

**Business, Legal, Regulatory
and Spectrum Challenges to
Widespread Deployment of
Wireless Telephony**

by Rob Frieden

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Business, Legal, Regulatory and Spectrum Challenges to Widespread Deployment of Wireless Telephony

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Terrestrial and satellite-delivered wireless technologies have become more prevalent as consumers recognize the productivity and safety enhancements of tetherless communications. Such visibility stems primarily from the successful deployment of high profile mobile applications like cellular radio telephone service, some additional spectrum allocations and from the willingness of investors to bid over \$18 billion for the privilege of providing in the United States the next generation of predominately mobile telecommunication offerings commonly referred to as Personal Communications Services ("PCS").¹

Despite the proliferation of wireless technologies and investments, few operators or users have considered the potential for fixed services, including wireless local loop ("WLL") telephony, i.e., the use of "fixed wireless links to connect residences, apartment buildings, office buildings and other structures with wireline local exchange networks" ² This curious outcome appears to have occurred due to consumer perception and because of legal, regulatory and spectrum management issues that heretofore have relegated wireless technologies to ancillary, non-essential and primarily mobile services. While wireless technologies optimally support mobile applications, recent innovations make the technology more versatile and suitable for both mobile or fixed services. ³ Given such developments the failure to change assumptions about wireless technology can blunt its commercial promise and

ability to help achieve longstanding public policy objectives like universal service.⁴

Until recently the cost associated with wireless technologies frustrated widespread deployment and the use of such technologies in lieu of, or in conjunction with wireline options. Because previous cutting edge wireless technologies did not support a cost advantage vis a vis wireline applications, wireless services were considered niche plays available to serve markets where inelastic demand made it possible to charge high, usage sensitive rates. Regulators, users and incumbent service providers generally concluded that wireless applications made sense only for unlicensed operations typically involving short links,⁵ mobile users willing to pay high rates for access to the rest of the world, or users in geographically or climatically inhospitable environments.

This paper will examine wireless technologies with an eye toward determining whether and how business, legal, regulatory and spectrum management decisions may blunt future development, by perpetuating the view that these technologies only can serve niche markets, despite the fact that declining costs, more available spectrum, more operational flexibility and temporary promotional efforts by regulators make such technologies competitive with more types of wireline applications. This examination will consider why increasingly suspect conclusions about the suitability of wireless technologies persist among users, existing wireless service providers and policymakers alike even as technological innovations substantially change the cost calculus. The paper concludes that policymakers can promote more widespread wireless options by including them in the set of potential universal service solutions, even if incumbent wireless operators are content with the status quo and the most prominent wireless technology, cellular radio service, has created a robust and profitable market niche by serving less than ten percent of the total population.

Underestimating the Suitability of Wireless Technologies

Past technological characteristics join with historical factors to relegate wireless technologies to niche markets, despite narrowing cost differentials with wireline services ⁶ and the recognition that such technologies promote faster deployment, often also accomplished with lower construction, maintenance, management and operating costs. Spectrum managers and regulators have helped perpetuate the status quo by allocating and licensing narrow bandwidths for mobile, wireless services, while providing comparatively more generous amounts for the spectrum requirements of wireline operators, e.g., microwave radio backhauling.

Likewise, they have to confer operational flexibility so that licensees can provide a blend of fixed and mobile services over the same frequencies.

Currently most spectrum users have not had to pay for the privilege of using spectrum. The absence of such fees and the ability to operate profitably by concentrating on niche markets has not stimulated much enthusiasm among wireless service providers for seeking the elimination of spectrum and operational limitations. In fact spectrum limitations create opportunities to extract higher profits given the absence of robust competition. For example, the United States Federal Communications Commission's decision initially to allocate 40 MHz for only two cellular radio operators ⁷ in any locality made it possible for duopoly pricing, i.e., consciously parallel decision making on prices leading to high rates with little incentive to trigger a price war. As a result, cellular operators have charged rates of forty or more cents per minute at a time when wireline options are priced on a usage-insensitive, flat-rate of typically less than \$20.00 per month.

Cellular radio and other Commercial Mobile Radio Service ("CMRS") providers appear content with the assumption that they serve market niches. By having their services considered non-essential, CMRS operators have qualified for streamlined regulation.⁸ While the Communications Act of 1934, as amended, classifies CMRS as common carriage, these services appear more like private carriage⁹ given the paucity of regulatory burdens.¹⁰ With few regulatory requirements and with relatively little direct competition, CMRS operators have little incentive to serve substantially larger markets if doing so would lower profit margins, cannibalize existing high margin services and force operators to assume more of the traditional common carrier obligations. Using a cost/benefit analysis, wireless operators currently see little payoff relative to new regulatory burdens like the duty to interconnect their facilities with other wireline and wireless carriers and to contribute to universal service funding.

International Spectrum Allocation

On the international level, anachronistic assumptions about the versatility of wireless services and the portability of transceivers have perpetuated a dichotomy between fixed and mobile services and between frequencies "appropriate" for end user wireless applications and those larger bandwidths needed by incumbent wireline providers of basic services. Delegates to conferences convened by the International Telecommunication Union ("ITU") have allocated precious little spectrum for wireless telephony applications resulting in less potential for robust competition, and expedited deployment of new technologies.

Contrasting Actual and Possible Spectrum Allocation Strategies

The efficient management of spectrum constitutes an essential element for effective use of a nation's telecommunications infrastructure.¹¹ While few countries have yet opted to treat

spectrum like real estate and create a market for its sale, spectrum has substantial, if unrealized value,¹² particularly when demand far exceeds the amount of bandwidth allocated.

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Some spectrum uses have the characteristic of a public good in that one person's consumption of, for example, an educational program on broadcast television, does not exhaust or reduce what can be received by others. However, spectrum also can constitute a "common pool" economic resource, like offshore drilling sites owned by the government, in that it is exhaustible, subject to congestion, can be allocated for specific uses and can be sold or leased to particular users. Technological innovations have enabled productive use of progressively higher frequencies and the ability to derive usable channels with less bandwidth. But along with innovations, which conserve spectrum and provide more throughput, are new ideas and services that generate additional spectrum requirements. Because of increasing demand for spectrum and the costs incurred by incumbents or newcomers to conserve it, the ITU and national regulators must conserve and manage spectrum. This endeavor involves allocating spectrum among competing uses, and serving as a traffic cop of the airwaves to avoid interference and to resolve conflicts. Spectrum managers need to fashion compromises based on a number of factors including:

- **technology**--the duty to prevent harmful interference and to achieve efficient activation of channels. For example, in allocating spectrum for broadcast television in the Very High Frequency band, the Federal Communications Commission ("FCC") had to create large geographical spacing between stations to prevent interference. This limited the number of available stations in any locality thereby generating demand for an additional allocation in the Ultra High Frequency ("UHF") band;

- **regulatory policy**--regulation may direct spectrum allocations in ways designed to serve public policies. For example, the FCC sought to promote the doctrine of localism by allotting broadcast channels for as many different localities as technologically possible. This policy reduced the number of stations available in urban localities that otherwise could have served nearby towns;
- **commerce**--the need to conduct a comparison of spectrum requirements by services with an eye toward allocating spectrum to uses that will maximize social welfare primarily, and individual profitability of firms secondarily. For example, the FCC reallocated portions of the UHF television band for mobile radio services when it determined that most localities could not support a full inventory of UHF television stations, but desperately needed additional spectrum for public safety and private wireless services;
- **social welfare**--the public interest merit in allocating spectrum for a particular service in the face of other requirements that accordingly have to make do with less, different, or possibly no spectrum. For example, in allocating spectrum for new wireless mobile services like PCS networks, the FCC forced existing microwave users like railroads and public utilities, first to share the spectrum and subsequently to move to higher, less congested frequencies; ¹⁴ and
- **national security**--compelling requirements for safety, public welfare, national defense and emergency applications. For example, the ITU has allocated particular emergency calling frequencies that always are monitored.

In a perfect world spectrum allocation would constitute a dynamic and ongoing process as conditions change. But in reality, incumbent beneficiaries of existing spectrum allocations strive mightily to perpetuate the status quo. Without having incurred a financial obligation to bid for spectrum, beneficiaries of existing spectrum allocations become vested stakeholders in the status quo and view current allocations as conferring a perpetual right of use.

The ITU and in turn, the FCC and other national spectrum managers, allocate blocks of

frequencies earmarked for a particular service. Politics and non-technological factors may dominate the process, and the FCC may not fully articulate the criteria used to determine the relative merits of one service versus others. The process appears to place a premium on incumbency, with existing stakeholders expecting that having received a spectrum allocation, they will never be ousted, or forced to share the allocated spectrum. Put another way, advocates for new services bear the burden of convincing decision makers that the benefits accruing from new spectrum use outweigh the cost and inconvenience affecting some incumbents. If wireless operators are content with their existing market niches, then they will lack incentives for investing the time, money and effort necessary to launch a successful spectrum reallocation campaign. Likewise, they will not seek reallocations if it appears too daunting or costly relative to the payoff.

New services, technological innovations and user constituencies with expanded spectrum requirements must vie for spectrum with incumbents. Rarely do newcomers receive exclusive spectrum allocations. Typically they receive less than desired bandwidth, often with a duty to share the spectrum with incumbents, or to compensate incumbents if they agree to vacate a frequency band.¹⁵ A "co-primary" allocation means that newcomers have equal status with other primary users, and enjoy interference protection from subsequent users even with primary service requirements. A secondary allocation would subordinate the newcomer, not only to existing primary service users, but also to subsequent ones.

Block spectrum allocation awards bandwidth on the basis of then current technologies, services and user requirements effectively advocated at the ITU and domestic regulatory forums. For example, satellite services have been divided as a function of transmitter and receiver

location. There are domestic, international, fixed, and maritime, land and aeronautical mobile services with separate frequency allocations. Discrete service definitions and spectrum allocations made sense when users could not easily move terminals, but now they can easily operate a single portable transceiver for a variety of applications.

The FCC acknowledged the flexibility afforded by technological innovation and proposed in ITU conferences that a generic Mobile Satellite Service ("MSS") incorporate previously discrete maritime, land and aeronautical mobile allocations. When the international consensus persisted in maintaining separate, geographically specific allocations, the United States "took a reservation . . . with respect to these allocations, indicating its continuing desire to implement MSS in an appropriate manner to satisfy U.S. requirements." ¹⁶

The FCC also believes that it can enhance consumer welfare by consolidating its previously separate domestic and international satellite licensing rules. The Commission has decided to permit U.S. satellite licensees to provide both domestic and international services, ¹⁷ and it has begun considering whether to confer similar landing rights to satellite operators licensed abroad if the nation of origin provides "effective competitive opportunities" for U.S. satellite licensees. ¹⁸

By using service and region specific, block allocations spectrum managers have created substantial barriers to accommodating new services and technological innovations. Many of the innovations in wireless technology defeat assumptions about the need to maintain a dichotomy between fixed and mobile services, broadband and narrowband applications and domestic and international services. Miniaturized wireless transceivers can operate on land, in the air and aboard maritime vessels. Developments in wireless technology make it possible to use a mobile

service to provide fixed services, particularly if decisionmakers allocate more bandwidth based on the conclusion that a larger population will use the service than when only high margin, costly mobile services were contemplated.

Yet despite such innovations, service definitions and block allocations of spectrum restrict flexibility and in turn the number of authorized operators. Few technological factors exist that prevent a wireless technology from providing both mobile and fixed services. But mutually exclusive spectrum allocations and service limitations may limit the use a particular frequency to one or the other usage, or alternatively place priorities and preferential rights of access to one type of usage.

Winning the Spectrum Allocation Sweepstakes

Spectrum reallocation success achieved by advocates for large constellations of low earth orbiting ("LEO") satellites provides an instructive case study. National representatives to ITU spectrum allocation conferences in 1992¹⁹ and 1995²⁰ reached a consensus on the merits of reallocating significant bandwidth both for links between handsets and satellites and between gateway earth stations and the satellites, commonly referred to as "feeder links."²¹ Because these advocates entered the ITU spectrum sweepstakes with no preexisting allocations, on which to fallback, success constituted a sine qua non. With that kind of motivation, representatives from such ventures as Iridium, Globalstar and Teledesic joined with government officials in "conceptual evangelizing," i.e., spreading the "gospel" of LEO satellite technology by explaining how the systems worked, why traffic carried by these systems would generate new revenue streams instead of migrating traffic and how national telephone and satellite carriers worldwide could access cutting edge technology simply by

granting landing rights.²²

Without a survival motivation, and perhaps having some ambivalence about entering new markets, wireless operators may not generate the consensus support needed to reallocate spectrum and to revise service definitions to permit both fixed and mobile applications.

Prescription for Success

Many industry observers predict that wireless services will grow in importance and market share. They speculate that wireless services will evolve into an infrastructure capable of providing near ubiquitous telecommunications for mobile applications via handheld terminals, but as well for fixed "home cell" services in a manner much like cordless telephones. To achieve such market penetration in the United States advocates for wireless services must address the following legal, regulatory, business and spectrum issues:

- whether and how to accept greater regulatory burdens, including tariffing, historically borne by wireline local exchange common carriers, in exchange for broader service authorizations;
- whether to seek modification of the exemptions granted to CMRS²³ operators from having to unbundle service elements, interconnect facilities and contribute to universal service funding;
- whether to qualify as "Eligible Telecommunications Carriers" under Section 214(e) of the Communications Act, as amended, and receive universal service funding when serving rural or high cost areas;
- how to negotiate symmetrical interconnection arrangements with incumbent carriers instead of paying for terminations performed by wireline carriers, but receiving nothing for terminating traffic originated by wireline carriers;²⁴ and
- whether to adopt usage insensitive pricing and other marketing strategies currently used by wireline carriers to stimulate subscribership.

One Step Backwards to Go Two Steps Forward

Wireless operators may find it advantageous to pursue more regulation in the short run, because the FCC and the Telecommunications Act of 1996²⁵ confer more rights and responsibilities to common carriers vis a vis private carriers and users.²⁶ WLL operators and the broader set of wireless operators providing CMRS operate as common carriers in name only. The Telecommunications Act of 1996 exempts CMRS operators from constituting Local Exchange Carriers ("LECs")²⁷ and a previously enacted amendment to the Communications Act of 1934, Section 332,²⁸ confers greater deregulatory opportunities than what is available to conventional wireline common carriers.²⁹ The FCC has interpreted Section 332 as permitting it to exempt CMRS operators from having to tariff services, provide services on an unbundled, "ala carte" basis, interconnect facilities with other wireless or wireline carriers, and contribute to universal service funding.³⁰

To achieve the kind of legitimacy needed for expanded spectrum allocations and operational flexibility, wireless operators may have to abandon some or all of their special regulatory exemptions. Given the prevailing deregulatory desires of the FCC, having to accept more regulatory burdens may not last long. But by assuming such responsibilities in the short term, wireless operators will appear to have sought a level competitive playing field. Regulatory parity and uniformity make it easier for the FCC to conclude that it makes sense, notwithstanding limiting language in the 1996 Telecommunications Act, to vest CMRS operators with all the rights and responsibilities currently available to wireline operators, particularly because the latter also have wireless and mobile service opportunities that can

augment revenues. Such rights include some or all of the competitive opportunities established for all LECs by the Telecommunications Act of 1996, e.g., the right of facilities interconnection, number portability, dialing parity and reciprocal compensation arrangements for the transport and termination of traffic.

In August 1996 the FCC issued a First Report and Further Notice of Proposed Rule Making that revised domestic spectrum allocation rules to permit CMRS operators to provide both mobile and fixed services on a co-primary basis.³¹ However, the "Commission's decision on 'flexible use of CMRS spectrum' merely changed the spectrum allocation for these services . . . [leaving to a Further Notice of Proposed Rulemaking the question whether] fixed wireless services are 'CMRS' or 'local exchange' services or both, or neither."³² The FCC preliminarily concluded that licensees offering fixed services over CMRS spectrum "should be regulated as CMRS,"³³ but refrained from proposing uniform regulatory treatment on grounds that it needed to develop a more complete record with specific analysis, even though this approach might lead to issue "resolution on a case-by-case basis."³⁴

Benefits in Becoming Full Service Carriers

Changed circumstances may tilt the cost/benefit analysis in favor of relinquishing legislative and regulatory exemptions in exchange for accepting the rights and responsibilities of full service carriers. As the functional equivalent of wireline LECs, wireless telephony providers can qualify for universal service funding. The Telecommunications Act of 1996 revises and expands the universal service mandate both in terms of scope³⁵ and the set of "Eligible Telecommunications Carriers" who can qualify for funding³⁶ to help achieve a now broader mandate.

Wireless telephony can become more like wireline service in terms of consumer perception if it provides the same functionality at roughly the same cost. As the underlying cost of providing wireless loops has become roughly comparable to wireline loops, functional equivalency is achievable. Whether wireless telephony becomes the functional equivalent of wireline services will depend less on technological and cost factors and more on the strategic market assessments of wireless carriers. Simply put, wireless carriers have to want this new status and the blend of new opportunities and challenges it will present.

Wireless telephony providers currently provide service on a metered, usage sensitive basis. Because of their subordinate, niche market status, they do not enjoy interconnection parity vis a vis wireline carriers. These conditions limit the marketplace attractiveness of wireless services, but the potential for financial harm has been largely attenuated. Political factors make usage sensitive wireline local exchange service impracticable, but as a non-essential, niche service wireless telephony does not trigger the same concerns. Likewise, having to pay for wireline terminations appears financially harmful only if the wireless carrier has to absorb the average three to five cents per minute charge. But because of the consumer perception that wireless carriers provide premium services, these carriers simply can add the wireline termination fee to their rates.

To achieve functional equivalency and long term regulatory parity with wireline carriers, wireless telephony providers need to look, act and operate more like their incumbent counterparts. Wireless carriers will have to offer flat-rated services and generally hold themselves out as common carriers ready, willing and able to provide service even to low margin consumers. In exchange for these major changes, wireless carriers will be able to

negotiate symmetrical interconnection arrangements, because the traffic volumes of the two types of networks in time will come closer to parity³⁷ and in the short term wireless carriers can qualify as local exchange carriers entitled to symmetrical interconnection under the Telecommunications Act of 1996.

Wireless carriers may blanch at the prospect of having to relinquish the comparatively comfortable world of near private carriage. They may find a larger service mission too daunting in view of the near term onset of increased wireless telephony competition from PCS and Specialized Mobile Radio operators. As well they may see no significant payoff particularly in view of recent regulatory victories like the recent FCC decision ordering temporary reciprocal interconnection charges even without a commitment to universal service and the assumption of traditional common carrier responsibilities.

In its First Report and Order in Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98,³⁸ the FCC emphasized the need to promote improved wireless carrier access to wireline carrier local exchange and exchange access markets. The Commission so keenly seeks competitive entry that it granted wireless carriers zero cost interconnection opportunities on a short term basis, despite the fact that these carriers currently terminate far less traffic compared to the volume they hand off to wireline carriers for delivery to call recipients.

The FCC also rejected a proposal submitted by the Illinois Commerce Commission and others that CMRS providers should be regulated as LECs when providing a WLL for the express purpose of competing against or bypassing wireline local loop facilities. The Commission reported that the record contained no evidence that WLLs have begun to replace wireline loops

for the provision of local exchange service and thus wireless operators should not have to bear the interconnection and other regulatory burdens imposed on LECs.³⁹ Additionally, the FCC interpreted the Telecommunications Act of 1996 as recognizing that some CMRS providers would offer telephone exchange and exchange access services, but that their provision of such services, by itself, did not require CMRS providers to be classified as LECs.

At some point the FCC's promotion of wireline carriage as a competitive option will become tied to requirements that wireless carriers embrace universal service and reciprocal interconnection obligations. The FCC appears to be incubating wireless competition by conferring extraordinary opportunities. At some future date, however, the Commission likely will feel that it has done enough to stimulate wireless telephony. At that time, the burden of acquiring greater market share will lie more directly on the wireless telephony operator who will have to consider adjusting its service provisioning and pricing policies to build from what the Commission help start:

Given the dynamic nature of telecommunications technology and markets, it will be necessary over time to review proactively and adjust these rules to ensure both that the statute's mandate of competition is effectuated and enforced, and that regulatory burdens are lifted as soon as competition eliminates the need for them.⁴⁰

Conclusion

Technological innovations, financial success in market niches and some willingness on the part of regulators to confer operational flexibility create the potential for wireless carriers to serve a broader user base. The opportunity to serve more diverse and robust markets will force a cost/benefit analysis: whether to abandon exemptions from traditional common carrier burdens in exchange for the possibility of more spectrum, a larger user population and new

legitimacy as a key vehicle for achieving universal service objectives. If wireless operators embrace a universal service mission, then they can qualify for subsidies as the carrier of last resort. But along with new service opportunities will come new regulatory burdens including the possibility of having to contribute to universal service funding. To become full service carriers, with full market and spectrum access opportunities, wireless operators need to relinquish regulatory exemptions conferred when they primarily provided supplemental, mobile services.

NOTES

1. See Federal Communications Commission, Public Notice, "FCC Grants 99 Licenses for Broadband Personal Communications Services In Major Trading Areas," (June 23, 1995) (reporting \$7.7 billion raised for A and B Block PCS allocations); "Broadband Personal Communications Services 'C Block' Auction Closes Historic Auction Designed Solely for Entrepreneurs, (May 6, 1996) (reporting \$10.2 billion raised for C Block PCS allocations) available at http://www.fcc.gov/Bureaus/Wireless/News_Releases/nrwl5027.txt and [nrwl6021.txt](http://www.fcc.gov/Bureaus/Wireless/News_Releases/nrwl6021.txt).
2. Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services, WT Docket No. 96-6, First Report and Order and Further Notice of Proposed Rule Making, 11 FCC Rcd. 8965 (1996)[hereinafter cited as CMRS Service Flexibility Order].
3. "[W]ireless services can bring the benefits of competition to the local phone market. Wireless is a natural, lower cost alternative to wireline service." Michele C. Farquhar, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, "The Role of Wireless Telecommunications After the Telecommunications Act of 1996," Remarks Before the Metropolitan Washington Council of Governments, 1996 West Law 442043 (F.C.C.) (Aug. 2, 1996).
4. "The current universal service system is a patchwork quilt of implicit and explicit subsidies. These subsidies are intended to promote telephone subscribership, yet they do so at the expense of deterring or distorting competition. Some policies that traditionally have been justified on universal service considerations place competitors at a disadvantage. Other universal service policies place the incumbent LECs at a competitive disadvantage. For example, LECs are required to charge interexchange carriers a Carrier Common Line charge for every minute of interstate traffic that any of their customers send or receive. This exposes LECs to competition

from competitive access providers, which are not subject to this cost burden. Hence, section 254 of the [Telecommunications Act of 1996] Act requires the Commission, working with the states and consumer advocates through a Federal/State Joint Board, to revamp the methods by which universal service payments are collected and disbursed." 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, FCC 96-325, 1996 WL 452885 (F.C.C.) (rel. August 8, 1996). citing Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Notice of Proposed Rulemaking and Order Establishing Joint Board, FCC 96-93 (rel. Mar. 8, 1996).

5. Part 15 of the FCC's Rules address the unlicensed use of spectrum. See 47 C.F.R. Pt. 15 (1996). The FCC recently reallocated 20 MegaHertz of spectrum for unlicensed Personal Communication Services. See Notice of Proposed Rule Making and Tentative Decision, GEN Docket No. 90-314 and ET Docket No. 92-100, 7 FCC Rcd. 5676 (1992); Second Report and Order, GEN Docket No. 90-314, 8 FCC Rcd. 7700 (1993); Memorandum Opinion and Order, GEN Docket No. 90-314, 9 FCC Rcd. 4957 (1994); Third Report and Order in ET Docket 92-9, In the Matter of Redevelopment of Spectrum to Encourage Innovation in the Telecommunications Technologies, 8 FCC Rcd. 6589 (1993); Fourth Memorandum Opinion and Order, 10 FCC Rcd. 7955 (1995).

6. "According to some published figures . . . the cost of a wireless local loop has dropped to between \$800 and \$1,200, which is comparable to the average cost of a copper loop in the United States. And in some areas that are sparsely populated or have difficult terrain, the cost of a copper loop can easily reach as high as \$2,000 to \$5,000, making wireless solutions much more attractive." Congress of the United States, Office of Technology Assessment, Wireless Technologies and the National Information Infrastructure, OTA-ITC-622, pp. 216-217 (Washington, D.C.: U.S. Government Printing Office, July, 1995). See also Alan Jacobsen, Wireless Local Loop Technology: Motivations and Alternatives, October, 1995 available via the World Wide Web at <http://www.diva.com/wpwll.htm>.

7. See Second Report and Order, Docket No. 18262, 46 FCC 2d 752 (1974); Memorandum Opinion and Order, Docket No. 18262, 51 FCC 2d 945 (1975), aff'd sub nom., National Association of Regulatory Utility Commissioners v. FCC, 525 F.2d 630 (D.C. Cir.), cert. denied, 425 U.S. 992 (1976). The Commission subsequently allocated 10 MHz of additional spectrum. Amendment of Parts 2 and 22 of the Commission's Rules, 2 FCC Rcd. 1825 (1986).

8. See Implementation of Sections 3(n) and 332 of the Communications Act, GN Docket No. 93-252, Second Report and Order, 9 FCC Rcd 1411, 1424-1425 (1994); Erratum, 9 FCC Rcd 2156 (1994); Third Report and Order, 9 FCC Rcd 7988 (1994).

9. For a discussion on how legal, regulatory and judicial decisions have blurred the distinction between private and common carriage see Rob Frieden, "Schizophrenia Among Carriers: How Common Carriers and Private Carriers Trade Places," 1 Michigan Telecommunications and Technology Law Review, No. 2 (1996) available via Lexis and the

World Wide Web <http://www.umich.edu/~umlaw/mttlr.html>; Rob Frieden, "Contamination of the Common Carrier Concept in Telecommunications," 19 Telecommunications Policy No. 9, pp. 685-697 (December, 1995).

10. "In the Second Report and Order in General Docket No. 93-252, the Commission classified all mobile radio services as either commercial mobile radio service (CMRS) or private mobile radio service (PMRS) and determined pursuant to the Omnibus Budget Reconciliation Act of 1993 to forbear from applying Sections 203, 204, 205, 211, 212 and 214 of Title II of the Communications Act to any service classified as CMRS." Further Forbearance From Title II Regulation For Certain Types of Commercial Mobile Radio Service Providers, GN Docket No. 94-33, Notice of Proposed Rulemaking, 9 FCC Rcd. 2164 (1994); see also Equal Access and Interconnection Obligations Pertaining to Commercial Mobile Radio Services, CC Docket 94-54, Notice of Proposed Rulemaking, 9 FCC Rcd 5408 (1994); Second Notice of Proposed Rulemaking, 10 FCC Rcd. 10666 (1995); First Report and Order, FCC 96-263 1996 WL 391284 (F.C.C.) (rel. July 12, 1996)(establishing a 5 year period requiring cellular, broadband PCS and certain Specialized Mobile Radio service providers to permit resale); Second Report and Order and Third Notice of Proposed Rulemaking, 11 FCC Rcd. 9462 (1996)(requiring cellular, broadband PCS and some Specialized Mobile Radio service licensees to provide service access to "roaming" (i.e., temporary) subscribers of any of these services who uses a handset technically capable of accessing the licensee's system, but refraining from requiring all other mobile service providers to provide such access).

11. The United States government has begun to realize the need for effective and market oriented spectrum management. See United States Dept. of Commerce, National Telecommunications and Information Administration, U.S. Spectrum Management Policy: Agenda for the Future, 13, NTIA Spec. Pub. 91-23 (Washington, D.C.: Government Printing Off., Feb. 1991) [hereinafter cited as U.S. Spectrum Management Policy]

12. In 1990, shipments of radiocommunication equipment generated over \$55 billion. U. S. Spectrum Management Policy, Executive Summary. NTIA estimated the spectrum value of cellular radio services, which consumes 50 MHz, to be over \$79 billion. See Id. at Appendix D, "Estimating the Value of Cellular Licenses."

13. Sales of VHF television stations in major markets can exceed \$500 million, far in excess of the physical assets involved. See H. Geller and D. Lampert, Charging For Spectrum Use, p. 13 (Washington, D.C.: Benton Foundation Project on Communications and Information Policy Options, 1989).

14. In the First Report and Order and Third Notice of Proposed Rule Making in ET Docket No. 92-9, 7 FCC Rcd 6886 (1992), the Commission re-allocated the 1850-1990, 2110-2150, and 2160-2200 MHz bands for use by the personal communication services (PCS) and established the procedures for the 2 GHz microwave incumbents to relocate to frequencies in higher bands. In the Third Report and Order in ET Docket 92-9, 8 FCC Rcd 6589 (1993), the Commission outlined further details of the relocation plan. Specifically, the Commission established finite

voluntary and mandatory negotiation periods to facilitate the relocation of the incumbent microwave facilities. In the First Report and Order and Further Notice of Proposed Rule Making in WT Docket No. 95-157, the Commission adopted a cost-sharing plan whereby PCS licensees that incur costs to relocate microwave links during the voluntary negotiation period would receive reimbursement for a portion of those costs from other PCS licensees that would also benefit from the relocation of the link. First Report and Order and Further Notice of Proposed Rule Making in WT Docket No. 95-157, see also Amendment of the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, WT Docket No. 95-157, Memorandum Opinion and Order, 11 FCC Rcd. 9394, 1996 WL 459954 (F.C.C.) (rel. Aug. 14, 1996).

15. See Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, WT Docket No. 95-157, Notice of Proposed Rule Making, FCC 95-426 11 FCC Rcd. 1923 (1995) (revising a plan for sharing the costs of relocating microwave facilities currently operating in the 1850 to 1990 MHz band that had been allocated for use by broadband Personal Communications Services).

16. An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum, GEN Docket No. 89-554, Second Notice of Inquiry at 26, para 56, citing Notice of Proposed Rulemaking, GEN Docket No. 89-103, 4 FCC Rcd. 4173, 4178 (1989); see also Report and Order, FCC 91-188 (rel. June 20, 1991).

17. Amendment of the Commission's Regulatory Policies Governing Domestic Fixed Satellites and Separate International Satellite Systems, IB Docket No. 95-41, Report and Order, FCC 96-14 (rel. Jan. 22, 1996) (consolidating domestic and international satellite licensing policy and permitting integrated services).

18. Amendment of the Commission's Regulatory Policies to Allow Non-U.S.-Licensed Space Stations to Provide Domestic and International Satellite Service in the United States, Notice of Proposed Rulemaking, IB Docket No. 96-111, FCC 96-210 (rel May 14, 1996) (proposing to grant U.S. landing rights to foreign satellite operators if their home markets have "effective competitive opportunities" for U.S. satellite operators).

19. See Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92), Malaga-Torremolinos, 1992. The WARC-92 Final Acts entered into force internationally on October 12, 1993.

20. See Final Acts of the World Radiocommunication Conference (WRC-95), Geneva, 1995. The Final Acts apply provisionally as of June 1, 1998, "except for those revised provisions concerning new or modified frequency allocations (including any new or modified conditions applying to existing allocations) and the related provisions of S21, S22 and Appendix S4, which shall apply provisionally as of 1 January 1997." Article S59 of the Final Acts.

21. For an outline of U.S. proposals to the 1995 WRC see Preparation for International Telecommunication Union World Radiocommunication Conferences, IC Docket No. 94-31, 10 FCC Rcd. 12783 (1995).
22. To provide a global footprint, prospective mobile satellite service providers need landing rights throughout the world. These operators have found it necessary to share service revenues with national carriers even for instances where a user activated service in-country without using facilities of the national carrier.
23. See Equal Access and Interconnection Obligations Pertaining to Commercial Mobile Radio Services, CC Docket No. 94-54, Notice of Proposed Rulemaking, 9 FCC Rcd. 5408 (1994) (proposing to require CMRS providers to provide meet equal access requirements tailored to meet the individual circumstances of particular services, but not the full panoply of requirements imposed on landline local exchange common carriers).
24. See Interconnection Between Local Exchange Carriers and Commercial Mobile Radio Service Providers, CC Docket No. 95-185, Notice of Proposed Rulemaking, 11 FCC Rcd. 5020, (1996)(proposing reciprocal termination between wireline and wireless carriers, including the possibility of an interim zero termination charge between carriers); First Report and Order and Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers, CC Docket No. 96-98, FCC 96-325, 1996 WL 452885 (F.C.C.)(rel. August 8, 1996).
25. The Telecommunications Act of 1996, P.L. 104-104, 110 Stat. 56, signed into law Feb. 8, 1996, codified at 47 U.S.C. § 151 et seq. (1996).
26. Section 251 of the Communications Act of 1934 as amended requires all telecommunications carriers to provide, upon request, direct or indirect interconnection with other telecommunications carriers. 47 U.S.C. § 251 (a)(1). The 1996 Telecommunications Act defines telecommunications carrier as "any provider of telecommunications services "except call aggregators that provide access to telephone operator services. This section requires all such carriers to be treated as common carriers. The section establishes more expansive interconnection requirements for local exchange carriers, incumbent local exchange carriers and the Bell Operating Companies.
27. The interconnection requirements of Section 251 applicable to Local Exchange Carriers do not apply to CMRS operators, because they are expressly exempted "except to the extent the Commission finds that such service should be included in the definition of such term." 47 U.S.C. § 153(26).
28. In 1982, Congress amended the Communications Act by adding Section 3(gg) and Section 332(c). See United States Congress, H.R. Rep. No. 97-765, 97th Cong., 2d Sess. (1982). The purposes of adding these provisions were: (1) to define private land mobile service; (2) to distinguish between private and common carrier land mobile services; and (3) to specify

the appropriate authorities empowered to regulate these same services. *Id.* at 54. Section 3(gg) defined private land mobile service as "a mobile service ... for private one- way or two-way land mobile radio communications by eligible users over designated areas of operation." Communications Act, § 3(gg), 47 U.S.C. § 153(gg). In addition, Section 332(c)(3) preempted state authority to impose rate or entry regulation upon any private land mobile service. The FCC interpreted Section 332(c)(1) of the Act as confirming that the commercial sale of interconnected telephone service was a common carrier offering, but also concluded that the statute allowed private land mobile services to interconnect with the public switched telephone network and retain their regulatory status so long as the licensee did not profit from the provision of interconnection. *See* *Interconnection of Private Land Mobile Systems with the Public Switched Telephone Network in the Bands 806-821 and 851-866 MHz*, Docket No. 20846, Memorandum Opinion and Order, 93 FCC2d 1111 (1983). The Commission also concluded that Section 332 allowed it to extend the range of eligible users for Specialized Mobile Radio (SMR) and Private Carrier Paging (PCP) services, enabling licensees in these services to offer service to a broad customer base with only minimal restrictions. *See* *Amendment of Part 90, Subparts M and S of the Commission's Rules*, PR Docket No. 86-404, Report and Order, 3 FCC Rcd. 1838 (1988), clarified, 4 FCC Rcd.356 (1989); *Amendment of the Commission's Rules To Permit Private Carrier Paging Licensees To Provide Service to Individuals*, PR Docket No. 93-38, Report and Order, 8 FCC Rcd. 4822 (1993).

29. In 1993 Congress has replaced the common carrier and private radio definitions that evolved under the prior version of Section 332 with two newly defined categories of mobile services: commercial mobile radio service (CMRS) and private mobile radio service (PMRS). CMRS is defined as "any mobile service (as defined in section 3(n)) that is provided for profit and makes interconnected service available (A) to the public or (B) to such classes of eligible users as to be effectively available to a substantial portion of the public." Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b)(2)(A), 6002(b)(2)(B), 107 Stat. 312, 392 (1993), amending the Communications Act of 1934, § 332(d)(1), 47 U.S.C. § 332(d)(1). PMRS means "any mobile service (as defined in section 3(n)) that is not a commercial mobile service or the functional equivalent of a commercial mobile service." *Id.*, § 332(d)(2), 47 U.S.C. § 332(d)(2). Congress also replaced traditional regulation of mobile services with an approach that brings all mobile service providers under a comprehensive, consistent regulatory framework and gives the FCC flexibility to establish appropriate levels of regulation for mobile radio services providers. Section 332(c) states that a person providing commercial mobile radio service will be treated as a common carrier, but grants the Commission the authority to forbear from applying the provisions of Title II, except for Sections 201, 202, and 208. Sections 332(c)(1)(A) and 332(c)(1)(C) identify the criteria for forbearance. The statute also preempt state regulation of entry and rates for both CMRS and PMRS providers. States, however, may petition the Commission for authority to regulate CMRS rates under some circumstances. *Id.*, § 332(c)(3), 47 U.S.C. § 332(c)(3).

The Telecommunication Act of 1996 explicitly exempts CMRS providers from the definition of local exchange carrier "except to the extent that the . . . [FCC] finds that such service should be included in the definition of such term." 47 U.S.C. § 153 (26)(1996).

30. See Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Service, GN Docket No. 93-252, Second Report and Order, 9 FCC Rcd. 1411, 1463-93 (1994).
31. See CMRS Service Flexibility Order.
32. Michele C. Farquhar, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, "The Role of Wireless Telecommunications After the Telecommunications Act of 1996," Remarks Before the Metropolitan Washington Council of Governments, 1996 West Law 442043 (F.C.C.) (Aug. 2, 1996).
33. CMRS Service Flexibility Order at ¶ 4. The Commission noted that the regulatory structure for providers of the primary service to which spectrum is allocated "does not necessarily dictate the type of regulation to which every service provider in that same band will be subject regardless of the particular attributes of that service." Id. at ¶ 52. The Commission referred to Basic Exchange Telecommunications Radio Service, a WLL service it deemed fixed even though the service use spectrum allocated for Public Land Mobile Service. See Basic Exchange Telecommunications Radio Service, CC Docket 86-495, Report and Order, 3 FCC Rcd. 214 (1988).
34. CMRS Service Flexibility Order at ¶ 53.
35. Section 254 of the Communications Act, as amended, requires the formation of a Federal-State Joint Board on Universal Service to recommend changes to any universal service policy. 47 U.S.C. 254 (1996). This Section sets out several guiding principles: 1) access to quality services at just, reasonable and affordable rates; 2) access to advanced services throughout the nation now defined to include low-income consumers, and those in rural, insular, and high cost areas as well as advanced telecommunications services access for schools, health care providers and libraries; 3) equitable and nondiscriminatory contributions by all providers of interstate telecommunications services to universal service funding; and 4) specific and predictable support mechanisms. see 47 U.S.C. § 254(b); see also Federal-State Joint Board on Universal Service, Notice of Proposed Rulemaking and Order Establishing Joint Board, FCC 96-93, (rel. March 8, 1996); reprinted in 61 Fed. Reg. 10499 (March 14, 1996).
36. See 47 U.S.C. § 214(e), Provision of Universal Service.
37. For discussion on the terms and conditions for interconnection between wireline and wireless carriers see Rob Frieden, "Universal Personal Communications in the New Telecommunications World Order--Access to Wireline Networks," 19 Telecommunications Policy No. 1, pp. 43-49 (January, 1995).
38. 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, FCC 96-325, 1996 WL 452885 (F.C.C.)(rel. August 8, 1996)

39. Id. at ¶ 1004-1006.

40. Id. at ¶6.