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EXECUTIVE SUMMARY

U S WEST Communications, Inc. ("USW/C") is requesting authority to conduct experimentation, including technical testing and marketing studies, regarding establishment of new personal communications services ("PCS"). USW/C's program will cover not only radio technology, but also the network technology and infrastructure needed to make PCS viable economically, while meeting the needs of consumers and service providers.

The radio experimentation will proceed on two tracks:

I. Laboratory PCS Experimentation, and

II. A Wireless PCS Access Trial.

The laboratory testing will occur at the U S WEST Advanced Technologies laboratory in Boulder, Colorado and at USW/C's facilities in Portland, Oregon. USW/C proposes to test prototypes of selected radio hardware at its laboratories to ensure that the equipment performs according to specification before it is deployed in the field trial. The prototypes will also be used to confirm propagation predictions.

USW/C has two sets of objectives for the trial. First, the market unit's objective is to understand how consumers will use the wireless service to meet their need to communicate while in or away from their homes and offices. The network planners' objective is to provide trial equipment that can meet the needs of the market unit while affording the opportunity to learn more about the potential effects PCS will have on the network.

PUBLIC INTEREST and PIONEER'S PREFERENCE

Public Interest Considerations

U S WEST Communications, Inc. ("USW/C") is hereby requesting authority to conduct experimentation, including technical testing and market studies, regarding the establishment of new personal communications services ("PCS"). As the member of the U S WEST family of companies responsible for providing local exchange services throughout a fourteen-state region of the United States, USW/C must plan for a telephone network suited to the needs of the twenty-first century.

Wireless telecommunications technology and applications around the world are evolving at a rapid rate. Cellular, paging, the second-generation cordless telephone ("CT-2"), the Personal Communications Network ("PCN"), and other opportunities are moving targets in the ever-changing landscape of the wireless world.

PCS, as a general matter, can be defined in a variety of ways. Perhaps first and foremost, it is a market positioning which focuses on an application of mobile and portable communications designed to reach large numbers of customers, both businesses and consumers. It can also be defined as "a broad range of radio communications services that frees individuals from the constraints of the wireline public switch telephone network and enables them to communicate when they are away from their home or office telephone, stationary or on the move." Other definitions tie it to technology. Ultimately, the definition of PCS will be refined as it evolves and perhaps its best definition, at present, is a "communications for people not places."[1/]

The advent of new, wireless personal communications services over the next decade will pose many challenges to both communications providers and regulators. PCS has great potential. Since

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1/ This phrase has been used to describe the Personal Communications Network ("PCN"), a form of PCS under construction in the United Kingdom, by Unitel, one of the three PCN licensees. An affiliate of USW/C is an equity participant in Unitel. U S WEST NewVector Communications, Inc., the U S WEST company providing cellular, mobile, and paging services, is submitting to the FCC, concurrently with USW/C's filing of this application, the first in a series of reports of information learned in the Unitel project.

the invention of the telephone, the telecommunications network has been oriented toward communications between specific telephones. PCS turns this orientation around: communications will be between specific persons, not telephones. This shift in the basic paradigm of the communications network has already begun in small, measured ways. Today's "intelligent network" permits the offering of call forwarding, virtual private networks, and user-configurable network features. However, the use of advanced wireless technologies, together with further enhancements to the intelligent network and other changes to the network infrastructure will result in a new network for communications between people, not telephones.

While some forms of PCS will be oriented to a substantial degree toward users in fast-moving vehicles, there are a wide variety of PCS offerings that will be primarily oriented toward serving users who are pedestrians or predominantly at fixed locations. One example of such an offering is wireless PBX service. This will enable a user to remain in touch while in his or her office, on the factory floor, in a conference room, or anywhere within a campus setting. Another example is the use of radio to provide local loop service to persons in isolated communities or in new housing developments. A PCS system addressing these needs will operate at much lower power and be very differently designed than a system designed to serve the occupants of automobiles on an interstate highway — no handoff would be needed, for example.

PCS applications such as these may be of great importance in providing telephone service meeting future consumers' needs. USW/C is undertaking research to understand the underlying market needs that can be met with low power radio technologies. Specific technical and market research will center on how new radio technologies can be applied to urban and rural communications environments to better serve wholesale and retail customers. We expect this experimentation and market research to lead to new and innovative low power radio services and attendant network infrastructure services.

To make informed decisions on how to make the transition to the network of tomorrow, both network service providers and the FCC must explore a wide variety of issues. Perhaps the most important issue is the demand for new services — what services will address the needs of the public. Once those needs are identified, means for meeting those needs, in ways that are both technologically feasible and economically justifiable, must be explored. These three areas of inquiry — demand characteristics, technology, and economics — are highly interrelated and cannot be considered in isolation from each other.

U S WEST believes, on the basis of its research, that there is an untapped market for new forms of personal communications. Meeting the demands for new services requires the employment of new technological approaches and the establishment of a sound economic basis for the delivery of the new services. This application proposes a framework for exploring this demand and developing economic means of satisfying the demand. Through the experimental program set forth herein, USW/C will be able to better understand both the market (i.e., demand and cost) and the technology issues associated with PCS. To that end, USW/C will be conducting a trial of a variety of PCS applications over a two-year period, learning about customer expectations and how various services fit within or adjacent to the network.

USW/C's experimental program will cover not only radio technology, but also the network technology and architecture needed to make PCS viable economically while meeting the needs of consumers and service providers. Through its experience in the development of one of the PCN systems in the United Kingdom, U S WEST has become aware of the massive cost of establishing a network infrastructure suitable for supporting a large-scale PCS. Having in place a network that can support PCS providers can result in tremendous cost savings to those providers and thereby make these new services available to the public sooner and at lower cost.

This experimental program will permit USW/C to learn how to provide critical PCS network support elements in order to make the local exchange network "PCS-friendly". USW/C plans to develop a network infrastructure that can take maximum advantage of the public switched network while providing the functions needed by PCS providers. Ultimately, PCS support services could be offered by the local exchange network to multiple service providers on a wholesale basis, thereby obviating the need for these PCS providers to establish entirely new networks at great cost. These services would then be incorporated into the radio-based PCS offerings made available to the public by PCS providers at the retail level. Determining appropriate points of division between the wholesale provision of infrastructure services and the retail provision of packaged PCS services is an issue to be explored in the course of this experimentation.

In short, the experimental program to be pursued by USW/C pursuant to this application is designed to lead to the more rapid and economical delivery of PCS to a wide variety of consumers by multiple providers on a competitive basis, and will therefore serve the public interest.

Pioneer's Preference.

It is clear that among the critical issues in the PCS Inquiry and any subsequent allocation proceeding will be the development of a suitable definition of PCS, predicting the demand for PCS services, and determining how PCS providers will be able to accommodate that demand at an appropriate price. USW/C will be submitting reports on a regular basis as the result of its experimentation that are not only directly relevant to a resolution of these threshold issues but will greatly assist the decisionmaking process.

The establishment of an infrastructure for PCS will also be a critical issue, particularly in later stages of the proceeding. The role of various facility providers in establishing the infrastructure will have to be addressed, as will the cost and viability of support networks. Information to be developed in the course of USW/C's infrastructure experimentation will be of great assistance to the Commission in addressing these issues. Similarly, reports on technical issues based on USW/C's laboratory and market tests should contribute significantly to the Commission's understanding of these issues.

In view of the relevance and probative value of the data and information that will be submitted in this reporting program, USW/C submits that it is eligible to request a pioneer's preference in any notice of proposed rulemaking pertaining to the establishment of new personal communications services. This is consistent with the Commission's Report and Order in the Pioneer Preference proceeding[2/] and the Commission's Public Notice clarifying the July 29, 1991 deadline for filing experimental applications which form the basis of applicant's pioneers' preference request in the PCS proceeding.[3/]

2/ Establishment of Procedures to Provide a Preference, Gen. Docket No. 90-217, Report and Order, FCC 91-112 (May 13, 1991).

3/ Filing Requirements for Pioneer's Preference, DA 91-713, (June 13, 1991).

OVERVIEW

The radio experimentation to be undertaken pursuant to this application will proceed on two tracks: (I) Laboratory PCS Experimentation and (II) a Wireless PCS Access Trial. While the experimentation on Track I will begin earlier, it is expected that the activities on both tracks will be conducted in parallel, once sufficient information has been developed in the laboratory to warrant proceeding with the second track of the experiment.

I. Laboratory PCS Experimentation.

USW/C will perform laboratory measurements to support the wireless access trial undertaken in Track II, test and evaluate radio hardware, confirm propagation predictions, test various technical approaches and potential standards, and analyze interference potential. The laboratory experimentation track of this project will be conducted at the U S WEST Advanced Technologies laboratories in Boulder, Colorado and at USW/C facilities in Portland, Oregon.

II. Wireless PCS Access Trial.

USW/C will conduct a trial of PCS in 1992 and 1993 with a selected set of customers in a city within the USW/C Communications territory, involving 800-1000 customers, having a variety of communications needs, representing different markets. The first part of this trial will be a technical trial, and it will be followed by a market trial.

In this application, USW/C is requesting authorization for the use of radio on an experimental basis at the two laboratories in order to begin the activities in Track I. Exhibit 4 to this application contains information concerning the technical activities to be pursued at the laboratories and addresses the current usage of the radio frequencies that will be used for experimentation and the planned means of interference avoidance.

USW/C is organizing the second track of this experimental project. The company has issued RFPs (requests for proposals) to equipment vendors and has entered into negotiations for equipment. Before specific facilities are proposed for the second track of the experiment, however, it will be necessary to evaluate the equipment

and the technologies that are under consideration, using the laboratories that are part of the first track. A subsequent application will be filed for modification of the experimental license once the parameters of the second track of the experiment have been established.

The Wireless PCS Access Trial will involve personnel from most of the Market and Network organizations of USW/C. The market unit planners have been conducting research and thus have provided direction as to the type of service that would be attractive to the customers across the various market segments. USW/C - Network Planning, together with U S WEST Advanced Technologies, have been designing the trial architecture and evaluating available technology for both the network and the radio portions of the test. USW/C Communications - Network Engineering and Operations will be responsible for ordering, installing, maintaining, and operating the trial equipment once the trial begins.

There are two sets of objectives to the experiment — one for the market units and one for the technical units. The objective for the market units is to understand how businesses, families, and individuals will use wireless services to meet their need to communicate while in or away from their offices or homes. This understanding will influence the design of the trial architecture. The network planners' objective, on the other hand, is to provide trial equipment that can meet the needs of the market unit, while affording the opportunity to learn about the potential effects this type of service will have on the network.

Some of the specific goals falling under these objectives are:

- To understand the customer's preferences regarding a number of service approaches with different coverage parameters.

- To define the bundles of features that are preferred by each segment.

- To have customers test a number of service hypotheses in a trial environment, allowing the development of successful products by designing feature packages to meet customer needs and by matching those needs with viable technological capabilities.

- To understand how wireless technology can be integrated into the existing network.

- To understand how the existing network infrastructure can evolve to meet the needs of PCS providers.

- To obtain information about calling patterns, traffic patterns, propagation characteristics, and costs associated with a low-power wireless public network access service.

- To understand how a PCS service will fit into the intelligent network.

- To evaluate the trial solution for network access and radio control to understand their effect on the network.

- To gain understanding the scope of operations management requirements associated with wireless services.

- To understand the technology and the market in order to perceive how different participants in the provision of PCS may fulfill their roles.

- To understand the nature of the customer addressing issues associated with widespread portable service.

DESCRIPTION OF EXPERIMENTAL EQUIPMENT AND PROCEDURES

Introduction

USW/C seeks experimental authorization to perform any laboratory measurements which may be necessary to support a wireless access trial. Prototypes of selected radio hardware will be tested at the U S WEST Advanced Technologies laboratories in Boulder, Colorado to insure that the equipment performs according to specification before it is deployed in a field location.

These prototypes may also be used to confirm independent propagation predictions. These propagation measurements will support the design of any field trials which may be authorized. In addition to the Boulder, Colorado location, USW/C facilities in Portland, Oregon may also be utilized. Separate applications are being filed for the two locations; in each application Exhibit 4.1 will contain the map of the relevant location.

Test Description

The majority of the testing will be performed indoors, but occasional tests may also be made outdoors near the designated locations. During any outdoor testing, the mobile and/or base station prototypes will be confined to a 1-mile radius of the locations shown in Exhibit 4.1.

Tests will be performed to validate equipment performance in a controlled laboratory environment before being deployed for the field trial. Specifically, such testing will evaluate:.

1. The performance and operation of the handset to base station radio link.

2. Interoperation of the radio subsystem with the network access equipment.

3. Effectiveness and limitations of the two-way calling and handoff functions.

4. Verification of overall system operation, including both voice and data (control) network functions.

Radio Equipment Technical Characteristics

The test trial will use a low-power radio link similar to the CT-2 equipment being deployed in Europe. The equipment will be modified to operate in the 1850-1990 or 2110-2130/2160-2180 MHz band. Permission is also requested to operate unmodified equipment in the 866-868 MHz band. The equipment will use the same time-division duplex and frequency division multiple access techniques as specified in the common air interface standard for CT-2. The radio link protocols will be modified as necessary to support two-way calling and other required features. Other modulation techniques (FHMA, CDMA, and TDMA) may also be explored.

The system uses either 20 or 80 radio-frequency (RF) channels. Each RF channel supports one voice channel with a bit rate of 72 kb/s. This digital signal modulates the RF carrier using binary frequency shift keying, resulting in a RF bandwidth of 100 kHz per channel. Therefore, the 866-868 MHz band will support 20 channels; 80 channels will be used in the other requested bands.

The maximum output power of each base station transmitter will be 40 mW with a maximum EIRP of 127 mW. The maximum output power of each handset transmitter will be 10 mW with a maximum of EIRP of 7 mW. The bandwidth of each RF channel will be 100 kHz. The modulation will be binary frequency shift keying.

Voice signals will be digitized using 32 kb/s ADPCM encoding to provide quality comparable to wireline services and to limit the complexity and power consumption of the handsets.

Avoiding Interference into Licensed Services

A detailed frequency interference analysis will be performed to determine what licensed frequencies must be avoided in any of the requested frequency bands. Prior to actual testing, the transmit frequencies of the prototypes under test will be selected to avoid interference into operational systems. Testing will be coordinated with existing users to avoid any harmful interference to operational systems during the measurements. As an extensive user of point-to-point microwave systems, U S WEST Communications' engineers are experienced in the analysis of microwave interference potential and frequency coordination procedures.

Exhibit 4.2, Figures 1 and 2, shows all microwave paths in the 1850-1990 MHz band which have at least one end within 1 degree of Boulder, Colorado and Portland, Oregon, respectively. Exhibit 4.2, Tables 1 and 2, shows the relevant technical data for each of these paths, including licensee name and operating frequencies.

Exhibit 4.3, Figures 1 and 2, shows all microwave paths in the 2110-2130/2160-2180 MHz band which have at least one end within 1 degree of Boulder or Portland, respectively.

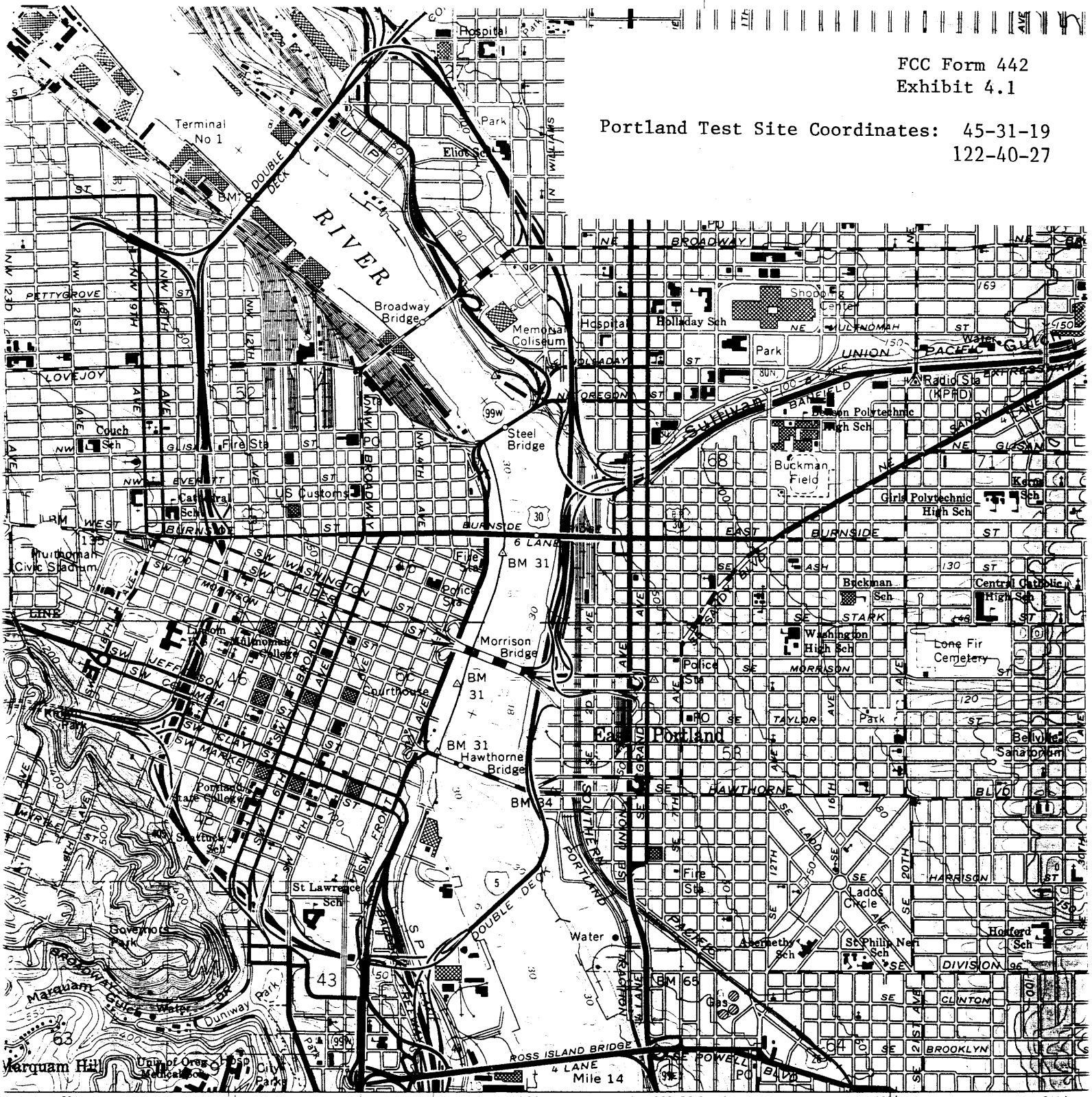
Exhibit 4.3, Tables 1 and 2, shows the relevant technical data for each of these paths, including licensee name and operating frequencies.

A frequency search by Comsearch, Inc., shows that there are no licensed stations in the 866-868 MHz band within a 70-mile radius of the Boulder or Portland locations. USW/C will monitor the FCC public notices on a regular basis to determine whether any new public safety facilites are licensed in this band during the duration of the experiment in this band.

Exhibit 4.1

FCC Form 442
Exhibit 4.1

Portland Test Site Coordinates: 45-31-19
122-40-27



524 (LAKE OSWEGO) 1474 I NW — TIGARD 7.3 MI, NEWBERG 22 MI — 40′ — LAKE OSWEGO 6 MI. — INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1976 — 1 450 000 FEET (WASH.) — MILWAUKIE 4.2 MI, OREGON CITY 11 MI. — GRESHAM 11 MI.

SCALE 1:24 000

0 1 MILE

1000 2000 3000 4000 5000 6000 7000 FEET

.5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

RVES AND SOUNDINGS IN FEET—COLUMBIA RIVER DATUM

E SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER

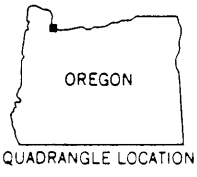
THE MEAN RANGE OF TIDE IS APPROXIMATELY 2 FEET

ROAD CLASSIFICAT

Heavy-duty — Light-d

Medium-duty — Unimp

Interstate Route — U. S. Rou



QUADRANGLE LOCATION

PORTLAND, O

SW/4 PORTLAND I

N4530—W1

COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

GICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

BING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple compiled from aerial photographs taken 1970 and 1975. This information not field checked

Map edited 1977

Purple tint indicates extension of urban areas

196

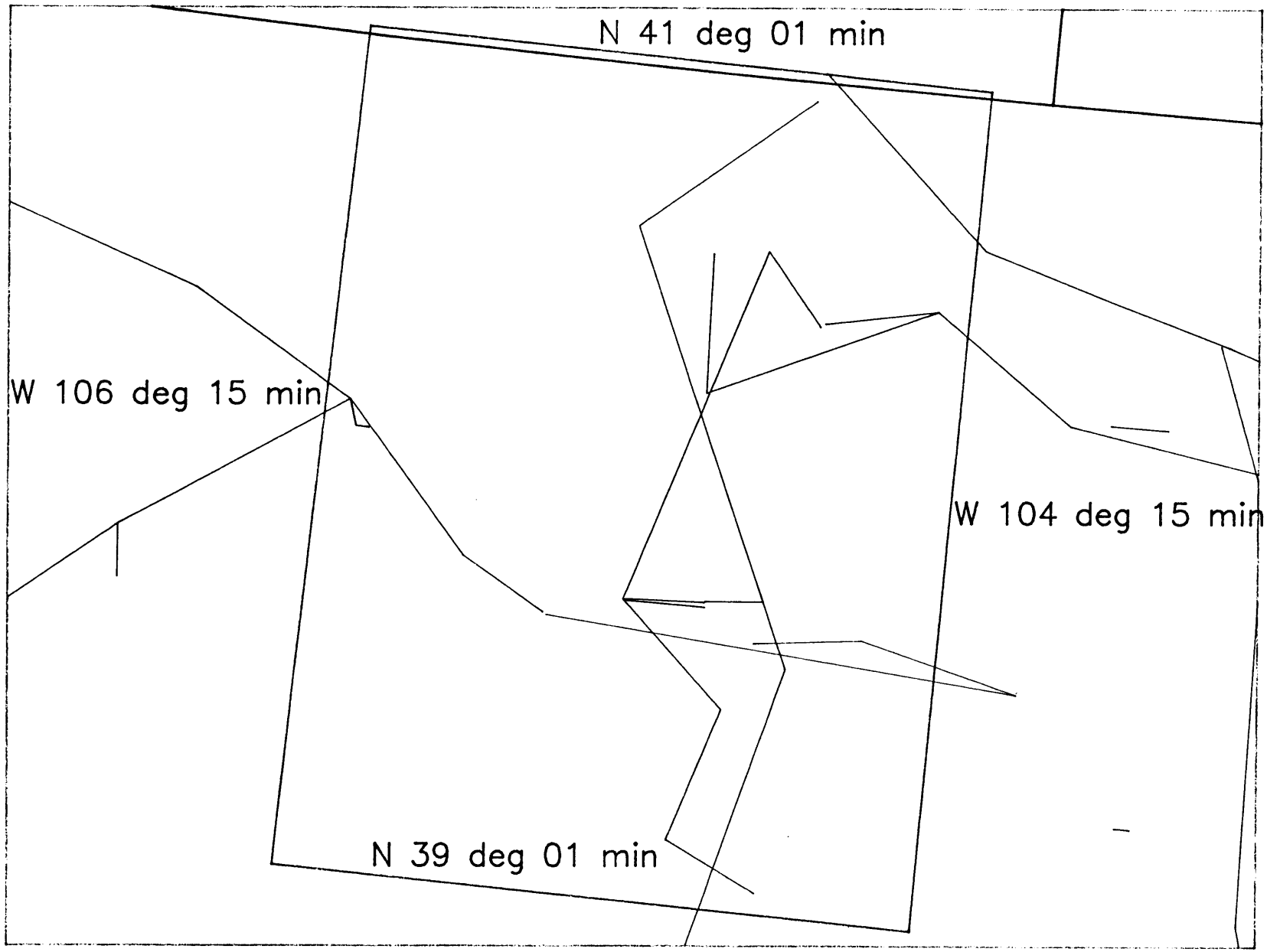
PHOTOREVISED 1

AMS 1475 II SW

Exhibit 4.2

PRIVATE POINT TO POINT MICROWAVE

BOULDER: 1850 – 1990 MHz



FCC Form 442
Exhibit 4.2
Figure 1

U S WEST COMMUNICATIONS
2 GHz PRIVATE CARRIER
1850 - 1990 MHz

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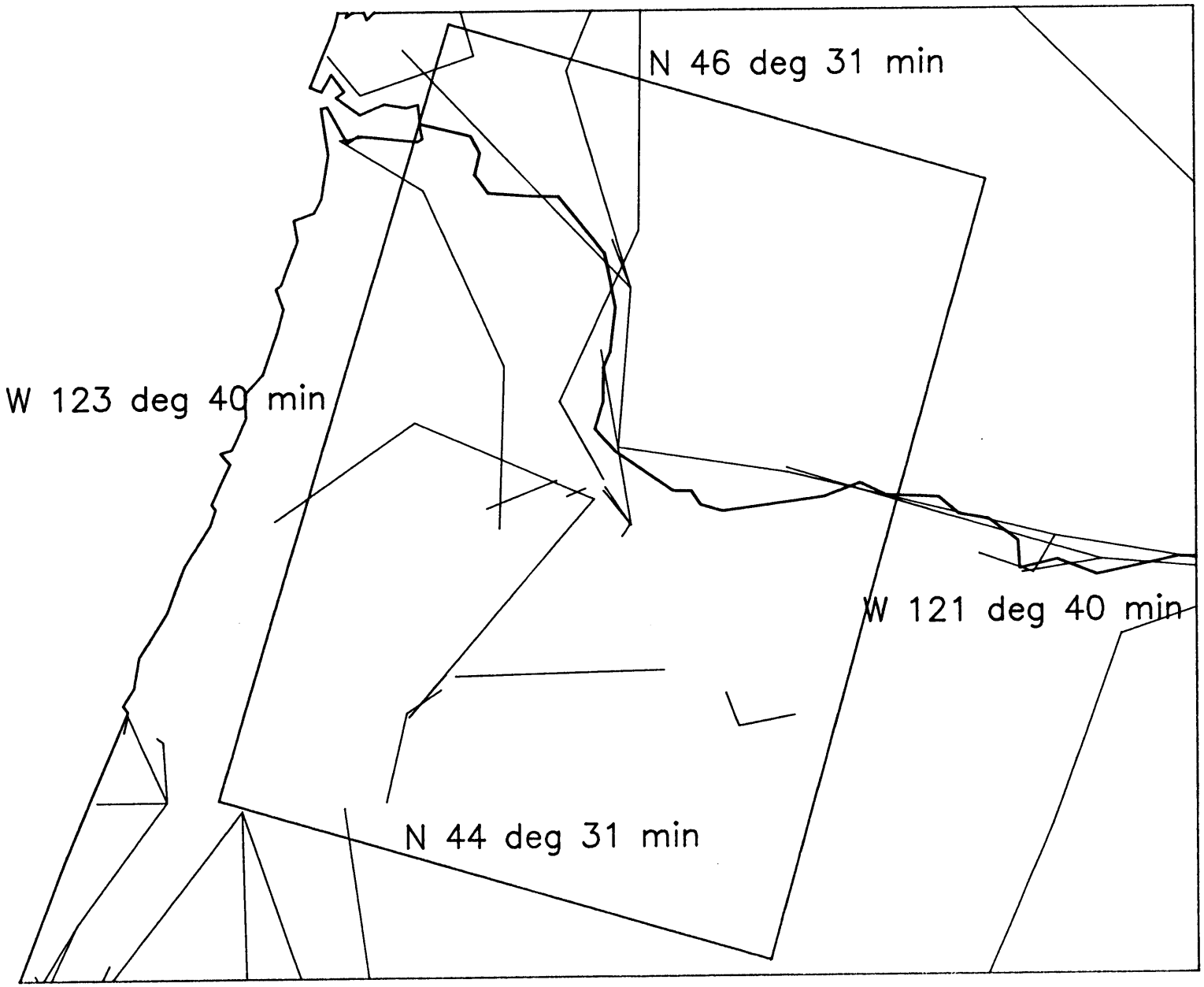
FCC Form 442
Exhibit 4.2
Table 1

LATITUDE 39deg 1min - 41deg 1min
LONGITUDE 104deg 15min - 106deg 15min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
CO	ARAPAHOE, COUNTY OF	1	1,865.00000	IDAHO SPRING	394031	1052902	WIA608
		2	1,905.00000	SOUTH AURORA	393925	1044930	WIA611
		3	1,965.00000	BENNETT	394120	1042919	WIA612
		4	1,985.00000	BENNETT	394120	1042919	WIA612
	COLORADO INTERSTATE GAS COMPANY	5	1,925.00000	DENVER	393611	1044302	KAO69
		6	1,975.00000	DENVER	393611	1044302	KAO69
		7	1,885.00000	AURORA	394530	1044833	KAO70
		8	1,915.00000	AURORA	394530	1044833	KAO70
		9	1,855.00000	AURORA	394530	1044833	KAO70
		10	1,965.00000	DENVER	394444	1045924	WAM264
		11	1,955.00000	FORT COLLINS	403702	1051935	WQW47
		12	1,975.00000	FORT COLLINS	403702	1051935	WQW47
		13	1,925.00000	FORT COLLINS	403702	1051935	WQW47
		14	1,875.00000	CHEYENNE	405712	1044801	WQW48
	COLORADO, STATE OF	15	1,905.00000	IDAHO SPRING	394052	1052944	KAP31
		16	1,875.00000	GREELEY	402553	1044208	KAQ97
		17	1,985.00000	BERTHOUD PAS	394740	1054547	KBB98
		18	1,945.00000	BERTHOUD PAS	394740	1054547	KBB98
		19	1,965.00000	HOT SULPHUR	400422	1060615	KHT45
		20	1,965.00000	HOT SULPHUR	400424	1060847	KHT45
		21	1,955.00000	BARNSVILLE	402908	1042057	KUX26
		22	1,985.00000	BARNSVILLE	402908	1042057	KUX26
		23	1,965.00000	BARNSVILLE	402908	1042057	KUX26
		24	1,865.00000	HOT SULPUR S	400806	1061024	WAA897
		25	1,905.00000	HOT SULPUR S	400806	1061024	WAA897
		26	1,855.00000	HOT SULPUR S	400806	1061024	WAA897
		27	1,885.00000	HOT SULPUR S	400806	1061024	WAA897
		28	1,885.00000	HOT SULPHUR	400424	1060847	WAA897
		29	1,925.00000	MEAD	401424	1050319	WBX328
		30	1,865.00000	MEAD	401424	1050319	WBX328
		31	1,945.00000	FORT COLLINS	403412	1050443	WBX329
	PUBLIC SERVICE COMPANY OF COLORADO	32	1,855.00000	GREELEY	402522	1044259	KAP40
		33	1,935.00000	WINDSOR	403521	1045418	KAP41
		34	1,975.00000	WINDSOR	403521	1045418	KAP41
		35	1,895.00000	GOLDEN	394355	1051457	KAP43
		36	1,875.00000	GOLDEN	394355	1051457	KAP43
		37	1,905.00000	GOLDEN	394355	1051457	KAP43
		38	1,955.00000	DENVER	394435	1045931	WNEF206
		39	1,985.00000	SEDALIA	392936	1045417	WNEF207
		40	1,955.00000	SEDALIA	392936	1045417	WNEF207
		41	1,945.00000	GOLDEN	394343	1051412	WNEP849
		42	1,865.00000	DENVER	394353	1045922	WNEP850
		43	1,855.00000	WESTCREEK	391028	1050202	WNTD996
		44	1,895.00000	WESTCREEK	391028	1050202	WNTD996
		45	1,975.00000	BLACK FOREST	390412	1044433	WSW99
	WILLIAMS NATURAL GAS COMPANY	46	1,905.00000	CHEYENNE	405928	1045426	WEF844

PRIVATE POINT TO POINT MICROWAVE

PORTLAND: 1850 – 1990 MHz



FCC Form 442
Exhibit 4.2
Figure 2

U S WEST COMMUNICATIONS
2 GHz PRIVATE CARRIER
1850 - 1990 GHz

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DATE: 07/25/91

FCC Form 442
Exhibit 4.2
Table 2

LATITUDE 44deg 31min - 46deg 31min
LONGITUDE 121deg 40min - 123deg 40min

STATE	COMPANY			FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
OR	DIGINET INCORPORATED		1	1,960.00000	CORVALLIS	443513	1231414	WNTG314
	NORTHWEST NATURAL GAS COMPANY		2	1,855.00000	SALEM	445048	1230632	KKW94
			3	1,985.00000	SALEM	445048	1230632	KKW94
			4	1,895.00000	PORTLAND	452922	1224146	KKW95
			5	1,925.00000	PORTLAND	452922	1224146	KKW95
			6	1,975.00000	PORTLAND	453131	1224015	KZC69
			7	1,975.00000		453247	1232248	WEG528
			8	1,965.00000		453247	1232248	WEG528
			9	1,945.00000	SALEM	445819	1230140	WGC69
			10	1,895.00000	PORTLAND	452717	1223300	WHC210
	OREGON, STATE OF	STATE HIGH	11	1,975.00000	PORTLAND	453031	1224411	KVX66
			12	1,855.00000	NEWBERG	452116	1225919	KVX67
			13	1,875.00000	PORTLAND	452716	1223300	KYR49
			14	1,895.00000	BEAVERTON	452837	1224730	WAL531
			15	1,955.00000	PORTLAND	452510	1223357	WNEM963
			16	1,935.00000	BUXTON	454438	1230758	WNEP395
			17	1,945.00000	BUXTON	454438	1230758	WNEP395
			18	1,875.00000	WESTPORT	460620	1233507	WNEP396
			19	1,865.00000	WESTPORT	460620	1233507	WNEP396
			20	1,895.00000	SALEM	445830	1225930	WNTE431
	PORTLAND GENERAL ELECTRIC COMPANY		21	1,855.00000	SAINT HELENS	455055	1224907	KBE37
			22	1,855.00000	THREE LYNX	450706	1220352	KOR91
			23	1,855.00000	THREE LYNX	450256	1215925	KOR91
			24	1,905.00000	TIMOTHY MEAD	450645	1214840	KOR92
			25	1,905.00000	THREE LYNX	450256	1215925	KOR92
			26	1,935.00000	HAPPY VALLEY	452708	1223246	KOV94
			27	1,945.00000	HAPPY VALLEY	452708	1223246	KOV94
			28	1,895.00000	NEWBERG	452336	1230303	KOV95
			29	1,905.00000	PORTLAND	453056	1224023	KXO95
			30	1,975.00000	BEAVERTON	453028	1225031	WPS43
	SOUTHERN PACIFIC TRANSPORTATION COMPANY		31	1,965.00000	ALBANY	443750	1230605	KJO34
			32	1,955.00000	SALEM	445557	1230139	KJO35
			33	1,885.00000	PROSPECT HIL	445116	1230713	KJO38
			34	1,875.00000	PROSPECT HIL	445116	1230713	KJO38
	UNION PACIFIC RAILROAD COMPANY		35	1,875.00000	SKAPPOOSE	454152	1225431	WAM32
			36	1,885.00000	SKAPPOOSE	454152	1225431	WAM32
			37	1,965.00000	PORTLAND	453232	1224057	WAM33
WA	PACIFIC, COUNTY OF		38	1,975.00000	LEBAM	462737	1233252	WNEL902
			39	1,955.00000	LEBAM	462737	1233252	WNEL902
	UNION PACIFIC RAILROAD COMPANY		40	1,945.00000	KELSO	460941	1224833	KPE47
			41	1,955.00000	KELSO	460941	1224833	KPE47
			42	1,965.00000		454138	1220425	KSN29
	WASHINGTON, STATE OF		43	1,925.00000	KELSO	460714	1225322	KOJ36
			44	1,965.00000	CHEHALIS	462921	1231251	KOJ41
			45	1,935.00000	CHEHALIS	462921	1231251	KOJ41
			46	1,965.00000	KALAMA	460102	1224640	KOJ42
			47	1,985.00000	KALAMA	460102	1224640	KOJ42
			48	1,885.00000	KALAMA	460102	1224640	KOJ42
			49	1,975.00000	KALAMA	460102	1224640	KOJ42
			50	1,915.00000	VANCOUVER	453742	1223952	KOJ46
			51	1,905.00000	VANCOUVER	453742	1223952	KOJ46
			52	1,985.00000	SKAMANIA	454057	1220406	WBH466

U S WEST COMMUNICATIONS
2 GHz PRIVATE CARRIER
1850 - 1990 GHz

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Exhibit 4.2
Table 2

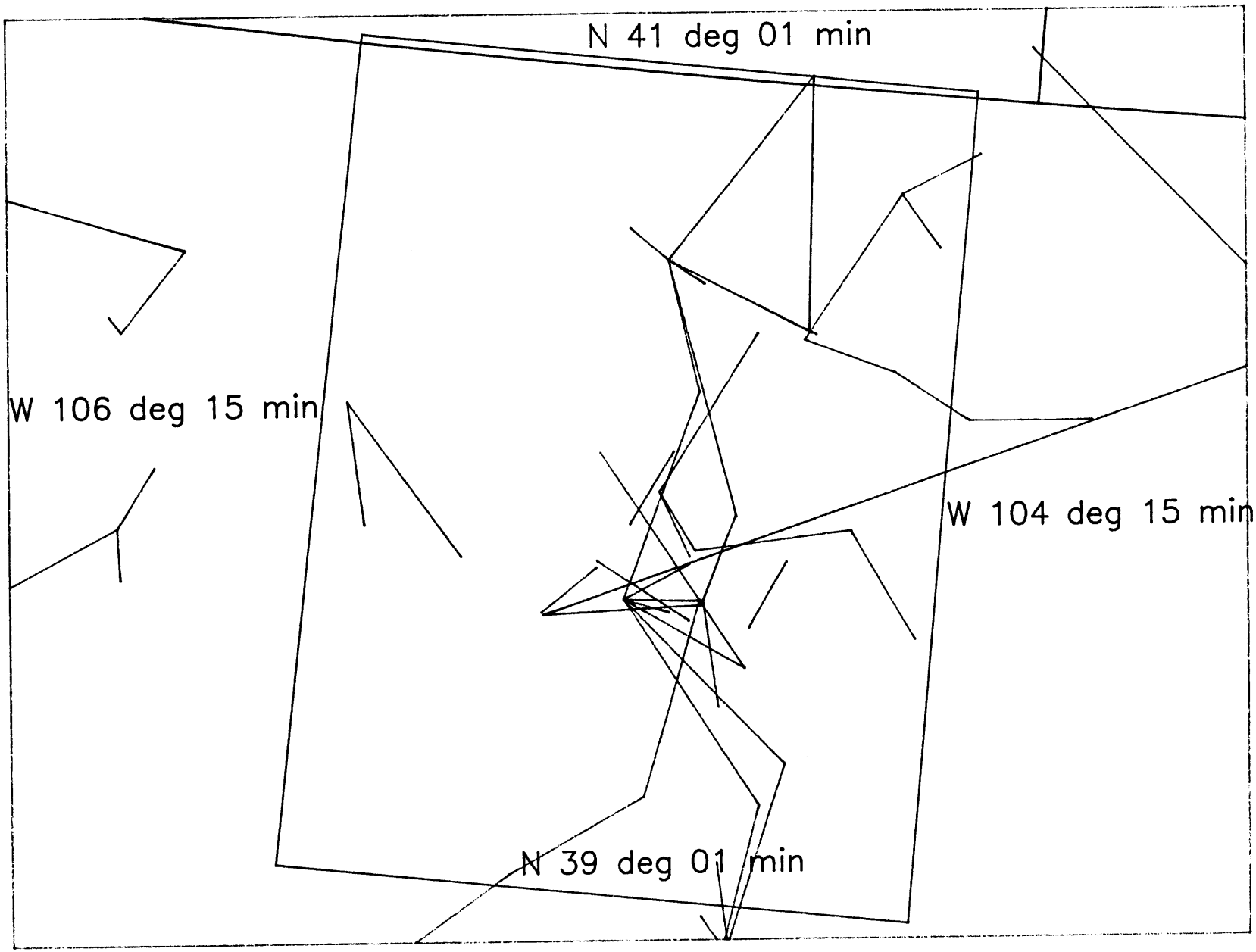
LATITUDE 44deg 31min - 46deg 31min
LONGITUDE 121deg 40min - 123deg 40min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
WA	WASHINGTON, STATE OF	53	1,935.00000	SKAMANIA	454057	1220406	WBH466

Exhibit 4.3

COMMON CARRIER

BOULDER: 2 GHz



FCC Form 442
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Figure 1

U S WEST COMMUNICATIONS
2 GHz COMMON CARRIER

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Table 1

LATITUDE 39deg 1min - 41deg 1min
LONGITUDE 104deg 15min - 106deg 15min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
CO	ACADEMY COMMUNICATION ENTERPRISES	1	2,118.400	GUY HILL	394853	1051956	WHS950
		2	2,168.400	ACADEMY	394138	1050129	WHS949
	AT&T COMMUNICATIONS OF THE MTN STATES	3	2,118.400	DEVILS HEAD	391550	1050650	KAN28
		4	2,121.600	DEVILS HEAD	391550	1050650	KAN28
		5	2,165.200	BADGER MTN	390300	1053047	WHS820
		6	2,168.400	BADGER MTN	390300	1053047	WHS820
		7	2,171.600	DENVER	394443	1045945	WHR280
	BUSINESS RADIO COMMUNICATIONS	8	2,112.400	HORSETOOTH	403256	1051147	WHA485
		9	2,116.800	HORSETOOTH	403256	1051147	WHA485
		10	2,120.000	HORSETOOTH	403256	1051147	WHA485
		11	2,126.400	HORSETOOTH	403256	1051147	WHA485
		12	2,164.400	GREELEY	402415	1044259	WHA488
		13	2,166.800	NORTHGLEN	395701	1045409	WHA489
		14	2,170.000	FT COLLINS	402959	1050430	WAH486
		15	2,176.400	BUCKHORN	403700	1051937	WHA487
	CONTACT COMMUNICATIONS	16	2,119.600	LOOKOUT MTN	394345	1051408	WHE543
		17	2,129.000	LOOKOUT MTN	394345	1051408	WHE543
		18	2,169.600	FRANKTOWN	391608	1044500	WHO893
		19	2,179.000	FRANKTOWN	391608	1044500	WHO893
		20	2,179.000	LAKEWOOD	394231	1050523	WHE542
	DENVER CELLULAR TELEPHONE CO	21	2,112.000	MONUMENT 2	390721	1045157	WLM717
		22	2,112.000	NIWOT	400529	1050717	WLM710
		23	2,121.600	NEW AIRPORT	395118	1044352	NEW
		24	2,121.600	NIWOT	400529	1050717	WLM710
		25	2,123.200	WADLEY	395701	1045425	WLM708
		26	2,128.000	DANIELS PK	392940	1045417	WLM709
		27	2,162.000	GRAIN SILO	395431	1051419	WLM705
		28	2,171.600	AURORA	394123	1044955	WLM707
		29	2,171.600	GRAIN SILO	395431	1051419	WLM705
		30	2,173.200	MELLON FINA	394441	1045906	WLM704
		31	2,178.000	MELLON FINA	394441	1045906	WLM704
	GREELEY MSA LIMITED PARTNERSHIP	32	2,128.000	GREGRELYJCT	402330	1045317	WLW233
	INTERLINK COMMUNICATIONS COMPANY	33	2,113.600	GUY HILL	394755	1051956	WLL455
		34	2,163.600	SQUAW MTN	394047	1052935	WLL454
	MCCAW RCC COMMUNICATIONS, INC	35	2,113.600	LOOKOUT MTN	394345	1051413	WHO573
		36	2,115.200	HORSETOOTH	403257	1051149	WHO568
		37	2,116.800	LOOKOUT MTN	394345	1051413	WHO573
		38	2,118.400	HORSETOOTH	403257	1051149	WHO568
		39	2,121.600	LOOKOUT MTN	394345	1051413	WHO573
		40	2,123.200	HORSETOOTH	403257	1051149	WHO568
		41	2,124.800	HORSETOOTH	403257	1051149	WHO568
		42	2,127.200	LOOKOUT MTN	394345	1051413	WHO573
		43	2,128.000	LEE HILL	400419	1052114	WHO572
		44	2,163.600	DENVER	394435	1045914	WHO574
		45	2,165.200	FT COLLINS	402959	1050420	WHO569
		46	2,166.800	FRANKTOWN	392223	1044050	WHO576
		47	2,168.400	BUCKHORN	403700	1051940	WHO567
		48	2,171.600	ENGLEWOOD	393535	1045002	WHO575
		49	2,173.200	GREELEY UNC	402406	1044159	WHO570
		50	2,174.800	LONGMONT	401425	1050325	WHO571
		51	2,176.400	FRANKTOWN	392223	1044050	WHO576
		52	2,177.000	LONGMONT	401425	1050325	WHO571
		53	2,178.000	ENGLEWOOD	393535	1045002	WHO575

U S WEST COMMUNICATIONS
2 GHz COMMON CARRIER

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Table 1

LATITUDE 39deg 1min - 41deg 1min
LONGITUDE 104deg 15min - 106deg 15min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
CO	TELESTAR, INC.	54	2,115.000	GREELEY	402455	1044329	WGX333
		55	2,115.200	SQUAW MTN	394031	1052902	WGX327
		56	2,121.600	HORSE TOOTH	403256	1051147	WGX334
		57	2,124.800	SQUAW MTN	394031	1052902	WGX327
		58	2,165.200	DENVER	394358	1045906	WGX326
	TELSTAR COMMUNICATIONS, INC.	59	2,115.000	GREELEY	402455	1044329	WGX333
		60	2,121.600	HORSE TOOTH	403256	1051147	WGX334
		61	2,124.800	SQUAW MTN	394031	1052902	WGX327
		62	2,124.800	SQUAW MTN	394031	1052902	WGX327
		63	2,165.200	DENVER	394358	1045906	WGX326
	U S WEST COMMUNICATIONS, INC.	64	2,110.000	GREELEY JCT	402310	1044411	KCO83
		65	2,112.000	GROUSE MTN	400802	1061025	WPE72
		66	2,120.000	GREELEY JCT	402310	1044411	KCO83
		67	2,128.000	GROUSE MTN	400802	1061025	WPE72
		68	2,160.000	HARDIN	401935	1042619	KPP22
		69	2,162.000	BERTHOUD PS	394738	1054548	WPE71
		70	2,165.000	HARDIN	401935	1042619	KPP22
		71	2,178.000	AMAX MILL	395043	1060442	WAU336
	US WEST NEW VECTOR GROUP, INC.	72	2,112.000	DENFEDRLHTS	395137	1050125	WLW485
		73	2,115.200	DENSTRAUS#2	394144	1041811	NEW
		74	2,121.600	DENFEDRLHTS	395137	1050125	WLW485
		75	2,121.600	WESTMINSTER	395040	1050216	
		76	2,162.000	DENWTCI	395627	1043208	NEW
		77	2,165.200	DENWTCI	395627	1043208	NEW
		78	2,171.600	DENBOULDER	395933	1050916	WLV974
		79	2,171.600	DENBOULDER	395933	1050916	WLV974
		80	2,178.000	DENBOULDER	395933	1050916	WLV974
	US WEST PAGING, INC	81	2,129.000	LOOKOUT MTN	394345	1051408	WHE543
		82	2,179.000	WESTMINSTER	394936	1050217	WHE542
	WIGGINS TELEPHONE ASSOCIATION	83	2,128.000	BRIGGSDALE	403802	1041938	WAH471
		84	2,162.000	CROW VLY HL	404524	1042758	WPX83
		85	2,170.000	CROW VLY HL	404524	1042758	WPX83
		86	2,178.000	CROW VLY HL	404524	1042758	WPX83

COMMON CARRIER

PORTLAND: 2 GHz

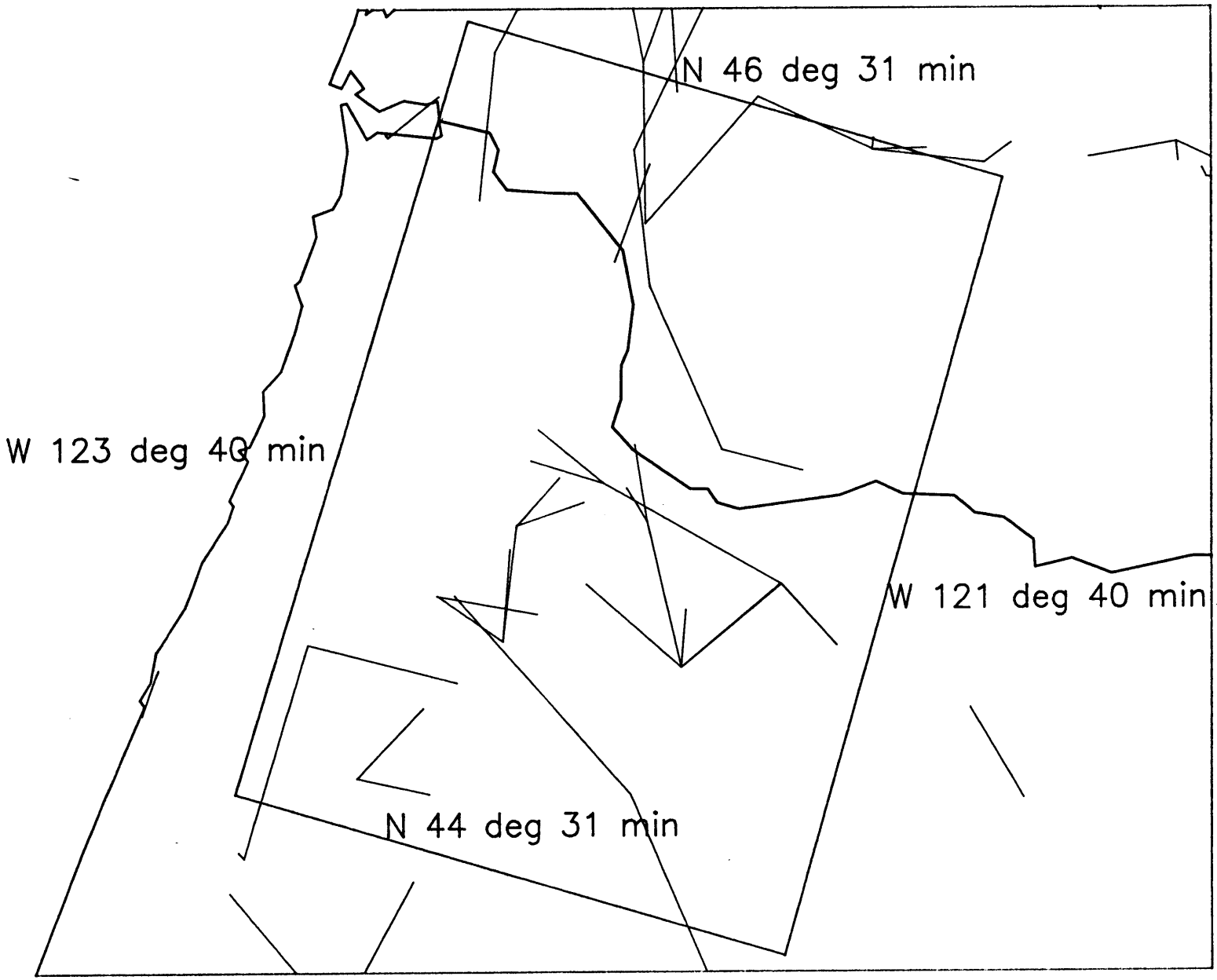

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Figure 2

U S WEST COMMUNICATIONS
2 GHz COMMON CARRIER

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Table 2

LATITUDE 44deg 31min - 46deg 31min
LONGITUDE 121deg 40min - 123deg 40min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
OR	AT&T COMMUNICATIONS OF THE PACIFIC NW	1	2,111.000	AMITY	450837	1230744	WHR379
		2	2,129.000	NICOLAI RG	460603	1232637	WHR406
		3	2,161.000	MT HOREB	444735	1222021	KYS72
		4	2,179.000	MT HOREB	444735	1222021	KYS72
	CANBY TELEPHONE ASSOCIATION	5	2,121.800	CANBY	451545	1224137	
		6	2,171.800	GOAT MTN	450755	1221743	
	CASCADE UTILITIES	7	2,112.000	GOAT MTN	450752	1221728	WLA744
		8	2,162.000	DAYHILL	451614	1221954	KGH29
	GTE MOBILNET INCORP	9	2,115.200	GOAT MTN	450752	1221728	WLL871
		10	2,124.800	MT HOOD	451720	1214704	WLL783
		11	2,124.800	MT HOOD	451720	1214704	WLL783
		12	2,126.400	GOAT MTN	450752	1221728	WLL871
		13	2,128.000	WOODBURN	450927	1224954	NEW
		14	2,165.200	BRIGHTWOOD3	452351	1220153	WLL872
		15	2,174.800	BRIGHTWOOD3	452351	1220153	WLL872
		16	2,174.800	BRIGHTWOOD3	452351	1220153	WLL872
		17	2,178.000	AMITY HILLS	450749	1231112	NEW
		18	2,178.000	MT SCOTT	452718	1223257	WLL870
	MCCAW COMM OF THE MID-SOUTH, INC	19	2,112.000	VIEWMASTER	452723	1224702	NEW
		20	2,112.000	VIEWMASTER	452723	1224702	NEW
		21	2,118.400	GOAT MTN	450753	1221725	WLV912
		22	2,118.400	GOAT MTN	450753	1221725	WLV912
		23	2,118.400	ALOHA	452955	1225331	NEW
		24	2,121.600	GERVAIS	450409	1225512	NEW
		25	2,121.600	GERVAIS	450409	1225512	NEW
		26	2,121.600	KOIN	453058	1224359	WLV935
		27	2,128.000	GERVAIS	450409	1225512	NEW
		28	2,128.000	GERVAIS	450409	1225512	NEW
		29	2,128.000	GERVAIS	450409	1225512	NEW
		30	2,128.000	KOIN	453058	1224359	WLV935
		31	2,128.000	KOIN	453058	1224359	WLV935
		32	2,128.000	MT HOOD	451720	1214704	NEW
		33	2,162.000	MT CHEHALEM	452117	1225917	NEW
		34	2,162.000	MT CHEHALEM	452117	1225917	NEW
		35	2,168.400	BRIGHTWOOD	452354	1220205	WLV913
		36	2,168.400	BRIGHTWOOD	452354	1220205	WLV913
		37	2,168.400	MT CHEHALEM	452117	1225917	NEW
		38	2,171.600	BRIGHTWOOD	452354	1220205	WLV913
		39	2,171.600	MCMINNVLE	450750	1231110	NEW
		40	2,171.600	MCMINNVLE	450750	1231110	NEW
		41	2,178.000	BRIGHTWOOD	452354	1220205	WLV913
		42	2,178.000	HILLSBORO	453107	1230023	NEW
		43	2,178.000	MT CHEHALEM	452117	1225917	NEW
		44	2,178.000	NEWBERG	451736	1225914	NEW
		45	2,178.000	NEWBERG	451736	1225914	NEW
		46	2,178.000	NO PLAINS#2	453553	1230041	NEW
	NATIONAL TELEPHONE COMPANY, INCORPORATED	47	2,116.000	PORTLAND	453114	1223913	WHQ804
		48	2,166.500	MT SCOTT	452718	1223258	WHQ805
		49	2,173.500	MT SCOTT	452718	1223258	WHQ805
	POINT COMMUNICATIONS COMPANY	50	2,121.600	VINEYARD MT	443826	1231628	WLR453
		51	2,121.600	VINEYARD MT	443826	1231628	WLR453
		52	2,128.000	VINEYARD MT	443826	1231628	WLR453
		53	2,171.600	PROSPECT HL	445114	1230720	NEW

U S WEST COMMUNICATIONS
2 GHz COMMON CARRIER

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Table 2

LATITUDE 44deg 31min - 46deg 31min
LONGITUDE 121deg 40min - 123deg 40min

STATE	COMPANY		FREQUENCY	STATION NAME	LATITUDE	LONGITUDE	CALL SIGN
OR	POINT COMMUNICATIONS COMPANY	54	2,171.600	PROSPECT HL	445114	1230720	NEW
		55	2,178.000	KNOX BUTTE	443915	1230053	NEW
	U S WEST COMMUNICATIONS, INC.	56	2,117.200	LAUREL MT	445524	1233424	WCU565
		57	2,124.800	LAUREL MT	445524	1233424	WCU565
		58	2,174.800	SALEM	445618	1230157	KYS71
WA	AT&T COMMUNICATIONS OF THE PACIFIC NW	59	2,114.600	SKAMANIA	454102	1220413	WHR414
		60	2,121.800	KALAMA	460058	1224626	WHR391
		61	2,129.000	KALAMA	460058	1224626	WHR391
		62	2,161.000	LEBAM	462742	1233230	KYS66
		63	2,164.600	CASTLE ROCK	461949	1225756	KOC67
		64	2,164.600	LIVINGSTON	454045	1222158	KOU55
		65	2,171.800	CASTLE ROCK	461949	1225756	KOC67
		66	2,179.000	LEBAM	462742	1233230	KYS66
		67	2,179.000	LIVINGSTON	454045	1222158	KOU55
	EVERGREEN TELEPHONE COMPANY	68	2,163.000	KOSMOS	462943	1220842	KYO97
		69	2,168.800	KOSMOS	462943	1220842	KYO97
		70	2,177.000	KOSMOS	462943	1220842	KYO97
	MCCAW COMM OF THE MID-SOUTH, INC	71	2,118.400	TOLEDO	462950	1225227	NEW
		72	2,128.000	RANIER	460258	1225507	NEW
		73	2,178.000	CASTLE ROCK	461822	1225347	NEW
	MCDANIEL CELLULAR TELEPHONE COMPANY	74	2,168.400	MT BRYNION	460946	1225107	WLU825
		75	2,168.400	MT BRYNION	460946	1225107	WLU825
	NATIONAL TELEPHONE COMPANY, INCORPORATED	76	2,123.500	VANCOUVER	453747	1224006	WHQ806
	U S CELLULAR OPERATING COMPANY	77	2,118.400	DOG MTN	462947	1220838	NEW
		78	2,171.640	DOG MTN	462947	1220838	NEW
	U S CELLULAR TELE CO (ASHEVILLE) L.P.	79	2,174.800	MT BRYNION	460946	1225107	WLU825