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SP 3400-3700 MHz
July 1998

Spectrum Management and Telecommunications

Spectrum Utilization Policies

Spectrum Policy and Licensing Provisions for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3700 MHz

Amended by:

DGRB-003-03 Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands
(September 2003)

DGTP-006-03 Expansion of Spectrum for Fixed Wireless Access in the 3500 MHz Range (April 2003)

DGTP-002-03 Restructuring the Spectrum in the Band 3400-3650 MHz to More Effectively Accommodate Fixed and Radiolocation
Services (February 2003)

This document has been superseded by *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 and 3500 MHz Frequency Bands*, Revised 2004.

CANADA

RADIOCOMMUNICATION ACT

NOTICE NO. DGTP-013-98

SPECTRUM POLICY AND LICENSING PROVISIONS FOR FIXED WIRELESS ACCESS SYSTEMS IN RURAL AREAS IN THE FREQUENCY RANGE 3400-3700 MHz

The purpose of this Notice is to announce the release of policy paper under the above mentioned title.

In August 1997, Industry Canada released a spectrum policy consultation paper, under *Canada Gazette* Notice DGTP-006-97, which addressed several new opportunities for usage of the radio spectrum in the 1-20 GHz frequency range including the introduction of fixed wireless access systems in the frequency range 3400-3700 MHz.

The Department has received significant interest from telecommunication service providers and equipment manufacturers to open new spectrum at 3.4 GHz for fixed wireless access systems. Wireless multipoint systems could offer an economical means to provide telephony and data services to business and residential customers. In particular, these systems could provide a promising technology in upgrading rural communications.

Based on the public interest shown, the Department agrees that there is a need to make spectrum available for wireless communications to advance telecommunications in rural areas. The spectrum policy provides for the licensing of radio systems in this band on a first-come, first-served basis in rural areas.

Comments on Spectrum Licensing Fees

Comments are invited on the proposed spectrum licensing fees for fixed wireless access systems (refer to Section 3.1.4. in the policy paper). The comments which will be made public, should be submitted on or before October 13, 1998 to the office of:

Director General
Radiocommunication and Broadcasting Regulatory Branch
Industry Canada, Jean Edmonds Building
300 Slater Street, Ottawa, Ontario
K1A 0C8

The policy paper is available electronically via the Internet at the following address:

World Wide Web (WWW)
<http://strategis.ic.gc.ca/spectrum>

or in hard copy, for a fee from:

Tyrell Press Ltd.
2714 Fenton Road
Gloucester, Ontario
K1T 3T7

Canada toll-free no.: 1-800-267-4862
U.S. toll-free no. : 1-800-574-0137
Worldwide tel. no. : (613) 822-0740
Fax number : (613) 822-1089

Canada Communication Group
45 Sacré-Coeur Blvd.
Hull, Quebec
K1A 0S9

Toll-free no. : 1-888-562-5561
Fax number : (819) 779-2858
Worldwide tel. no. : (819) 779-4335

Date at Ottawa, this 23rd of July, 1998.

Michael Helm
Director General
Telecommunications Policy Branch

1.0 Introduction

This spectrum policy addresses the introduction of fixed wireless access (FWA) systems operating in the frequency band 3400-3700 MHz. It also revises the policy provisions for point-to-point fixed systems operating in the band 3500-4200 MHz. An objective of this policy is to assist in facilitating improvements to telephone and data services in rural areas by providing spectrum for wireless access technology.

2.0 Background

In August 1997, Industry Canada initiated a review of the radio spectrum in the 1-20 GHz range. The consultation paper, entitled *Proposals to Provide New Opportunities for the Use of the Radio Spectrum in the 1-20 GHz Frequency Range (DGTP-006-97)*, put forward a number of spectrum policy revisions to address the requirements of new wireless technologies and services.

The consultation paper dealt with many issues including the introduction of fixed wireless access technology in the band 3400-3700 MHz. This requirement had been brought to the attention of Industry Canada by telecommunication service providers and equipment suppliers. There was a clear indication of equipment availability and some service providers had embarked on field trials, particularly in rural areas, to assess the technical performance and market acceptance of fixed wireless equipment.

The Department indicated in the consultation paper that the promotion of reliable and affordable telecommunications services of high quality to rural regions of Canada has been a long standing policy objective. In this regard, fixed wireless access systems could play an important role in upgrading rural local telecommunication systems, including the provision of single line telephone service and improved data communication capabilities. In the consultation paper the Department asked a number of questions which address spectrum policy issues related to the use of the band 3400-3700 MHz by FWA systems including:

1. The policy provisions needed to ensure rapid implementation of FWA systems in rural areas.
2. A frequency band plan to suit a number of FWA equipment types and system characteristics.
3. The matter of frequency block-area versus site licensing of FWA systems.
4. The treatment of incumbent point-to-point systems operating in the 3500-4200 MHz band.
5. The possible uses and spectrum requirements of FWA systems in urban areas.

3.0 Discussion

Nearly all of the 26 responses to the consultation paper announced in *Canada Gazette* Notice DGTP-006-97 provided comments regarding the opening of the 3400-3700 MHz band for fixed wireless access systems. It was clear from the comments received that there was substantial support for the development and deployment of FWA systems in this frequency range. Indications are that manufacturers are ready to supply, or in the process of developing, equipment and certain service providers have taken a strong interest in using FWA facilities in their public networks. In addition, the Department is aware of a number of other countries such as United Kingdom, Australia, Mexico and Brazil which have adopted FWA band plans in this frequency range and have, or are currently, authorizing FWA systems.

3.1 Deployment of Fixed Wireless Access Systems in Rural Areas

One of the challenges facing telecommunication service providers and government is to address the growing disparity between urban and rural telephony/data services. There remains close to 200,000 multi-party telephone lines in rural areas and many rural subscribers cannot, or have difficulty receiving Internet and electronic mail services due to transmission performance of existing rural lines. With new local distribution networks being implemented in the large urban centres, the communication gap between rural and urban areas is growing. In order to foster the benefits of improved communication facilities to rural residents, Industry Canada believes FWA system operators in this spectrum should consider offering upgraded telephone and data services.

Wireless technology can provide economical solutions for high cost rural communications provided there is sufficient spectrum to build cost effective systems. Permitting initially services which require large bandwidth, for example carriage of multiple video programs, could result in the depletion of the available spectrum in this frequency range, possibly leaving little opportunity for telephony and data service providers. In addition, by fostering the use of this spectrum for telephony and data applications, equipment suppliers could benefit from a larger, more focussed market, which could result in more variety of products and lower equipment costs. The success of FWA systems in this frequency band is dependant on a number of factors including the need to have low cost customer terminals. The Department recognizes this point and therefore encourages potential FWA licensees in this band to focus on the provision of telephone and data services.

3.1.1 Definition of Rural Service Areas

For the purposes of this policy, and as a first step in opening spectrum in this frequency band, rural service areas are defined as those areas having low telecommunication density (teledensity). Typically these areas are high cost service areas due to extensive wireline facilities required to serve relatively few customers. Presently, the Canadian Radio-Television and

Telecommunications Commission (CRTC) is in the process of defining tariff bands which would apply in the various teledensity areas, including low teledensity, throughout Canada. Industry Canada will initially focus the licensing of FWA systems in high cost, low teledensity areas. As an interim measure, for the purposes of defining rural areas for licensing FWA systems in the 3.4 GHz band, the Department will use the tariff band definitions granted interim approval by the CRTC and described in the telephone companies General Tariffs¹ and certain interrogatory responses. Annex 1 provides details on the low teledensity local telephone exchanges or locations where FWA operators may initially offer service to rural subscribers. The local telephone exchanges in Annex 1 are to be used as a guide and the Department will consider applications for FWA service in other local telephone areas and small communities of less than 4000 households where there is clear evidence that the consumers could benefit from improved or new telecommunication services.

In addition, it should be noted that the operation of FWA systems offering public correspondence service will be required to comply with the telecommunication regulatory requirements (e.g. CRTC, provincial authority). Applicants should take note of the CRTC's findings in Telecom Decision CRTC 97-8, Local Competition regarding, among other things, contribution, portable subsidy mechanisms and requirements to unbundle essential services and the ongoing proceeding regarding service in high cost areas as briefly outlined in Annex 2.

3.1.2 Frequency Band Structure

Industry comments on the structure of the band, channel block size, transmit/receive spacings varied considerably. Manufacturers and service providers are currently working together to address these issues through the Radio Advisory Board of Canada (RABC). However, given the importance of rapid deployment of FWA systems in rural areas of Canada and the need to accommodate several service providers and technologies, Industry Canada is prepared to provide an interim frequency plan based on the characteristics of the currently available equipment. Hence, a total of 150 MHz is being opened now, six 25 MHz blocks, in the band 3400-3550 MHz and this spectrum is available immediately for licensing FWA systems in the rural areas.

The channel block arrangement plan will support a variety of transmit/receive spacings and guard band requirements. To ensure service provision

¹ Under the CRTC General Tariff: Bell Canada, Item 60; Manitoba Telecom Services Inc., Item 460; BC TEL, Item 30, NewTel Communications Inc., Item 50. Response to CRTC Interrogatories: TELUS Communications Inc., TCI (CRTC) 14 July 97 1510; The New Brunswick Telephone Company Limited, Maritime Tel. & Tel., Island Telecom Inc., ITC MTT NB Tel (CRTC) 14 July 97 1510 (PC II).

opportunities for a number of operators, the Department will limit any service provider, including affiliates, to one paired block, or a single spectrum block, depending on the requirements of the technology.

Initially, it is anticipated that a limited number of technologies may be available and some demand for early deployment of certain technology may be concentrated in one or two frequency blocks. For this reason, spectrum blocks will be assigned on a shared basis in rural areas. Operators will be assigned to specific channels within a 25 MHz block, or paired blocks, with the objective to ensure implementation opportunities for two to three users. Although the spectrum blocks may be assigned on a shared basis, individual channels within the blocks will be assigned only once in a given area. At the request of a service provider, this sharing requirement may be reviewed, at some point in the future, by Industry Canada. In these cases, the Department may award more spectrum in the 25 MHz block(s) to the incumbent operator, in certain service areas, if specific conditions exist such as a demonstrated need for the additional spectrum and equipment is readily available in other spectrum blocks for additional operators.

3.1.3 Frequency Assignment and Licensing Considerations

From the consultation process, interested parties supported the need to ensure rapid implementation of FWA systems in rural areas. Respondents suggested that block-area licensing would be preferred as it is envisaged that operators will typically serve large areas requiring multiple FWA hub stations. Respondents also suggested that site licensing of hub stations, at least initially, would also be required in order to permit early deployment of FWA systems.

The Department concurs with the view of industry, particularly with the need to initiate service in the rural areas. Since there is a large supply of spectrum in this band, certainly enough to support competitive service providers and a range of technology, the Department will initiate licensing of FWA systems in the rural areas on a first-come, first-served basis. Industry Canada will issue spectrum licences to authorize the use of frequency assignments in spectrum block(s) within a defined geographical service area for FWA systems that will be brought into service within a period not greater than six months from receipt of an approval-in-principle/licence. In addition, the Department will not entertain requests for wide area authorization, for example, large regions of a province.

Based on an application and following acceptance by the Department, a spectrum licence will be issued for a specific service area. Licensees will be expected to take measures to minimize radio frequency coverage into non-rural areas. Where actual radio frequency coverage overlaps a non-rural area, which given the non-cellular shape of the defined rural telephone exchange areas, licensees will generally not be permitted to serve any customers in those non-rural areas. While the Department will not reject applications based on such incidental coverage, actual licences will not authorize such additional coverage on the spectrum licence. Further licensees may be required to abide by urban/rural border and/or co-existence criteria as they are finalized and when such adherence is required, possibly when urban areas are available for licensing. In the interim, licensees will be required to successfully coordinate with existing FWA systems before systems are implemented.

The complete licensing procedure will be published in a Client Procedures Circular (CPC) following the release of this spectrum policy and licensing provisions for the band 3.4 GHz.

In licensing certain public wireless access facilities, Industry Canada has in the past provided for the requirements of law enforcement agencies to have the capability to continue their lawful interception activities. The Solicitor General of Canada has to this end released a set of assistance capability requirements that encompass police agency needs. Industry Canada intends to continue this practice through its conditions of licence for FWA systems offering public commercial services in the band 3400-3700 MHz by requiring that such licensees provide for and maintain lawful interception capabilities. As in past practice, Industry Canada will consider requests for forbearance from certain of these capabilities for a limited period where, in the opinion of the Minister of Industry and in consultation with the Solicitor General, the requirement(s) is (are) not reasonably achievable. Interested parties should contact the offices of the Solicitor General to obtain a copy of their document entitled *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications* which defines their requirements for lawful interception.

3.1.4 Proposed Licence Fees

Industry Canada is of the view that licence fees should reflect the economic value of the radio frequency spectrum being used. However, in the absence of a market based mechanism by which this economic value can be revealed, the Department recognizes that such determinations are difficult.

Industry Canada proposes to apply a fee proportional to the geographic area being licensed. For each 25 Km² an annual fee of \$120.00 for each 25 MHz block in the 3400-3550 MHz band is proposed. This fee was derived, in part, using the current per telephone channel licensing fee established in the *Radiocommunication Regulations* as a base and assumes that the block is shared, whether this is the case or not. The number of potential telephone channels that could be accommodated within 25 MHz of spectrum using state-of-the-art data transmission technology was then calculated. The resulting figure was tested against a calculation of the cost of the wireline substitute as reflected in the monthly line access charges of the carriers.

Interested parties are invited to comment on the proposed fee as described above.

Comments should be submitted on or before October 13, 1998 to the office of:

Director General
Radiocommunication and Broadcasting Regulatory Branch
Industry Canada
Jean Edmonds Building
300 Slater Street
Ottawa, Ontario
K1A 0C8

3.1.5 Frequency Allocation and Regulation Considerations

The fixed service allocation in the band 3400-3700 MHz needs to take into account other service allocations including those in adjacent spectrum. The band 3100-3300 MHz is allocated to the radiolocation and radionavigation services on primary basis. While there is no co-channel operations with fixed wireless access systems in the band 3400-3700 MHz, there may be out-of-band emissions from radars in areas adjacent to waterways with international traffic, including the Great Lakes which may cause interference.

The band 3300-3500 MHz is allocated to radiolocation on primary basis and is limited in Canada to government use. In the United States, the band 3300-3700 MHz is allocated to radiolocation on a primary basis for government use. Consequently, FWA systems will need to coordinate with the U.S. in certain coastal areas due to the operation of ship-borne radars. As well, there are some operations of airborne radar in the band. Studies are underway to determine the susceptibility of FWA systems to these operations. Upon request, the Department will provide advice to applicants, based on available information, as to the potential of interference to proposed FWA systems from radars operating in Canada and the United States. Protection of FWA systems from radars will be afforded to the extent that coordination or

assurance against interference can be achieved with domestic and foreign operations.

The frequency band 3500-4200 MHz is allocated to fixed and fixed-satellite service on a co-primary basis. Coordination of FWA and FSS stations is required and studies are underway in conjunction with the Radio Advisory Board of Canada (RABC) to determine the relevant coordination criteria. Furthermore, FWA systems in the band 3500-3700 MHz will be required to coordinate with multi-hop point-to-point radio systems operating in the band 3500-4200 MHz in accordance with SRSP 303.5 Issue 4. (See Section 3.3 for more information.)

Upon release of this policy document, the Radio Advisory Board of Canada (RABC) will be consulted on a number of technical issues to facilitate implementation and coordination of FWA systems in the band 3400-3700 MHz.

The band 3300-3500 MHz is also allocated to amateur service on secondary basis. It should be noted that the Canadian Table of Frequency Allocations was amended in 1997. Included in the changes was a new primary allocation for the fixed service in the band 3400-3500 MHz. Consequently, operators of amateur systems will continue to have access to this band on a secondary basis. Operators of amateur stations will be required to protect FWA systems and other primary services from interference and operate on a no protection basis. Radio amateurs are encouraged to consult the Department for information on FWA system deployment.

3.1.6 Technical and Coordination Considerations

As FWA systems will be authorized using spectrum licences, and pending the finalization of co-existence criteria, individual site licensing and coordination of hubs will be required on an inter-system basis. The subscriber stations however, will require a measure of protection throughout the licensed service area. This can be accomplished by specifying a field strength or coordination distance to the desired service area boundary. Either one will require the assumption of typical system characteristics and configuration to minimize the potential for interference while still retaining a measure of spectrum reuse efficiency. The characteristics and precise mechanisms for coordination will be developed in consultation with the RABC, taking into account existing and planned equipment as well as band usage to the extent possible.

The use of spectrum blocks of 25 MHz has evolved as an industry recognized structure for the band which will allow sufficient capacity and flexibility for deployment of systems within a desired service area. The selection of a channel plan within the band i.e. the pairing of the 25 MHz blocks, will accommodate transmit/receive frequency pairings of 50 and 100 MHz to

accommodate frequency division duplexing systems. Within the 25 MHz blocks, a common hub/sub or go/return designation is expected to facilitate coordination of FWA systems sharing the same channel block(s). Provisions for time division duplexing systems using a single 25 MHz block(s), will also be accommodated in the frequency band plan.

Emission limits will be required to prevent inter-system interference. Point-to-multipoint systems are less constrained when the emission limitations are applied to a block of spectrum rather than to individual channels within the block. This flexibility is workable when spectrum is allocated on a block and area basis, and consideration should be given to the application of emission limits at the frequency block edge. These issues will be further developed in consultation with the RABC. Coordination will be facilitated within a common area by co-location to the extent possible to avoid near/far problems. The point-to-area implementations with ubiquitous subscriber locations lends itself to type approval of equipment. A certification specification will be required and developed by the Department.

FWA licensees will be expected to meet Industry Canada's policy of encouraging shared use of antenna sites. Further, interconnection standards may be required to facilitate the interconnection with public switched networks and the Terminal Attachment Program Advisory Committee (TAPAC) may be asked to develop any necessary standards. Also, Canadians have clearly expressed, in a number of fora, that they value their privacy. The possible use of radiocommunications to effect the link between the communications of individual consumers and the conventional public switched telephone network (or other networks) has obvious ramifications for the privacy concerns of users. Licensees providing public commercial service should consider measures to ensure that privacy concerns are addressed.

3.1.7 Ownership and Control

Licensees operating as radiocommunications carriers must comply with the Canadian ownership and control requirements as outlined in subsection 10(2) of the *Radiocommunication Regulations*. In addition, carriers must notify Industry Canada of any change which would have a material effect on ownership or control in fact. Such notification must be made in advance of any proposed transactions within the knowledge of the carrier.

3.2 Future Licensing Considerations of Fixed Wireless Access Systems in Urban Areas

In the consultation process most organizations supported the eventual deployment of FWA in urban areas. The CRTC local competition decision (Local Competition, Telecom Decision CRTC 97-8), released on May 1, 1997, put in place the rules that enable cable companies, wireless service providers and others, to enter the local telephone market in competition with the incumbent telephone companies. The Department intends to provide sufficient spectrum to support a wide range of wireless access systems and competitive service offerings.

Currently, manufacturers have developed products that primarily operate in parts of the lower 150 MHz, 3400-3550 MHz. The Department wishes, as previously indicated, to proceed expeditiously with the licensing of FWA systems on a first-come first-served basis in rural areas, to advance the level and range of communication service toward what exists in urban areas. The Department will defer the licensing of FWA systems in the band 3400-3700 MHz in urban areas, until equipment is more readily available in the full 300 MHz of the band and service applications are better defined in order to accommodate a range of service providers and innovative services. Also, licensing of FWA systems in urban areas will be subject to a competitive process as the demand could likely exceed the available spectrum. It should be noted that further public consultation will be required before FWA system licensing is initiated in urban areas over the spectrum range 3400-3700 MHz.

3.3 Existing Point-to-Point Microwave Systems

High capacity, point-to-point microwave systems have used the frequency band 3700-4200 MHz for many years with certain cross-sections also using the band 3500-3700 MHz. The telephone companies developed these systems as part of their telecommunications network backbone, handling inter-city voice, data and video traffic. As a consequence, the Department has ensured over the years that this spectrum, coupled with spectrum in the 4400-5000 MHz band is available for heavy-route, long haul microwave systems. However, during the last decade, telecommunication companies have developed extensive inter-city fibre optic facilities which carry much of the traffic once found on the heavy-route microwave systems using the 4 GHz and 6 GHz bands. As a result, a number of microwave systems have been decommissioned and there has been little growth in either new systems or expansion of existing systems.

The comments received from industry support the continued use of assignments in the 3500-4200 MHz bands by point-to-point systems. However, recognizing the importance of finding spectrum for FWA technology, industry supported the direction of not authorizing new point-to-point systems in the band 3500-3700 MHz. The Department concurs with this view and will permit the use of the 3500-3700 MHz band for expansion of an existing microwave route, on a case-by-case basis, where

justification supports such assignments outside of urban areas.

4.0 Summary of Policy Provisions for the Band 3400-4200 MHz

As outlined in Section 3 of this document, the introduction of FWA systems in the 3400-3700 MHz band affects the use of the spectrum by other radio services in the frequency range of 3400-4200 MHz. A summary of these policy provisions can be found in Annex 3 of this document and, effective upon release of this policy, the aforementioned Annex will replace the provisions for the 3500-4200 MHz band in the spectrum utilization policy document entitled *Revisions to Microwave Spectrum Utilization Policies in the Range of 1-20 GHz, (SP 1-20 GHz)*, dated January 1995.

5.0 Implementation

It is suggested that applicants contact the nearest office of Industry Canada regarding licensing in the band 3400-4200 MHz. General inquiries about the policy provisions contained in this document may be addressed to the Spectrum and Radio Services Directorate, Telecommunication Policy Branch, 300 Slater Street, Ottawa, Ontario, K1A 0C8 or by calling 613-998-3949 or faxing 613-952-0567.

Issued under the authority
of the *Radiocommunication Act*

Michael Helm
Director General
Telecommunications Policy Branch

Annex 1

Rural Service Areas

Initially, the rural areas¹ available to operators of fixed wireless access (FWA) systems in the 3.4 GHz band, are generally defined as high cost, low teledensity serving areas. Licensees may operate public commercial and private FWA systems in these rural areas. The provision of public commercial services is subject to the appropriate regulatory authorization (e.g. CRTC, provincial authority).

Within the serving areas of the Stentor companies, the following description provides the rural telephone exchanges, or rural serving areas that are being opened for implementation of FWA systems. Operators of FWA systems may also serve local telephone exchanges or small communities of less than 4000 households, provided that their systems can be reasonably coordinated with future deployment in large urban areas.

All areas outside of the local telephone exchanges served by the Stentor companies, including Stentor's associate members, Quebec-Telephone and North West Tel are open for implementation of FWA systems. These areas include the territories of some 50 independent telephone companies including their urban telephone exchanges. It is noted that competition in local telephone exchanges is limited to the service areas authorized by the regulator.

The rural telephone exchanges or rural serving areas are described as follows within the Stentor local telephone exchanges:

Alberta - TELUS Communications Inc.

Operators of FWA systems may serve customers in band 'D' exchange areas. Refer to the response to the *CRTC Interrogatories TELUS - TCI (CRTC) 14 July 1997, 1510* for detailed description of the tariff bands. For information, the tariff bands are shown below. A limited number of customers in certain band 'C' exchange areas may also be served by an FWA operator. Permission to serve such customers in band 'C' areas will be granted on a case-by-case basis, where such service continues to be in a rural area, there are clearly demonstrated benefits to these customers, and the coverage is incidental to coverage of a band 'D' areas. In addition, operators of FWA systems cannot serve the greater Edmonton area which is not covered in the above tariff.

- Band A : Calgary
- Band B : Calgary (other exchanges)/Ft McMurray, Grande Prairie, Lethbridge, Lloydminster, Medicine Hat, Red Deer, Sherwood Park, St. Albert
- Band C : Airdrie, Brooks, Camrose, Drayton Valley, Ft. Saskatchewan, Leduc, Spruce Grove, Stony Plain, Wetaskiwin
- Band D : all other exchanges

¹ Industry Canada will evolve the definition of rural service areas according to any future decision of the CRTC on General Tariffs for low teledensity, high cost serving areas. The Department also recognizes that certain rural areas and small communities of local telephone exchanges may have been inadvertently omitted and that these rural service areas could be permitted for FWA systems.

British Columbia - BC TEL

Operators of FWA systems may serve customers in bands 'D1-D4' exchange areas. Refer to the *CRTC General Tariff Item 30 - BC TEL* for a detailed description of the tariff bands. For information, the tariff bands are shown below. A limited number of customers in certain band 'C' exchange areas may also be served by an FWA operator. Permission to serve such customers in band 'C' areas will be granted on a case-by-case basis, where such service continues to be in a rural area, there are clearly demonstrated benefits to these customers, and the coverage is incidental to coverage of a band 'D1-D4' areas.

Band A1/B3:	Vancouver
Band B1:	Victoria
Band B2:	North Vancouver, Saanich, Sooke, West Vancouver
Band B3:	Ladner, New Westminster, Port Moody, Whalley
Band B4:	Aldergrove, Cloverdale, Fort Langley, Haney, Langley, Newton, Pitt Meadows, Port Coquitlam, Richmond, White Rock, Whonnock
Band C:	Abbotsford, Aspen Park, Cedar, Chilliwack, Courtenay, Dallas, Hartway, Kelowna, Ladysmith, Lakeview Heights, Lantzville, Nanaimo, North Kamloops, Okanagan Mission, Pineview, Prince George, Rutland, South Kamloops, Vanway, Wellington, Westbank, Westsyde
Band D1-D4:	all other exchanges

Manitoba - Manitoba Telecom Services Inc.

Operators of FWA systems may serve customers in bands 'D' and 'E' exchange areas. Refer to the *CRTC General Tariff Item 460 - Manitoba Telecom Services Inc.* for a detailed description of the tariff bands. For information, the tariff bands are shown below.

Band A:	Winnipeg Core
Band B:	Winnipeg Suburban
Band C:	Brandon
Band D:	Exchanges with 1500 and over lines
Band E:	Exchanges with fewer than 1500 lines
E2:	Exchanges previously in Rate Group 2
E1:	Exchanges previously in Rate Group 1
EA:	Exchanges not having community calling service or extended area service

New Brunswick - The New Brunswick Telephone Company Limited

Operators of FWA systems may serve customers in band 'B' exchange areas, with the exception of Bathurst and Edmundston. Refer to the response to the *CRTC Interrogatories NBTel (CRTC) 14 July 1997 1510 (PCII)* for a detailed description of the tariff bands. For information, the tariff bands are shown below.

Band A:	Fredericton/Moncton/St. John
Band B:	all other exchanges

Newfoundland - NewTel Communications Inc.

Operators of FWA systems may serve customers in band 'B' exchange areas. Refer to the *CRTC General Tariff Item 50 - NewTel* for a detailed description of the tariff bands. For information, the tariff bands are shown below.

- Band A: St. John's
- Band B: All other exchanges

Nova Scotia - Maritime Tel. & Tel. Limited

Operators of FWA systems may serve customers in band 'C' exchange areas. Refer to the response to the *CRTC Interrogatories Maritime Tel. & Tel. (CRTC) 14 July 1997 1510 (PCII)* for a detailed description of the tariff bands. For information, the tariff bands are shown below. A limited number of customers in certain band 'B' exchange areas may also be served by an FWA operator. Permission to serve such customers in band 'B' areas will be granted on a case-by-case basis, where such service continues to be in a rural area, there are clearly demonstrated benefits to these customers, and the coverage is incidental to coverage of a band 'C' areas.

- Band A: Halifax
- Band B: Amherst, Bridgewater, Glace Bay, Kentville, New Glasgow, Sackville, Sydney, Truro, Yarmouth
- Band C: all other exchanges

Ontario and Québec - Bell Canada

Operators of FWA systems may serve customers in band 'D1/D2a-2c' exchange areas. Refer to the *CRTC General Tariff Item 60 - Bell Canada* for detailed description of the tariff bands. For information, the tariff bands are shown below. A limited number of customers in certain band 'C1, C2a, C2b' exchange areas may be served by a FWA operator. Permission to serve such customers in band 'C1, C2a, C2b' areas will be granted on a case-by-case basis, where such service continues to be in a rural area, there are clearly demonstrated benefits to these customers, and the coverage is incidental to coverage of a band 'D1/D2a-2c' area.

- Band A: Montreal (A/B2), Toronto (A/B2)
- Band B1: Boucherville, Chomedey, Hamilton, Kitchener-Waterloo, Lachine, Laprairie, London, Longueuil, Ottawa, Pointe-Claire, Pont-Viau, Quebec, Roxboro, St-Bruno, St-Constant, Ste-Genevieve, Ste-Julie-de-Vercheres, St-Lambert, Ste-Rose, St-Vincent-de-Paul, Terrebonne
- Band B2: Castlemore, Cooksville, Laval-Est, Laval-Ouest, Le Gardeur, Malton, Markham, Mirabel-Aeroport, Port Credit, St-Eustache, Ste-Therese, South Pickering, Thornhill, Unionville, Woodbridge,
- Band C1: Alma, Aylmer, Barrie, Belleville, Bowmanville, Brantford, Brockville, Buckingham, Burlington, Chambly, Charny, Chateauguay, Chatham, Chicoutimi, Cobourg, Collingwood, Cornwall, Deauville, Drummondville, Dundas, Galt, Gatineau, Georgetown, Granby, Grandmere, Guelph, Jockvale, Joliette, Jonquiere, Kanata-Stittsville, Kingston, Levis, Lindsay, Loretteville, Magog, Midland, Milton, Newmarket, Niagara Falls, Niagara-on-the-Lake, North Bay, Notre-Dames-Des-Laurentides, Orillia, Orleans, Oshawa, Owen Sound, Pembroke, Peterborough, Port Colborne, Preston, Riviere-du-Loup, St-Catharines-Thorold,

St-Hyacinthe, St-Jerome, St-Nicolas, St. Thomas, Sarnia, Sault Ste. Marie, Shawinigan, Sherbrooke, Simcoe, Smiths Falls, Sorel, Stoney Creek, Stratford, Sudbury, Tecumseh, Thetford Mines, Tillsonburg, Trenton, Trois-Rivieres, Valleyfield, Varennes, Victoriaville, Welland, Whitby, Windsor, Woodstock

Band C2a: Beloeil, Ile-Perrot, L'Epiphanie-L'assomption, Mascouche, Richmond Hill, St-Jean, Vaudreuil

Band C2b: Ajax-Pickering, Aurora, Brampton, Clarkson, Oakville, Streetsville,

Band D1/D2a-2c: all other exchanges

Quebec (Eastern) - Quebec-Telephone

Operators of FWA systems may serve customers in all exchange areas except Rimouski.

Prince Edward Island - Island Telecom Inc.

Operators of FWA systems may serve customers in all areas except Charlottetown. Refer to the response to the *CRTC Interrogatories Island Telecom Inc. ITU (CRTC)14 July 1997 1510 (PCII)* for detailed description of the tariff bands. For information, the tariff bands are shown below.

Band A: Charlottetown
Band B: Summerside
Band C: all other exchanges

Saskatchewan - Saskatchewan Telecommunications

Operators of FWA systems may serve customers in all exchange areas except Regina, Saskatoon, Moosejaw, and Prince Albert.

Yukon and North West Territories - Northwestel Inc.

Operators of FWA systems may serve customers in all exchange areas.

Annex 2

CRTC Decisions and Proceedings of Interest to Rural Areas

1. Contribution and Portable Subsidy Mechanisms

In Decision 97-8, Local Competition, of May 1, 1997, the CRTC determined that a contribution mechanism is necessary to ensure that basic residential rates in high cost/low revenue areas continue to remain affordable while minimizing distortion of the competitive market. Contribution refers to the flow of revenue from services priced above costs to services priced below cost such as basic local residential services. The Commission opted for an explicit and portable contribution mechanism based on contributions from long distance service revenue. The interexchange contribution rate will be frozen at 2 cents (per minute per end) for the duration of the price cap regime of four years beginning January 1, 1998. This is to ensure stability of the contribution mechanism and to minimize distortion of the competitive local market. Contribution levels were determined in a subsequent decision (CRTC Decision 97-18). All providers of long distance toll services (including toll traffic carried between wireless and wireline stations, and long distance voice and data network services) are obliged to contribute towards the fund. The Commission further concluded that the Residential Subsidy Requirement (RSR) will be calculated based on incumbent carriers' costs and revenues by rate band (A, B, C, D) as: residential exchange costs (Phase II plus 25%), plus residential optional local costs (Phase II plus 25%) minus approved local rates. Decision 97-8 also sets out a number of obligations applying to local exchange carriers including certain requirements to provide essential services at unbundled rates.

2. Service in High Cost Areas (CRTC Public Notice 97-42)

In Decision 97-8, the CRTC noted that the advent of competition in all telecommunications markets raises the issue of appropriate regulatory approach to ensure the "continued achievement" of the policy objective of reliable and affordable telecommunications services accessible to all Canadians in all regions of Canada. In a previous decision, CRTC 96-10, *Local Service Pricing Options*, the Commission stated its intention to consider issues related to the provision of service to unserved areas and the upgrading of existing service to under served areas. In December, 1997, the CRTC initiated a public proceeding (PN 97-42) to "explore the best possible means of ensuring high quality telephone service in those areas where competition may not provide an appropriate solution". The Commission is seeking comments among other things on: the criteria and mechanism for extending and upgrading service to high cost service areas in a competitive environment; whether high cost service areas should be subsidized and if so, what would be the appropriate funding mechanism; which services and facilities to be funded from a high-cost service fund; the appropriate sources of funding for any funding mechanism that may be established; and eligibility and mechanism for receiving funding and whether there should be any limits on funding. The proceeding will take approximately 12 months with regional hearings held in various locations across Canada.

Annex 3

Spectrum and Licensing Policy Provisions for the Band 3400-4200 MHz

Service	3400	3500	3700	4200
FIXED	Multipoint Communication Systems		Point-to-Point Systems	
	* (3700-4200 MHz)			
FIXED-SATELLITE (space-Earth)	* (3700-4200 MHz)			
RADIO-LOCATION	C15 ¹			

* 3700-4200 MHz is paired with 5925-6425 MHz

- 1.0 A full description of the relationship between bands and services, as contained in related international and domestic footnotes, can be found in the Canadian Table of Frequency Allocations.
- 2.0 Fixed Service Use: 3400-3700 MHz Multipoint Communication Systems
3700-4200 MHz Point-to-Point Systems² (High Capacity)
- 3.0 The fixed service is allocated on a co-primary basis with Radiolocation in the band 3400-3500 MHz. Usage of the fixed service allocation is subject to the domestic footnote C15¹ of the Canadian Table of Frequency Allocations.
- 4.0 **Point-to-Point Systems in the Band 3500-4200 MHz**
 - 4.1 New point-to-point systems will not be authorized to use assignments in the band 3500-3700 MHz.

¹ **C15** (CAN 97) In the band 3400-3500 MHz, in certain regions of Canada the radiolocation service has priority over the fixed service. Consequently, the deployment of fixed systems will be subject to successful coordination with radar facilities operated by the Government of Canada.

² Point-to-point systems are permitted on a case-by-case basis in the band 3500-3700 MHz. See Section 4 of this Annex.

- 4.2. Existing point-to-point systems may continue to use assignments in the band 3500-3700 MHz provided the technical characteristics are in accordance with the current SRSP. Extensions and/or expansions of existing systems which require the use of assignments in the band 3500-3700 MHz will be considered by the Department on a case-by-case basis outside of urban centres.
- 4.3 New point-to-point systems in the band 3700-4200 MHz must justify a traffic growth to at least 9 DS-3. The inequality in the number of go and return channels shall not exceed 25% of the total number of go and return channels.
- 4.4 Existing analog transmissions carrying video traffic may continue to operate until this traffic is converted to digital.
- 4.5 The band 3700-4200 MHz is shared with receiving earth stations in the fixed-satellite service, including a large number of licence-exempt Television Receive Only (TVRO) stations.

5.0 **Multipoint Communication Systems (MCS) in the Band 3400-3700 MHz**

5.1 **Fixed Wireless Access (FWA) Systems in Rural Areas**

- 5.1.1 The use of this band by multipoint communication systems is primarily limited to Fixed Wireless Access³ (FWA) applications.
- 5.1.2 FWA systems will be licensed on a first-come, first-served basis. Industry Canada will issue a spectrum licence to authorize the use of frequency assignments in a spectrum block(s) within a defined geographical FWA service area that will be brought into service within a period not greater than six months from receipt of an approval-in-principle/licence. In addition, requests for wide area authorization, for example, large regions of a province, will not be considered for licensing.
- 5.1.3 FWA licence applicants must coordinate their frequency requirements with existing FWA systems, existing point-to-point systems and licensed stations in the fixed-satellite and radiolocation services.
- 5.1.4 For the purposes of this policy, and for opening the band 3400-3550 MHz for FWA systems, rural service areas are defined as those areas having low telecommunication density (teledensity). Typically these areas are high cost service areas due to extensive wireline facilities required to serve relatively few customers. Presently, the Canadian Radio-Television and

³ Fixed Wireless Access generally refers to the use of radio to provide access to a public telecommunications network for telephone and/or data services serving residential and business communities. These systems may also provide for private networks.

Telecommunication Commission (CRTC) is in the process of defining tariff bands which would apply in the various teledensity areas, including low teledensity areas, throughout Canada. Industry Canada will initially focus the licensing of FWA systems in high cost, low teledensity areas. As an interim measure, for the purposes of defining rural areas for licensing FWA systems in the band 3400-3550 MHz, the Department will use the CRTC service areas being developed as part of the General Tariffs⁴ for local telephone exchanges defined as low teledensity and high-cost provisioning. Annex 1 provides details on the local telephone exchanges or locations where FWA operators may initially offer service to rural subscribers. The local telephone exchanges in Annex 1 are to be used as a guide and the Department will consider applications for FWA service in other local telephone areas and small communities of less than 4000 households where there is clear evidence that the consumers could clearly benefit from improved or new telecommunication services. In addition, it should be noted that the operation of FWA systems offering public correspondence service will be required to comply with the telecommunication regulatory requirements (e.g. CRTC, provincial authority).

5.1.5 Service providers may use FWA systems for telephony services such as voice and data. Other types of services, such as video, requiring greater bandwidth are not generally permitted.

5.1.6 The Department will use the frequency band plan shown below, as an interim measure, for licensing FWA systems in rural areas. This band plan may be modified as deemed necessary by the Department due to introduction of new FWA technology or services. Such changes would be done after full consultation with FWA service providers and manufacturers.

Block A	3400-3425 MHz
Block B	3425-3450 MHz
Block C	3450-3475 MHz
Block D	3475-3500 MHz
Block E	3500-3525 MHz
Block F	3525-3550 MHz

5.1.8 The above frequency blocks may be assigned individually or as paired blocks to provide two-way services. FWA operators may select paired, or single frequency blocks in accordance with the requirements of the equipment noting that frequency coordination with other users may have an impact on the availability of any particular block. FWA applicants should consult with the appropriate Regional Office of Industry Canada for information on frequency

⁴ Under the CRTC General Tariff: Bell Canada, Item 60; Manitoba Telecom Services Inc, Item 460; BC TEL, Item 30, NewTel Communications Inc, Item 50. Response to CRTC Interrogatories: TELUS Communication Inc., TCI (CRTC) 14 July 97 1510; The New Brunswick Telephone Company Limited, Maritime Tel. & Tel. Limited, Island Telecom Inc, ITC MTT NB Tel (CRTC) 14 July 97 1510 (PC II).

block availability.

- 5.1.9 The channel block arrangement plan will support a variety of transmit/receive frequency spacings and guard band requirements. To ensure service provision opportunities for a number of operators, the Department will limit any service provider, including affiliates, to one paired block, or a single spectrum block, depending on the requirements of the technology. Initially, it is anticipated that a limited number of technologies may be available and some demand for early deployment of certain technology may be concentrated in one or two frequency blocks. For this reason, spectrum blocks will be assigned on a shared basis in rural areas. Operators will be assigned to specific channels within a 25 MHz block, or paired blocks, with the objective to ensure implementation opportunities for two to three users. Although the spectrum blocks may be assigned on a shared basis, individual channels within the blocks will be assigned only once in a given area. At the request of a service provider, this sharing requirement may be reviewed, at some point in the future, by Industry Canada. In these cases, the Department may award more spectrum in the 25 MHz block(s) to the incumbent operator, in certain service areas, if specific conditions exist such as a demonstrated need for the additional spectrum and equipment is readily available in other spectrum blocks for additional operators.

5.2 Future Licensing Considerations of FWA Systems in Urban Areas

- 5.2.1 The licensing of FWA systems in the band 3400-3700 MHz in urban areas is deferred until equipment is more readily available in the full 300 MHz of spectrum and service applications are better defined in order to accommodate a range of service providers and innovative services. Also, licensing of urban FWA systems in urban areas will likely be subject to a competitive process as the demand is likely to exceed the available spectrum. It should be noted that further public consultation may be required before FWA systems are licensed in urban areas.

- 5.3 The band 3300-3500 MHz is also allocated to amateur service on secondary basis. It should be noted that the Canadian Table of Frequency Allocations was amended in 1997. Included in the changes was a new primary allocation for the fixed service in the band 3400-3500 MHz. Consequently, operators of amateur systems will continue to have access to this band on a secondary basis. Operators of amateur stations will be required to protect FWA systems and other primary services from interference and operate on a no protection basis. Radio amateurs are encouraged to consult the Department for information on FWA system implementation.

- 6.0 Emissions from radars operating below 3500 MHz may cause interference to fixed service in the lower parts of the band 3400-3700 MHz in some coastal and border areas. The band 3300-3500 MHz is allocated to radiolocation on primary basis, limited in Canada to government use. In the United States, the band 3300-3700 MHz is allocated to

radiolocation on a primary basis for government use. Consequently, FWA systems will need to coordinate with the U.S. in certain coastal areas due to the operation of ship-borne radars. As well, there are some operations of airborne radar in the band. Upon request, the Department will provide advice to applicants, based on available information, as to the potential of interference to proposed FWA systems from radars operating in Canada and the United States.