law provisions.[29] When the Commission set an immediate effective date for a default bill-and-keep methodology for this traffic in the *USF/ICC Transformation Order*, we found that re-negotiation under such provisions would help provide a reasonable transition for LECs with such agreements. Now, the change in the effective date for bill-and-keep provides a transition for non-access LEC-CMRS traffic to mitigate marketplace disruption for carriers for which these revenues may be significant today. Given that change, we find that this measure is necessary to maintain the balance of benefits to consumers and carriers from a default bill-and-keep methodology that the Commission intended in the *USF/ICC Transformation Order*. Further, because of the limited nature of this modification, we find that it will not have the harmful effects that concerned the Commission in adopting its general policy on existing agreements.[30] We also find that adoption of this limited measure will have minimal adverse impact on carriers.[31]

9. *Regulatory Flexibility Certification.* The Regulatory Flexibility Act (RFA)[32] requires that agencies prepare a regulatory flexibility analysis for notice-and-comment rulemaking proceedings, unless

[28] To be subject to this requirement, an interconnection agreement must have a change-of-law provision triggered by Commission changes to intercarrier compensation regulations.

[29] *See* Letter from Carl W. Northrup, Counsel to MetroPCS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 96-45, WT Docket No. 10-208 at 9 (filed Dec. 21, 2011) (urging the Commission to distinguish between situations where there was an existing agreement between a CMRS carrier and the LEC at the time of the *CAF/ICC Transformation Order* from those situations where no agreement existed); *see also* Letter from Scott K. Bergmann, CTIA, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 07-135, 05-337, GN Docket No. 09-51, CC Docket No. 01-92 at 5-6 (filed Dec. 22, 2011).

[30] In particular, we emphasize that this change does not affect contracts that do not have change-of-law provisions, and does not require a "fresh look" for contracts, and thus do not deprive carriers of the benefit of long-term contracts. The impact of this modification on carriers is further limited because it will not apply to traffic exchanged during negotiations except where such negotiations extend beyond June 30, 2012.

[31] For example, this limited action will not improperly interfere with investment-backed decisions because any resulting net reduction in reciprocal compensation received by incumbent LECs will be subject to potential recovery through the recovery mechanism beginning in July 1, 2012, as specified in the *USF/ICC Transformation Order*. *See supra* para. 5. Other carriers' resulting net loss of intercarrier compensation can be recovered through other rates. *See, e.g.*, *USF/ICC Transformation Order*, paras. 864-66. In addition, carriers have entered these agreements against the backdrop of long-contemplated intercarrier compensation reform. *See, e.g.*, *Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, Notice of Proposed Rulemaking, 16 FCC Rcd 9610 (2001); *see also, e.g.*, *2008 Order and ICC/USF FNPRM*, 24 FCC Rcd 6475, 6627, App. A, para. 292 (seeking comment on a proposal to allow a "fresh look" for interconnection agreements in "evergreen" status); *id.* at 6825, App. C at para. 287 (same). We also note that prior Commission actions in the context of LEC-CMRS intercarrier compensation have provided more broadly for a "fresh look" of agreements as a result of intercarrier compensation reforms. *See, e.g.*, *Local Competition Order*, 11 FCC Rcd 15499, 16044-45, para. 1095 (1996). Moreover, because our actions here will not deprive any carrier of the opportunity for adequate cost recovery and otherwise are reasonable, they do not constitute a regulatory taking. *See USF/ICC Transformation Order*, para. 925. *See also Connolly v. Pension Ben. Guaranty Corp.*, 475 U.S. 211, 224-25 (1986); *FPC v. Hope Natural Gas Co.*, 320 U.S. 591, 605 (1944).

[32] *See* 5 U.S.C. § 604. The RFA, *see* 5 U.S.C. § 601 *et seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities."[33] We hereby certify that this rule revision will not have a significant economic impact on a substantial number of small entities, because the action merely maintains the status quo for the entities affected. The Commission will send a copy of this Order, including this certification, to the Chief Counsel for Advocacy of the Small Business Administration.[34] In addition, the *Order* (or a summary thereof) and certification will be published in the Federal Register.[35]

10. *Paperwork Reduction Act Analysis.* This document contains no modified information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104-13. There is also no information collection associated with this rule revision, so no OMB approval is required for the revised rules.

11. *Congressional Review Act.* The Commission will send a copy of this Order on Reconsideration in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act ("CRA").[36]

12. *Effective Date.* We conclude that good cause exists to make the effective date of the amendments to rule 54.101 effective immediately upon publication in the Federal Register, pursuant to section 553(d)(3) of the Administrative Procedure Act.[37] Agencies determining whether there is good cause to make a rule revision take effect less than 30 days after Federal Register publication must balance the necessity for immediate implementation against principles of fundamental fairness that require that all affected persons be afforded a reasonable time to prepare for the effective date of a new rule.[38] In this instance, no ETC will be prejudiced by this Order being effective immediately upon publication in the Federal Register because this action merely clarifies the intent of the *USF/ICC Transformation Order* and, by delaying the implementation date of the modified rule, restores the status quo for Lifeline-only ETCs in those states where they have already been designated that existed prior to the *USF/ICC Transformation Order* for a defined period of time. This will allow the Commission the opportunity to take further action with respect to the "own facilities" requirement for such providers in the context of the low-income program.

13. We also conclude that good cause exists to make the revisions to sections 20.11(e), 51.705(a), and 51.709(c) effective immediately upon publication in the Federal Register.[39] As discussed above, allowing the rules subject to this Order to go into effect on December 29, 2011 may potentially result in a significant financial impact on LECs exchanging non-access LEC-CMRS traffic pursuant to interconnection agreements, contrary to the Commission's initial assumptions. Thus, we find good cause to make these rule revisions take effect upon publication in the Federal Register. Again, no parties will be prejudiced by this Order being effective immediately upon publication in the Federal Register because this action merely permits LECs and CMRS providers exchanging non-access traffic pursuant to an interconnection agreement to maintain the status quo for a defined period of time.

14. ACCORDINGLY, IT IS ORDERED, pursuant to the authority contained in sections 1, 2, 4(i), 201-206, 214, 218-220, 251, 252, 254, 256, 303(r), 332, 403 of the Communications Act of 1934, as

[33] 5 U.S.C. § 605(b).

[34] *Id.*

[35] *Id.*

[36] *See* 5 U.S.C. § 801(a)(1)(A).

[37] 5 U.S.C. § 553(d)(3). For Lifeline-only ETCs that have already been designated, our intent is to preserve the status quo in the service areas for which they are currently designated for a limited period of time as set forth above.

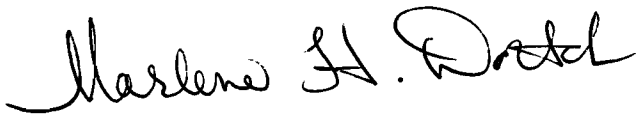
[38] *Omnipoint Corporation v. FCC*, 78 F.3d 620, 630 (D.C. Cir. 1996), *citing United States v. Gavrilovic*, 551 F.2d 1099, 1105 (8th Cir. 1977).

[39] 5 U.S.C. § 553(d)(3).

amended, and section 706 of the Telecommunications Act of 1996, 47 U.S.C. §§ 151, 152, 154(i), 201-206, 214, 218-220, 251, 252, 254, 256, 303(r), 332, 403, 1302, and sections 1.1 and 1.108 of the Commission's rules, 47 C.F.R. §§ 1.1, 1.108, that this Order on Reconsideration IS ADOPTED.

15. IT IS FURTHER ORDERED that the Order shall become effective immediately upon publication in the Federal Register, with the exception of the waiver of sections 51.705(a) and 51.709(c), 47 C.F.R. §§ 51.705(a), 51.709(c), to the extent described above, which is effective upon release.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47

CFR parts 20 and 54 to read as follows:

PART 20 -- COMMERCIAL MOBILE RADIO SERVICES

1. The authority citation for Part 20 continues to read as follows:

Authority: 47 U.S.C. 154, 160, 201, 251–254, 301, 303, 316, and 332 unless otherwise noted. Section 20.12 is also issued under 47 U.S.C. 1302.

2. Section 20.11 is amended by revising paragraph (e) to read as follows:

§20.11 Interconnection to facilities of local exchange carriers.

* * * * *

(e) An incumbent local exchange carrier may request interconnection from a commercial mobile radio service provider and invoke the negotiation and arbitration procedures contained in section 252 of the Act. A commercial mobile radio service provider receiving a request for interconnection must negotiate in good faith and must, if requested, submit to arbitration by the state commission.

* * * * *

PART 54—UNIVERSAL SERVICE

1. The authority citation for part 54 continues to read as follows:

Authority: 47 U.S.C. 151, 154(i), 201, 205, 214, 219, 220, 254, 303(r), 403, and 1302 unless otherwise noted.

Subpart B—Services Designated for Support

2. Revise §54.101 to read as follows:

§ 54.101 Supported services for rural, insular and high cost areas.

(a) Services designated for support. Voice telephony services shall be supported by federal universal service support mechanisms. Eligible voice telephony services must provide voice grade access to the public switched network or its functional equivalent; minutes of use for local service provided at no additional charge to end users; access to the emergency services provided by local government or other public safety organizations, such as 911 and enhanced 911, to the extent the local government in an eligible carrier's service area has implemented 911 or enhanced 911 systems; and toll limitation for qualifying low-income consumers (as described in subpart E of this part).

*****

EXHIBIT JM-PP

Excerpts of In the Matter of Developing an Unified Intercarrier Compensation Regime, Report and Order and FNPR, 26 FCC Rcd. 17663 (rel. Nov. 18, 2011)

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

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	
Developing an Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Lifeline and Link-Up	)	WC Docket No. 03-109
	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208

REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING

Adopted: October 27, 2011 **Released: November 18, 2011**

Comment Date on Sections XVII.A-K: January 18, 2012
Reply Comment Date on Sections XVII.A-K: February 17, 2012
Comment Date on Sections XVII.L-R: February 24, 2012
Reply Comment Date on Sections XVII.L-R: March 30, 2012

By the Commission: Chairman Genachowski and Commissioners Copps and Clyburn issuing separate statements; Commissioner McDowell approving in part, concurring in part and issuing a statement.

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specify the transition to reduce these rates further at this time. Instead, we seek comment regarding the transition and recovery for such other rate elements in the FNPRM.[1494]

801. Thus, at the outset of the transition, all interstate switched access and reciprocal compensation rates will be capped at rates in effect as of the effective date of the rules.[1495] We cap these rates as of the effective date of the Order, as opposed to a future date such as January 1, 2012,[1496] to ensure that carriers cannot make changes to rates or rate structures to their benefit in light of the reforms adopted in this Order. For price cap carriers, all intrastate rates will also be capped, and, for rate-of-return carriers, all terminating intrastate access rates will also be capped. Consistent with many proposals in the record, our transition plan provides rate-of-return carriers, whose rates typically are higher, additional time to transition as appropriate. Specifically, we conclude that a six-year transition for price cap carriers and competitive LECs that benchmark to price cap carrier rates and a nine-year transition for rate-of-return carriers and competitive LECs that benchmark to rate-of-return carrier rates to transition rates to bill-and-keep strikes an appropriate balance that will moderate potential adverse effects on consumers and carriers of moving too quickly from the existing intercarrier compensation regimes.[1497]

Intercarrier Compensation Reform Timeline		
Effective Date	**For Price Cap Carriers and CLECs that benchmark access rates to price cap carriers**[1498]	**For Rate-of-Return Carriers and CLECs that benchmark access rates to rate-of-return carriers**[1499]
Effective Date of the rules	All intercarrier switched access rate elements, including interstate and intrastate originating and terminating rates and reciprocal compensation rates are capped.	All interstate switched access rate elements, including all originating and terminating rates and reciprocal compensation rates are capped. Intrastate terminating rates are also capped.

[1494] We do, however, cap price cap interstate and intrastate originating access rates to combat potential arbitrage and other efforts designed to increase or otherwise maximize sources of intercarrier revenues during the transition.

[1495] Although the ABC Plan and Joint Letter proposed that rates should be capped on January 1, 2012, ABC Plan at 11, Joint Letter at 3, we cap such rates as of the effective date of the rules. This will ensure that carriers do not seek to inflate their access charges in advance of our reforms. Specifically, we cap all rate elements in the "traffic sensitive basket" and the "trunking basket" as described in 47 C.F.R. §§ 61.42(d)(2)-(3) unless a price cap carrier made a tariff filing increasing any such rate element prior to the effective date of the rules and such change was not yet in effect.

[1496] *See* ABC Plan, Attach. 1 at 11; Joint Letter at 3 & n.1.

[1497] As a baseline, we adopt the transition proposed in the ABC Plan and Joint Letter with the addition of an extra year to allow each set of carriers to complete a transition to bill-and-keep. *See id.*

[1498] ABC Plan, Attach. 1 at 11. We note that CMRS providers are subject to mandatory detariffing. Nonetheless, CMRS providers are included in the transition to the extent their reciprocal compensation rates are inconsistent with the reforms we adopt here.

[1499] Joint Letter at 3 & n.1. We note that carriers remain free to make elections regarding participation in the NECA pool and tariffing processes during the transition. *See* 47 C.F.R. § 69.601 et seq. At the same time, we decline to adopt the Rural Associations' proposal to require carriers that withdraw from NECA association tariffs for switched access elements to continue to contribute to the pool as if they had remained part of the NECA pool. *See* Letter from Michael R. Romano, Senior Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos.10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 96-45, Attach. at 25 (filed Oct. 17, 2011). Such a requirement would frustrate efficiencies generated by our reforms and could unnecessarily burden carriers with costs that are no longer necessary.

July 1, 2012	Intrastate terminating switched end office[1500] and transport rates,[1501] originating and terminating dedicated transport,[1502] and reciprocal compensation rates, if above the carrier's interstate access rate, are reduced by 50 percent of the differential between the rate and the carrier's interstate access rate.	Intrastate terminating switched end office[1503] and transport rates,[1504] originating and terminating dedicated transport,[1505] and reciprocal compensation rates, if above the carrier's interstate access rate, are reduced by 50 percent of the differential between the rate and the carrier's interstate access rate.
July 1, 2013	Intrastate terminating switched end office and transport rates and reciprocal compensation, if above the carrier's interstate access rate, are reduced to parity with interstate access rate.	Intrastate terminating switched end office and transport rates and reciprocal compensation, if above the carrier's interstate access rate, are reduced to parity with interstate access rate.
July 1, 2014	Terminating switched end office and reciprocal compensation rates are reduced by one-third of the differential between end office rates and $0.0007.*	Terminating switched end office and reciprocal compensation rates are reduced by one-third of the differential between end office rates and $0.005.*
July 1, 2015	Terminating switched end office and reciprocal compensation rates are reduced by an additional one-third of the original differential to $0.0007.*	Terminating switched end office and reciprocal compensation rates are reduced by an additional one-third of the original differential to $0.005.*
July 1, 2016	Terminating switched end office and reciprocal compensation rates are reduced to $0.0007.*	Terminating switched end office and reciprocal compensation rates are reduced to $0.005.*
July 1, 2017	Terminating switched end office and reciprocal compensation rates are reduced to bill-and-keep. Terminating switched end office and transport are reduced to $0.0007 for all terminating traffic within the tandem serving area when the terminating carrier owns the serving tandem switch.	Terminating end office and reciprocal compensation rates are reduced by one-third of the differential between its end office rates ($0.005) and $0.0007.*
July 1, 2018	Terminating switched end office and transport are reduced to bill-and-keep for all terminating traffic within the tandem serving area when the terminating carrier owns the serving tandem switch.	Terminating switched end office and reciprocal compensation rates are reduced by an additional one-third of the differential between its end office rates as of July 1, 2016 and $0.0007.*
July 1, 2019		Terminating switched end office and reciprocal compensation rates are reduced to $0.0007.*
July 1, 2020		Terminating switched end office and reciprocal compensation rates are reduced to bill-and-keep.*

[1500] *See* App. A, 47 C.F.R. § 51.903(d).

[1501] *See* App. A, 47 C.F.R. § 51.903(i).

[1502] *See* App. A, 47 C.F.R. § 51.903(c).

[1503] *See* App. A, 47 C.F.R. § 51.903(d).

[1504] *See* App. A, 47 C.F.R. § 51.903(i).

[1505] *See* App. A, 47 C.F.R. § 51.903(c).

* Transport rates remain unchanged from the previous step.

Figure 9

802. We believe that these transition periods strike the right balance between our commitment to avoid flash cuts and enabling carriers sufficient time to adjust to marketplace changes and technological advancements, while furthering our overall goal of promoting a migration to modern IP networks.[1506] We find that consumers will benefit from this regulatory transition, which enables their providers to adapt to the changing regulatory and technical landscape and will enable a faster and more efficient introduction of next-generation services.

803. The transition we adopt is partially based on a stakeholder proposal,[1507] with certain modifications, including the adoption of a bill-and-keep methodology as the end state for all traffic. As explained further below, states will play a key role in implementing the framework we adopt today. In particular, states will oversee changes to intrastate access tariffs to ensure that modifications to intrastate tariffs are consistent with the framework and rules we adopt today. For example, states will help guard against carriers improperly moving costs between or among different rate elements to reap a windfall from reform.

804. Since intercarrier compensation charges are constrained by the transition glide path that we adopt, we will be monitoring to ensure that carriers do not shift costs to other rate elements that are not specifically covered, such as special access or common line. We also clarify that, in cases where a provider's interstate terminating access rates are higher than its intrastate terminating access rates, intrastate rate reductions shall begin to occur at the stage of the transition in which interstate rates come to parity with intrastate rate levels.[1508]

805. The transition imposes a cap on originating intrastate access charges for price cap carriers at current rates as of the effective date of the rules. The transition does not cap originating intrastate access charges for rate-of-return carriers. Rate-of-return carriers suggested that it would not be viable for them to reduce terminating switched rates, while at the same time reducing originating rates without overburdening the Universal Service Fund.[1509] In the meantime, rate-of-return carriers indicate that the wholesale long distance market will constrain originating rates.[1510] Given our commitment to control the

[1506] We decline to adopt a "tribal carve-out" for ICC reform as proposed by Gila River. *See* Letter from Tom W. Davidson, Counsel to Gila River Telecommunications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 09-51, WC Docket Nos. 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45 at 2 n.2 (filed Oct. 21, 2011). There is insufficient evidence in the record demonstrating that any such carve-out is necessary; nor is there any evidence that the recovery mechanism we adopt below, coupled with the Total Earnings Review process for additional recovery described below, is somehow insufficient for Tribal carriers. Moreover, we are concerned that such a carve-out could invite arbitrage opportunities that we are seeking to curtail in this Order.

[1507] *See* ABC Plan, Attach. 1 at 11; Joint Letter at 3 & n.1.

[1508] *See* App. A, 47 C.F.R. §§ 51.907, 909. As we describe above, in most cases intrastate terminating access rates are higher than intrastate rates (*see supra* para. 791), and we believe that initially focusing our reforms to address this disparity is appropriate. *But see* Letter from Tina Pidgeon et al., General Communication, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 96-45 at 2 (filed Oct. 6, 2011) (proposing that the higher of interstate or intrastate access rates be reduced during the first two years).

[1509] Rural Associations *August 3 PN* Comments at 40.

[1510] *Id.* at 41 ("[I]f originating access rates are not reduced . . . then the interexchange carriers upon which RLECs rely to provide retail toll service will likely increase their wholesale rates . . . . Another likely outcome is that some IXCs may simply exit rural markets and no longer provide wholesale services to RLECs.").

size of the CAF and minimize burdens on consumers, we do not cap intrastate originating access charges for rate-of-return carriers at this time. As noted above, we have placed priority on reform of terminating access charges and we are mindful of the compromises that must be made to accomplish meaningful reform in a measured and timely manner. In the FNPRM, we seek comment on the transition of *all* originating access charges to bill-and-keep, including originating intrastate access charges for rate-of-return carriers.

806. *CMRS Providers*. As noted above, CMRS providers will be subject to the transition applicable to price cap carriers. Although CMRS providers are subject to mandatory detariffing, these providers are included to the extent their reciprocal compensation rates are inconsistent with the reforms we adopt here.[1511] In section XV, we also address compensation for non-access traffic exchanged between LECs and CMRS providers. As we detail in that section, we immediately adopt bill-and-keep as the default compensation methodology for non-access traffic exchanged between LECs and CMRS providers under section 20.11 of our rules and Part 51.

807. *Competitive LECs*. To ensure smooth operation of our transition, we provide competitive LECs that benchmark their rates a limited allowance of additional time to make tariff filings during the transition period. Application of our access reforms will generally apply to competitive LECs via the CLEC benchmarking rule.[1512] For interstate switched access rates, [1513] competitive LECs are permitted to tariff interstate access charges at a level no higher than the tariffed rate for such services offered by the incumbent LEC serving the same geographic area (the benchmarking rule).[1514] There are two exceptions to the general benchmarking rule. First, rural competitive LECs offering service in the same areas as non-rural incumbent LECs are permitted to "benchmark" to the access rates prescribed in the NECA access tariff, assuming the highest rate band for local switching (the rural exemption). Second, as explained in Section XI.A above, competitive LECs meeting the access revenue sharing definition are required to benchmark to the lowest interstate switched access rate of a price cap LEC in the state.[1515] Because we retain the CLEC benchmark rule during the transition, we allow competitive LECs an extra 15 days from the effective date of the tariff to which a competitive LEC is benchmarking to make its filing(s). We emphasize that the rates that are filed by the competitive LEC must comply with the applicable benchmarking rate. As is the case now, we decline to adopt rules governing the rates that competitive LECs may assess on their end users.

[1511] *See supra* note 1498.

[1512] In cases where more than one incumbent LEC operates within a competitive LEC's service area and those incumbent LECs are both price cap and rate-of-return regulated, a question may arise as to the appropriate transition track for the competitive LEC. *See Access Charge Reform: Reform of Access Charges Imposed by Competitive Local Exchange Carriers*, CC Docket No. 96-262, Eighth Report and Order and Fifth Order on Reconsideration, 19 FCC Rcd 9108, 9131-32, paras 46-48 (2004). If the competitive LEC tariffs a benchmarked or average rate in such circumstances, that competitive LEC shall adopt the transition path applicable to the majority of lines capable of being served in its territory. For example, if price cap carriers serve 70 percent of a competitive LEC's service territory and rate-of-return carriers serve 30 percent of the service territory, then the competitive LEC using a blended rate should follow the price cap transition.

[1513] References to access services and access rate elements in our rules or otherwise does not presuppose the application of access charge regulation.

[1514] *See* 47 C.F.R. § 61.26; *see also CLEC Access Reform Order*, 16 FCC Rcd at 9925, para. 3.

[1515] *See infra* para. 679.

CONFIDENTIAL EXHIBIT JM-QQ

Excerpts of AT&T Mobility Responses to Data Requests

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-RR

Excerpts of AT&T Mobility Responses to O1's Third Set of Data Requests

[REDACTED PUBLIC VERSION]

CONFIDENTIAL EXHIBIT JM-SS

Email from L. Bax, Bates No. ATT M 000334

[REDACTED PUBLIC VERSION]