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May 21, 2001

ORIGINAL

BY HAND

Ms. Magalie R. Salas
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

EX PARTE OR LATE FILED

Re: Amendment of Part 2 and Part 90 of the Commission's Rules To Allocate the 1427-1432 MHz Band for Automatic Meter Reading and Utility Telemetry Use; RM-9854
EX PARTE

Dear Ms. Salas:

Itron, Inc. ("Itron") filed the attached comments today in reference to the National Telecommunications and Information Administration's request for comments on current and future use of spectrum by providers of energy, water and railroad services.[1] Itron is hereby submitting those same comments in the above-referenced FCC rulemaking proceeding.

Respectfully submitted,

Henry Goldberg
Attorney for Itron, Inc.

[1] National Telecommunications and Information Administration, Request for Comment on Energy, Water and Railroad Service Providers' Spectrum Use Study, Docket No. 010327080-1080-01.

No. of Copies rec'd 0+4
List A B C D E

Attachment

cc: Peter A. Tenhula
Adam Krinsky
Bryan Tramont
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Kathleen O. Ham
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Before the
UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, DC 20230

In the Matter of	)	
	)	
Request for Comment on Energy,	)	Docket No. 010327080-1080-01
Water and Railroad Service Providers'	)	RIN 0660-XX12
Spectrum Use Study	)	

EX PARTE OR LATE FILED

COMMENTS OF ITRON, INC.

Itron, Inc. ("Itron"), by its attorneys, hereby responds to the notice and request for comment in the above-referenced proceeding (the "Notice").[1]

BACKGROUND

Congress has directed the National Telecommunications and Information Administration ("NTIA") to conduct a study, which must be submitted to Congress by December 21, 2001, of the current and future use of radio spectrum by entities that provide energy, water, and railroad services.[2] In the Notice, NTIA seeks information on "any issue of fact, law, or policy" relating to spectrum requirements necessary to "protect and maintain" the nation's critical infrastructure.[3]

One important use of the radio spectrum for critical infrastructure is wireless automated utility meter reading ("AMR"). AMR devices use state-of-the-art integrated technologies to monitor and transmit usage data from utility meters to utility databases in real time. Itron has been licensed to use the 1427-1432 MHz band ("1.4 GHz") for AMR since the early 1990s. Itron's involvement with providing AMR/utility telemetry in this spectrum stems, in part, from the federal government's interest in developing wireless AMR in the band.

In 1992, Congress recognized the potential to use "new and innovative communications equipment and services" in connection with utility services to further

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[1] *Request for Comment on Energy, Water and Railroad Service Providers' Spectrum Use Study*, 66 Fed. Reg. 18448 (Dep't of Commerce, NTIA Apr. 9, 2001).
[2] Pub.L. No. 106-553, 114 Stat. 2762, 2762A-174 (2000).
[3] *Request for Comment*, at 18449.

the national goals of energy conservation and protection of public health and safety, and it instructed the Department of Energy ("DOE") to submit a proposal demonstrating the use of such new and innovative communications technologies.[4] The demonstration proposal was to include the feasibility of using communications technologies to read meters remotely, manage electric and gas usage, and monitor utility services outages during natural disasters.[5] Congress also directed DOE to consider requesting authority from NTIA to use radio frequencies to carry out the demonstration projects.

In response, DOE issued a notice of inquiry on the "potential for energy conservation and for the enhancement of public health and safety" that could be achieved through the use of "new and innovative communications equipment that can read utility meters automatically, manage energy usage, and monitor utility system outages."[6] The DOE inquiry was consistent with an earlier conclusion of the Federal Communications Commission ("FCC" or "Commission") that AMR systems "benefit consumers by reducing billing problems, increasing the accuracy of meter readings and, ultimately, lowering utility bills."[7]

In 1993, and as a result of these initiatives, the FCC granted Itron a nationwide license to develop and test a wireless AMR/utility telemetry service in the 1427-1429 MHz band.[8] Subsequently, DOE issued its report to Congress reiterating the role that utility communications systems can play in improving customer service, managing energy and water use, reducing costs, and improving public health and safety.[9] DOE also determined that there was no need to request an authorization of frequencies from NTIA, based in large part on the fact that the FCC already had issued Itron a 1427-1429 MHz developmental license.[10] In 1994, the FCC upgraded Itron's license to allow full operations,[11] and, in 1998, with NTIA/IRAC approval, the FCC broadened Itron's

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[4] Telephone Disclosure and Dispute Resolution Act, Pub. L. No. 102-556, 106 Stat. 4181, § 401 (1992).
[5] *Id.*
[6] *Innovative Utility Communications Technology, Congressional Report on Proposal to Demonstrate,* 58 Fed. Reg. 4987 (Dep't of Energy Jan. 19, 1993).
[7] *Amendment of Sections 22.501(g)(2) and 94.65(a)(1) of the Rules and Regulations to Re-Channel the 900 MHz Multiple Address Frequencies,* 3 FCC Rcd 1564 (1988).
[8] File No. 9301081307.
[9] *Proposal for Demonstrating the Potential of Innovative Communications Equipment and Services for Utility Applications,* (Dep't of Energy Sept. 2, 1993) at 35.
[10] *Id.* at 37.
[11] File No. 9401115177. In keeping with the allocation plan in effect at the time, Itron's operations are secondary to federal government operations and, in the case of 1427-1429 MHz, space operation service operations. *See* 47 C.F.R. § 90.259.

license further to permit it to operate across the full 1427-1432 MHz band. In 1999, the FCC renewed Itron's nationwide license for an additional five-year term.[12]

After Itron received its initial license and had begun to deploy its network, NTIA identified the 1427-1432 MHz band as part of 200 megahertz of spectrum to be reallocated from government to non-government use pursuant to another congressional directive.[13] This transfer was effective in 1999.

The California power crisis dramatically presents the case for enabling utilities to more closely match supply with demand. Through data collection and analysis, including the use of precision load forecasting, long-term power purchase contracts, proactive load management and control, demand-side management programs and incentives, dynamic rate structures, and conservation programs, suppliers can direct valuable resources to consumers with much greater precision and efficiency. Indeed, the "fundamental imbalance" between energy supply and demand defines the nation's energy crisis according to the Administration's recent National Energy Policy report; modernizing our nation's infrastructure is one of the strategies recommended to promote a sound energy policy.[14]

That modernization with respect to meter reading is underway now and will become more important in the future. To date, utilities and their customers have invested millions of dollars in the development and use of advanced capability AMR systems for the 1427-1432 MHz frequencies. Experts forecast "vast possibilities" for telemetry use, with significant growth projected over the next five years. Yet, primarily because of the regulatory uncertainty regarding a long-term spectrum "home" for AMR, utilities have been reluctant to make the substantial investment in AMR that is required for a nationwide deployment of the technology.

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[12] The Commission also has licensed a second service provider, CellNet Data Systems, Inc., to provide AMR and utility telemetry services on an experimental basis in the 1427-1432 MHz band. File No. 0187-EX-RR-1999.

[13] Omnibus Budget Reconciliation Act of 1993 ("OBRA-93"), Pub. L. No. 103-66, 107 Stat. 312 (1993), and the Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 (1997) ordered the transfer of spectrum from government use to non-government use or mixed government and non-government use. *See NTIA Spectrum Reallocation Report*, NTIA Special Publication 98-36 (Feb. 1998); *See NTIA Spectrum Reallocation Final Report*, NTIA Special Publication 95-32 (Feb. 1995) (proposing reallocation of the 1427-1432 MHz band, pursuant to OBRA-93).

[14] National Energy Policy, Report of the National Energy Policy Development Group (May 2001) vii, ix at http://www.whitehouse.gov/energy.

Of immediate concern are recent FCC actions that could seriously diminish the amount of spectrum used for AMR. Originally, the FCC concluded that the 1427-1432 MHz band would be part of the spectrum reserve that Congress had required the Commission to establish, and that the band would not be allocated for additional non-government use until 2006.[15] The FCC, however, now has accelerated its timetable for allocating the 1427-1432 MHz band. In part, this change is due to its decision to use a portion of the band for a new wireless medical telemetry service.

Moreover, however, the FCC has received proposals from several other entities requesting allocation in the 1.4 GHz band for various services. Based on those proposals, the FCC has adopted a notice of proposed rulemaking in which three possible allocation options for the 1.4 GHz band are being considered.[16] Only one of those options ensures that adequate spectrum will be available for utility telemetry.

Processing information via wireless systems provides an efficient way to control and monitor utilities on a daily basis, enhances utility competition, and facilitates responsible environmental management. Comments filed by utilities in the FCC's *1.4 GHz Reallocation NPRM* discuss these benefits and the significant investment that utilities already have made in 1.4 GHz AMR technologies.[17] The future success of those technologies, however, depends on the continued availability of adequate spectrum and the establishment of a permanent spectrum "home" for utility telemetry. In the comments that follow, Itron addresses the issues set out in NTIA's Notice and demonstrates that protecting utility telemetry operations at 1.4 GHz is a spectrum efficient way to "protect and maintain" the nation's critical infrastructure.

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[15] *Plan for Reallocated Spectrum*, 11 FCC Rcd 17841 (1996). OBRA-93 required the Commission to hold a significant portion of reallocated spectrum in reserve. The 1.4 GHz band was a suitable candidate for the spectrum reserve because the federal government intends to continue using the band within 14 exclusion zones until 2004, potentially restricting commercial operations in most major metropolitan areas until that time.

[16] *Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands*, 15 FCC Rcd 22657 (2000) ("*1.4 GHz Reallocation NPRM*").

[17] *See* Comments of Crawfordsville Electric Light & Power, Gainesville Regional Utilities, KeySpan Energy Delivery, Corp., Reliant Energy, Inc., Southern Company (all responding to *1.4 GHz Reallocation NPRM*).

DISCUSSION

I. AMR/Utility Telemetry Current Spectrum Use: Amount, Bands, Services, Equipment.

Questions 1, 2, 3

A. AMR Telemetry Operates Successfully In The 1427-1432 MHz Band.

Currently, Itron and its utility customers are licensed by the FCC to provide AMR telemetry in the 1427-1432 MHz band. The 1427-1432 MHz band is without a doubt the best home for AMR telemetry. The band's characteristics make it a relatively inhospitable environment for most services, but an ideal environment for utility telemetry.

The 1.4 GHz band is allocated internationally on a primary basis for fixed and mobile operations. The band is allocated domestically on a primary basis to the government for fixed and mobile operations, and on a secondary basis to non-government entities for fixed (telemetering) and land mobile (telemetering and telecommand) operations.[18] Due to the U.S. military's current use of the band for tactical radio communications, which will continue until 2004, the band is unsuitable for most licensed services.[19] In addition, the band is adjacent to the 1400-1427 MHz radio astronomy band, which requires protection indefinitely.[20] Finally, the FCC recently has authorized a new low-power wireless medical telemetry service ("WMTS") at 1.4 GHz that will be used by hospitals and health care facilities to transmit patient data to nearby receivers.

As a result of the government and radio astronomy operations at 1.4 GHz, and because WMTS services in the band must be protected, there are significant constraints on future non-government operations in the band. Nonetheless, during the past decade, Itron's systems have proved their ability to co-exist safely with other users in the band and, as Itron has demonstrated to the FCC, the 1.4 GHz band can be shared harmoniously by utility telemetry and WMTS.[21]

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[18] 47 C.F.R. § 2.106. In addition, both domestic and international allocations of the 1427-1429 MHz band segment are on a primary basis for satellite uplink (earth-to-space) operations.

[19] *1.4 GHz Reallocation NPRM* ¶ 21.

[20] 47 C.F.R. § 2.106 US311 (avoid frequency assignments that could cause interference to radio astronomy operations); *see also* 47 C.F.R. § 2.106 S5.149 (same).

[21] Petition for Rulemaking of Itron, Inc., RM-9854 (Feb. 29, 2000). Comments of Itron, Inc. (Mar. 8, 2001).

B. Significant Investments In AMR/Utility Telemetry Equipment Have Been Made To Make Meter Reading More Efficient And Reliable.

1. The Hundreds Of Millions Of Dollars That Have Been Invested In AMR Equipment Results In Numerous Operational Efficiencies.

Hundreds of millions of dollars have been invested by Itron and its customers for AMR using the 1427-1432 MHz frequencies, including over $650 million that has been invested in upgrading meters to make them AMR capable. To date, Itron has deployed more than 20,000 network nodes nationwide in the band, and shipped over 16 million AMR units to more than 650 electric, gas, and water utilities.

Wireless meter-reading systems improve the accuracy and reliability of meter reading over conventional methods. They increase dramatically utility productivity and efficiency, in some cases eliminating the need for time-consuming travel and, in others, increasing by a factor of ten, twenty, or more the number of meters that can be read by a single meter reader in an eight-hour shift.[22] AMR systems also (1) improve a utility's ability to detect meter tampering, (2) make it possible for a utility to automate costly "off-cycle reads" associated with beginning- and end-of-service transactions, (3) eliminate the need for estimated bills, (4) reduce the number of erroneous readings, and (5) enable utility customers to monitor or make changes to their equipment from a remote location using wireless sensor devices.

2. AMR Systems Are An Important Component Of The Nation's Critical Utility Infrastructure.

AMR systems can be designed to meet residential and small business metering needs, or to meet the more complex needs of larger commercial and industrial energy customers. Regardless of the actual system's components, automatic metering technology provides an efficient and cost-effective means to deliver a wealth of crucial data used to protect and maintain the nation's critical infrastructure.

Specifically, Itron's AMR systems are used to collect, analyze, and deliver complex data to electric, gas, and water utilities and their customers. Its AMR systems establish a direct link between utility and customer, making it possible to reduce peak

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[22] See Yochi J. Dreazen and Jacob M. Schlesinger, *Job Stretching: Raleigh, N.C., Shows A Tight Labor Market Can Spur Productivity — Reading Meters by Computer*, WALL ST. J., Feb. 7, 2000, at A1; *see, e.g.*, KeySpan Energy Delivery Corp. Comments at 2.

demand and shift usage to off-peak hours, as well as to encourage conservation by providing customers with detailed, real-time price, consumption and outage information. More accurate load forecasting can reduce the risk of hugely expensive spot-market energy purchases such as those that have forced one California utility into bankruptcy and led to rolling blackouts across the state. As noted above, the Administration's recent National Energy Policy report focused attention on eliminating the imbalance between energy supply and demand, which is deemed essential to coping with the nation's energy crisis.

In addition, accurate forecasting leads to more precise planning of supply or generation requirements, further reducing frantic and costly power acquisitions when energy reserves are near emergency levels. By collecting real-time data, a utility can develop a new portfolio of dynamic rate structures and incentive programs, real-time pricing packages, and interruptible rates that can be targeted to specific customers to significantly improve load management and reduce peak demand. Further, utility and energy service providers can use the storehouse of knowledge acquired using AMR systems to negotiate longer-term power purchasing contracts at much more competitive prices.

Wireless capability also is the best means of coping with situations involving natural disasters where power lines may be down or natural gas lines broken. Land line communications - power lines, cable TV, fiber optic, and telephone lines, which all share the same poles - are subject to failure from weather such as ice storms, tornadoes, hurricanes, earthquake, mud slides, or accidents involving utility poles. Having the ability to detect a fault and activate valves and switches, greatly improves a utility's ability to protect public safety.

Moreover, Canadian authorities have allocated the 1427-1430 MHz and 1493.5-1496.5 MHz bands for narrowband multipoint communications systems "to support fixed telemetry applications for automatic meter reading."[23] With similar frequency plans for AMR, manufacturers will be able to develop equipment for both U.S. and Canadian markets and spread their fixed costs over a wider base, thereby reducing prices for users and encouraging innovation in the industry.

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[23] Industry Canada, *Amendments to the Microwave Spectrum Utilization Policies in the 1-3 GHz*, SP 1-3 GHz (Oct. 1999) at 1.

C. The Nation's Critical Infrastructure May Be Impaired If Adequate Spectrum Is Not Provided For AMR And Utility Telemetry.

Unfortunately, even though there is a substantial base of AMR users in the 1427-1432 GHz band, the FCC is considering reallocation options, all but one of which would reduce the amount of usable AMR spectrum by more than 50 percent.

As Itron more fully describes in its comments and reply comments filed with the FCC in its *1.4 GHz Reallocation NPRM*, AMR and WMTS already share spectrum in the 1.4 GHz band with existing government operations while providing valuable utility telemetry and health care services. Unlike other entities proposing to use the 1.4 GHz band, AMR and the medical telemetry community can continue to co-exist with federal government and radio astronomy operations into the foreseeable future.

For example, the comments filed with respect to the FCC's *1.4 GHz Reallocation NPRM* demonstrate that WMTS and utility telemetry users cannot share spectrum with Little LEOs. Any commercially viable Little LEO service would necessarily cause significant interference to other users of the band.[24] Moreover, because Little LEO downlinks will have ubiquitous, nationwide coverage, the potential for interference to a number of WMTS facilities would be great, while it would be extremely difficult to detect and isolate the source of the interference.[25]

Similarly, the constraints imposed on the 1427-1432 MHz band by the incumbent federal government users and WMTS operations will significantly limit deployment of private land mobile radio services. Indeed, the record in the *1.4 GHz Reallocation NPRM* proceeding makes it apparent that WMTS cannot operate adjacent to land mobile systems without employing expensive filtering devices or establishing a guard band that will significantly reduce the spectrum available for WMTS purposes.[26]

Growing demand for spectrum has required the FCC to accommodate new services either through sharing with existing services or through reallocation of

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[24] *1.4 GHz Reallocation NPRM*, American Hospital Assoc. ("AHA") Comments at 10.
[25] *See id.* at 10 n.21. The NTIA has stated that "reallocation of the 1427-1432 MHz band for airborne and space-to-earth applications must be avoided." *1.4 GHz Reallocation NPRM* ¶ 28. The Canadian government, which also has allocated 1.4 GHz frequencies for utility telemetry, recently expressed its concern that Little LEO feeder downlinks could interfere with utility telemetry systems and radio astronomy. *See* "Canadian Preliminary Views for WRC-2003, Ch. 2, Mobile, mobile-satellite, and space science services," OEA/Ser.L/XVII.4.3, PCC.III/doc. CAN-01-C2, p.6.
[26] AHA Comments at 14.

spectrum from existing services to new services and technologies.[27] In the latter case, existing operations either have been relocated to other, generally higher, frequency bands or they have been removed altogether from the subject bands.[28] Neither of these options is feasible in the case of utility AMR and telemetry operations operating in the 1427-1432 MHz band.

Relocation to other spectrum — assuming alternative spectrum could be found — is not practical. Itron and its utility customers have made significant investments in AMR equipment at 1.4 GHz. Thus, relocation would curtail crucial utility operations, diminish the value of millions of dollars of investments in an established technology, and put at risk the potential for AMR to transform the structure of the power industry at its darkest hour. Grandfathering existing operations would be similarly inadequate in that it would prevent utilities from securing the new AMR and telemetry services that they so vitally need.

Nor can AMR customers meet their needs with general purpose wireless services. Because of the large coverage gaps that are typical in such systems, general purpose wireless is not an adequate substitute for dedicated AMR/utility telemetry spectrum. Meters are geographically dispersed throughout many areas, and they may be located on pumps, wellheads, billboards, and gas storage facilities. These sites often are sparsely populated and, consequently, underserved or unserved by general purpose wireless providers.

Moreover, requiring utilities to use general purpose carriers would put a mission critical application in the hands of unrelated businesses with their own set of economic considerations and priorities. The public interest would not be well served by requiring the critical infrastructure industries, in times of a natural disaster in particular, to rely on the general wireless network for data transmission.[29]

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[27] *Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium,* 14 FCC Rcd 19868, 19869 (1999).

[28] *Id.*

[29] AMR two-way systems cannot make use of the 932/941 MHz channels that the FCC recently deemed available for these purposes. *Amendment of the Commission's Rules Regarding Multiple Address Systems,* 15 FCC Rcd 11956, 11967-73 (2000). The two-way systems used today have higher capacity requirements such that the 12.5 kHz and 50 kHz MAS channels are inadequate for many utility telemetry services. Similarly, although channels in the 902-928 MHz band have been used on an unlicensed basis, pursuant to Part 15 of the FCC's rules, for one-way transmissions from a meter module to a handheld or van driven collection device, the low powers permitted under Part 15 cannot satisfy the demands of a wide-area two-way system.

II. AMR/Utility Telemetry Future Spectrum Needs: Amount, Bands, Services, Equipment.

Question 5

Independent studies and data confirm the importance of, and growth potential for, AMR/utility telemetry products and services. As of the end of 1999, only two percent of the more than 270 million utility meters in the United States had been telemeterized.[30] Yet the Strategis Group estimates that 37 percent of those meters will be connected to fixed wireless networks within the next five years — the majority being electric or gas meters in hard-to-reach rural areas.[31] According to a Yankee Group analyst, "telemetry will grow significantly over the next five years, making a noticeable impact on the $200 billion deregulating energy industry and other industries. The value of telemetry, though virtually unrecognized today, is increasing as it becomes technologically feasible and cost-effective. Its possibilities are vast."[32]

III. Alternative Technologies and Commercial Services Do Not Meet The Nation's Critical Utility Infrastructure Needs.

Questions 4, 6

A. Manual meter reading.

AMR applications allow utilities to use wireless devices remotely to monitor equipment from a central location. The alternative, traditional data collection method is for utility employees to travel to each device and record measurements manually.

As noted, AMR has proved to be at least twenty times more efficient than traditional meter reading.[33] The more efficient meter reading technology well serves the utility industry in an era of deregulation. Access to competing utility service providers generates demand for communications links with industrial and commercial customers that must produce readings at least twice every hour or approximately 1,500 readings per month.

Meeting these increased meter reading capability needs poses not only a technical challenge for the nation's utilities, but also presents an issue of cost containment and efficiency. Traditional meter reading systems do not provide the

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[30] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, 14 FCC Rcd 10145, Appendix G, Section B (1999).

[31] *Id.*

[32] *Id.*

[33] *See supra* Part II.B.1.

benefits of improved efficiency of distribution, monitoring of outages, or other applications required to meet public policy and national energy strategy goals that AMR technology supports.

The alternative remote meter reading technologies discussed below also cannot compare with AMR systems in terms of technical superiority and cost-effectiveness.

B. Wired Services.

Although telephone lines have been used for industrial meter reading and in limited instances, residential meter reading, installation and operation issues present obstacles. Utilities using technologies that require direct or hardwired connections to a meter find that high installation and operation costs of these technologies do not provide for an adequate return on investment. Hardwired media also are power intensive, making battery use impractical. As a result, a more costly power supply must be connected to the hardwired media, in addition to the communications connection for gas and water meters. Any such power connection to a gas meter also raises safety concerns because of the risk presented of generating sparks that might cause an explosion in the event of a gas leak.

Furthermore, a wired phone network is not well suited to many of the communications requirements associated with real time pricing, load control and demand side management. The telephone system is designed to provide a switched point-to-point connection and even with the use of test trunks or central office equipment, the telephone system can perform only limited broadcast or multicast functions.

C. Wireless Services.

General purpose wireless technology is not an adequate substitute for AMR systems. As described in Part I.C. above, wireless systems likely leave sparsely populated areas in which many meters are located - pumps, wellheads, storage facilities - unserved or underserved. In addition, utilities would not have as much control over a wireless system run by an unrelated business with its own agenda.

Although satellite technology offers the most effective way to communicate over large, sparsely populated areas, its cost and power consumption limit its widespread use. Only in exceptional circumstances is satellite use cost effective with its high

installation costs, high power consumption, and operational costs associated with direct connection media. In addition, satellite capable transmitters and receivers can pose problems. For example, transmitters capable of communicating to a satellite are bulky, expensive, and are not practical for long-term battery power use.

CONCLUSION

As described above, utility telemetry services make efficient use of the 1427-1432 MHz band. NTIA should work with the FCC to preserve this band for these services to "protect and maintain" the nation's critical infrastructure.

Respectfully submitted,

ITRON, INC.

/s/ Henry Goldberg
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Sheryl J. Lincoln

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Its Attorneys

May 21, 2001