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August 2006

Spectrum Management and Telecommunications

# **Proposed Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz**

## **Department of Industry**

### **Radiocommunication Act**

#### **Notice No. DGTP-006-06 — Proposed Spectrum Utilization Policy, Technical and Licensing Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz**

#### **Intent**

The purpose of this notice is to announce the release of the above-mentioned document which proposes to establish the spectrum policy, technical and licensing provisions to accommodate new Wireless Broadband Services (WBS) in the band 3650-3700 MHz.

#### **Background**

In September 2003, the Department released the *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands* and later auctioned 175 MHz in the band 3475-3650 MHz. At the time, the Department noted that there was a strong possibility that the U.S. would deploy licence-exempt devices in the band 3650-3700 MHz.

In October 2004, the Department released *Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation* (DGTP-008-04). In this paper the Department requested comments on whether to make the band 3650-3700 MHz available for licence-exempt applications. Comments were also sought on the types of systems and services that could be implemented in the band and, noting the availability of licensed spectrum in the adjacent bands, whether there was a requirement to continue the designation for licensed services.

Comments supported general harmonization with the U.S. as being in the best interest of Canadians. In fact, the Department was urged to undertake a full consultative review of the band during which time the specific questions raised could be more adequately addressed.

In March 2005, the Federal Communications Commission adopted rules, different from their original plans of deploying licence-exempt devices, to open access to new spectrum for wireless broadband applications in the band 3650-3700 MHz.

Consequently, the Department is proceeding with this consultation which proposes to establish the spectrum policy, technical and licensing provisions to accommodate new Wireless Broadband Services in the band 3650-3700 MHz. Interested parties are invited to submit comments on the proposals outlined in the consultation.

#### **Submitting Comments**

Respondents are requested to submit their comments no later than October 27, 2006, in electronic format (WordPerfect, Microsoft Word, Adobe PDF or ASCII TXT) to the following e-mail address: wireless@ic.gc.ca, along with a note specifying the software, version number and operating system used.

Written submissions should be addressed to the Director, Spectrum and Radio Policy, Telecommunications Policy Branch, Industry Canada, 1604A, 300 Slater Street, 16th Floor, Ottawa, Ontario, K1A 0C8.

All submissions should cite the *Canada Gazette*, Part I, publication date, the title, and the notice reference number (DGTP-006-06).

### **Obtaining Copies**

Copies of this notice and documents referred to herein are available electronically on the [Spectrum Management and Telecommunications website](http://strategis.gc.ca/spectrum) at: <http://strategis.gc.ca/spectrum>.

Official printed copies of *Canada Gazette* notices can be obtained from the [Canada Gazette website](http://canadagazette.gc.ca/publication-e.html) at: <http://canadagazette.gc.ca/publication-e.html> or by calling the sales counter of Canadian Government Publishing at (819) 941-5995 or 1 800 635-7943.

June 23, 2006

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## 1. Intent

This document, announced in *Canada Gazette* notice DGTP-006-06, initiates a public consultation on accommodating new Wireless Broadband Services (WBS) in the band 3650-3700 MHz. The proposals outlined in this spectrum policy paper seek to address the eligibility, licensing, technical and service issues to accommodate fixed and mobile services in this band.

Industry Canada invites interested parties to provide their views and comments on the issues raised in this paper, in accordance with the instructions provided in the accompanying Gazette notice, DGTP-006-06. Submissions must be received no later than October 27, 2006 to ensure consideration.

## 2. Background

In August 1998, Industry Canada released the document *Spectrum Policy and Licensing Provisions for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3700 MHz*, SP 3400-3700 MHz, (DGTP-013-098) which provided Fixed Wireless Access (FWA) spectrum to radiocommunication carriers on a first-come, first-served (FCFS) basis in rural and high-cost serving areas. Licences issued under the FCFS policy had one-year terms with a six-month implementation requirement, and did not include transferability or divisibility rights.

In February and April 2003 respectively, two Gazette notices - *Restructuring the Spectrum in the Band 3400-3650 MHz to More Effectively Accommodate Fixed and Radiolocation Services* (DGTP-002-03) and *Expansion of Spectrum for Fixed Wireless Access in the 3500 MHz Range* (DGTP-006-03) were issued announcing rearrangements of the spectrum in the band 3400-3650 MHz to better accommodate FWA systems and radiolocation operations.

In September 2003, the Department released *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands* and later auctioned 175 MHz in the band 3475-3650 MHz. Three block pairs (25+25 MHz), as well as a stand-alone 25 MHz block, were auctioned. At the time, the Department noted that there was a strong possibility that the U.S. would deploy licence-exempt devices in the band 3650-3700 MHz.

In October 2004, the Department released *Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation* (DGTP-008-04). In this paper, the Department requested comments on whether to make the band 3650-3700 MHz available for licence-exempt applications. Comments were also sought on the types of systems and services that could be implemented in the band noting the availability of licensed spectrum in the adjacent bands. The Department also sought comments on the measures that should be introduced for the treatment of incumbent licences, noting the existing policy for the accommodation of FWA services in the band 3500-3650 MHz.

Comments supported general harmonization with the U.S. as being in the best interest of Canadians. The Radio Advisory Board of Canada (RABC) urged the Department to undertake a full consultative review of the band during which time the specific questions raised could be more adequately addressed.

Concern was also expressed about possible harmful interference caused by licence-exempt devices to licensed satellite, broadcast and fixed systems and that these devices must be sufficiently constrained to remove this possibility both within the band and in the adjacent band 3700-4200 MHz. It was suggested that stringent out-of-band emission limits designed to protect adjacent licensed services, along with type-approval certification on any proposed unlicensed device be imposed.

Consequently, the Department is proceeding with this consultation to introduce new Wireless Broadband Services in the band 3650-3700 MHz.

### **3. U.S. Status**

In March 2005, the Federal Communications Commission (FCC) adopted rules to open access to new spectrum for wireless broadband applications in the band 3650-3700 MHz. The Commission adopted a hybrid approach that draws from both the Commission's unlicensed and licensed regulatory models and provides for nationwide, non-exclusive licensing of terrestrial operations in the band, utilizing technologies employing contention-based protocols.

The Commission kept the existing allocations for the band, grandfathering previously licensed primary incumbent FSS earth station operations and three Federal Government radiolocation stations, entitling them to interference protection from new wireless licensees. To protect these incumbent operations, the Commission established circular protection zones around them – 150 km for FSS earth stations and 80 km for Federal Government stations – and prohibited new terrestrial licensees from operating within these zones unless they negotiate agreements with the incumbents. The Commission determined that new FSS stations should be allowed on a secondary basis, and denied several petitions for reconsideration of an earlier decision in this proceeding that established the existing fixed-satellite service (FSS), fixed service (FS) and mobile service (MS) allocations.

The Commission also concluded that there should be no eligibility restrictions (other than the statutory foreign ownership restrictions) and no in-band or out-of-band spectrum aggregation limits. Licensees will receive a ten-year licence with the right to renew and will be free to assign and transfer their non-exclusive nationwide licences.

However, the FCC licensing scheme, particularly non-exclusive licensing and the requirement to employ contention-based protocols, are currently the subject of a number of Petitions for Reconsideration. In addition, the Commission has been petitioned to decrease the permitted in-band power levels and to tighten adjacent band emission limits to better protect FSS earth stations operating in the band above 3700 MHz.

### **4. Canadian Allocations**

In Canada, the band 3500-4200 MHz is currently allocated to the fixed and fixed-satellite (space-to-Earth) services on a primary basis. In SP 3-30 GHz, the Department indicated that it would

make new spectrum available in the band 3650-3700 MHz once a U.S. decision was made. Comments from industry advised that harmonization with the U.S. would best serve Canadians whatever decision was made. As indicated above, the U.S. has opted to deploy licensed operations by fixed and mobile services in the band 3650-3700 MHz primarily for wireless Internet service applications. As such, the Department is making a primary allocation to the mobile service in the band 3650-3700 MHz to support Wireless Broadband Services applications.

The *Canadian Table of Frequency Allocations* illustrates the revised allocation status for the band 3500-4200 MHz.

3 500 – 3 650 MHz	FIXED C18 FIXED-SATELLITE (space-to-Earth) C20
3 650 – 3 700 MHz	FIXED FIXED-SATELLITE (space-to-Earth) <u>MOBILE</u>
3 700 – 4 200 MHz	FIXED FIXED-SATELLITE (space-to-Earth)

**C18 (CAN-03)** The band 3 450-3 650 MHz is designated for fixed wireless access applications under the fixed service allocation.

**C20 (CAN-03)** In the band 3 500-3 650 MHz, the fixed-satellite earth-stations will be located in areas so as not to constrain the implementation of fixed wireless access systems.

## 5. Incumbent Licences

### 5.1 Point-to-Point Systems

In 1998, the Department opened the band 3400-3550 MHz to license FWA systems in rural areas on an FCFS basis under SP 3400-3700 MHz. The Department made the provision that new point-to-point systems would not be authorized in the band 3500-3700 MHz. A further policy provision was established at that time which permitted extensions and/or expansions of existing systems that required the use of assignments in the band 3500-3700 MHz, on a case-by-case basis outside of urban areas. Since that time, several point-to-point systems have been retired from service.

Prior to the auction of spectrum in the bands 2300 MHz and 3500 MHz (September 2003), the Department imposed a moratorium on the licensing of point-to-point systems in the band 3500-3650 MHz. Existing point-to-point systems in the band 3500-3650 MHz were subject to a transition policy.

The Department now proposes that existing point-to-point systems in the band 3650-3700 MHz be grandfathered or displaced. Should point-to-point systems be grandfathered, extensions and/or expansions of these systems could be permitted on a case-by-case basis, only outside of urban areas. If these systems are displaced, the Department proposes to implement transition policy principles similar to those outlined in Appendix 3 of the *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands* (DGRB-003-03).

*The Department proposes to either grandfather or displace existing point-to-point systems in the band 3650-3700 MHz. Further, extensions and/or expansions of grandfathered systems on a case-by-case basis, outside of urban areas, may be permitted.*

*Comments are invited on whether point-to-point systems in the band 3650-3700 MHz should be grandfathered or displaced and what conditions should apply in either case.*

## 5.2 Fixed-satellite Service

The band 3500-4200 MHz is allocated to the fixed service and fixed-satellite service on a co-primary basis. Traditionally, authorization of FSS earth stations for domestic and Canada-U.S. traffic has been in the conventional C-band (3700-4200 MHz).<sup>1</sup> However, some authorizations of earth stations using foreign satellites providing international overseas traffic have included the extended C-band 3500-3700 MHz.

The Department currently limits the authorization of new FSS earth stations in the band 3500-3650 MHz to large antenna applications such as gateways located in remote areas outside urban centres. The Department proposes that this limit extend into the band 3650-3700 MHz. Furthermore, the Department proposes that any future FSS receive earth stations in the band 3650-3700 MHz operate on a secondary basis.

Operators planning to establish systems in the vicinity of existing FSS receive earth stations would be required to coordinate with the earth station operators. Currently, there are FSS receive earth stations located in Weir, Quebec (Laurentides) in the band 3650-3700 MHz.

*The Department proposes that FSS receive earth stations located at Weir, Quebec be grandfathered. Operators wishing to establish wireless access systems within a 150 km radius of these earth stations would be required to coordinate with the earth station operators.*

*The Department further proposes that any future FSS receive earth stations in the band 3650-3700 MHz operate on a secondary basis.*

*Comments are invited on this proposal.*

<sup>1</sup> Technical limits to protect adjacent band systems, including conventional C-band earth stations, are discussed in Section 9.



## 6. Applications in Canada

The Department wishes to ensure that there are minimal regulatory barriers in order to encourage new entrants and to stimulate the rapid expansion of wireless broadband applications in the band 3650-3700 MHz.

The Department proposes that new licensees be permitted to deploy a full range of fixed and mobile applications (i.e. point-to-multipoint or point-to-point).

*The Department seeks comments on types of wireless broadband applications which may be deployed in Canada in the near future.*

## 7. Licensing Approach

In October 2004, the Department requested comments on whether to make the band 3650-3700 MHz available for licence-exempt applications. Comments back supported general harmonization with the U.S. and concerns were expressed about possible harmful interference caused by licence-exempt devices to licensed systems.

When deciding on the most appropriate type of radio authorization for the Wireless Broadband Services in the band 3650-3700 MHz, the Department seeks to facilitate the deployment of new applications by providing the maximum flexibility practical and by minimizing regulatory intervention.

In Canada, there are two types of radio authorizations that could lend themselves to the licensing of systems in the band 3650-3700 MHz – radio licences and spectrum licences.

Both licence types are provided for under the *Radiocommunication Act*. The Act further stipulates the Minister of Industry may fix the terms and conditions as well as the services which may be provided by the licence holder.

A radio licence is an authorization for the installation and operation of radio apparatus and is issued on a site-specific basis whereas a spectrum licence provides for the use of spectrum over a defined geographical area.

Radio licensing is still used for the majority of the licences issued. However using radio licensing for this band has drawbacks. One of the most significant is that since licences are issued for each apparatus, each additional apparatus would require the submission of a radio station application to the Department in order to receive the authorization.

Benefits of spectrum licensing include reduction of administrative burden as licensees are authorized by geographic area and frequency or frequency block, rather than authority for the installation and operation of an individual radio apparatus. Spectrum licensees are responsible for ensuring that their radiocommunication networks are properly planned and coordinated prior to operation, including

approval of antennas and their supporting structures and other conditions of licence applicable to all licensees, which are outlined in Appendix A.

In formulating this proposal, the Department anticipates that licensees will be deploying a wide variety of systems and will want to deploy and adjust their systems to meet their individual and changing needs. A spectrum licence gives greater autonomy to licensees to deploy and configure their networks while still requiring them to undertake appropriate studies and coordination measures with other users in their proximity and to respect all other conditions of licence. Similar obligations would be required for radio licences, without the additional flexibility.

*The Department is of the view that the issuance of spectrum licences, as described above, would be the appropriate licensing mechanism for this service. Comments are invited on this proposal.*

## 7.1 Service Areas

The Department is of the view that Wireless Broadband Services would be amenable to licensing on a regional/local basis and proposes that Tier 4 service areas be used for this band (see Appendix B). Additional information and [descriptions of the service areas for competitive licensing](#) used by the Department can be found on the Spectrum Management and Telecommunications website at: [http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/h\\_sf01627e.html](http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/h_sf01627e.html).

Each eligible applicant would be granted access to the full block covering a Tier 4 service area. Individual site-licences would not be required; however, licensees could be required to provide technical information to be entered into a database. Details regarding the information and the format and process for inputting into the database are outlined in Client Procedures Circular 2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services* (CPC-2-1-23).

*Comments are sought on the proposal to use Tier 4 service areas for the licensing of the bands 3650-3700 MHz.*

*The Department invites alternative proposals on service areas, including rationale, where a Tier 4 service area is not suitable.*

## 7.2 Spectrum Structure and Licensing Options

In Canada, the structure for the band 3650-3700 MHz could be established as a single 50 MHz block or two, 25 MHz blocks. The FCC has proposed licensing the 3650-3700 as a single block of 50 MHz.

The use of a single 50 MHz spectrum block will allow for more bandwidth-intensive applications and potentially simpler implementation. The use of two 25 MHz spectrum blocks has the potential to simplify sharing between operators and could allow for different rules in different parts of this spectrum. The Department has outlined various licensing options below.

There are a number of licensing mechanisms that are available to the Minister to assign frequencies. The first-come, first-served approach is used in instances where there is sufficient spectrum to meet the anticipated demand in a given frequency band.

In situations where there is, or is likely to be, more demand for radio frequency spectrum than the supply of spectrum available for use in a given frequency band, the Department would initiate a competitive licensing process.

Based on the above considerations, the Department proposes the following licensing scenarios.

### **7.2.1 Exclusive Spectrum Licence**

Similar to the band 3475-3650 MHz, exclusive spectrum licences would be made available for each geographic area. This approach minimizes the potential for interference between systems, but also limits the number of potential licensees.

As the demand for spectrum would likely exceed the supply, exclusive licensing would likely require an auction process. If an auction process is used, it would be preceded by a further consultation to establish the details of the process. Licence fees would be set by the auction process.

### **7.2.2 Non-exclusive Spectrum Licence**

In this scenario, non-exclusive licences would be issued to multiple licensees for the same spectrum in the same geographic area on an FCFS basis. It is proposed that all licensees would have equal access to the spectrum and no priority be given based on the date of licensing.

Given the uncertainty with respect to the number of licensees who would ultimately be operating under this scenario, there could be the potential for significant interference between WBS systems. As a result, under this option, the Department proposes that technical interference mitigation measures, such as contention-based protocols (see Section 7.3 below), be implemented.

If licences are issued on an FCFS basis, the Department would establish an annual licence fee as discussed in Section 8.1.

### **7.2.3 Exclusive Urban and Non-exclusive Rural Spectrum Licences**

Industry Canada recognizes that the potential for excessive congestion and interference is more likely in densely populated urban areas. In this scenario, the Department would issue non-exclusive spectrum licences in rural areas and exclusive spectrum licences in urban areas. The Department would most likely initiate a competitive licensing process for the exclusive spectrum in urban areas and an FCFS process for the non-exclusive rural spectrum. An urban/rural split could apply to all 50 MHz, or only to a single 25 MHz block of spectrum.

The same issues raised under scenarios outlined in 7.2.1 and 7.2.2 continue to apply (i.e. interference, coordination and the requirement for contention-based protocols for non-exclusive spectrum), with the additional requirement to establish criteria to define rural and urban.

The table below illustrates the two basic licensing options. Comments are invited on these and the third urban/rural scenario.

**Table 1 - Spectrum Licensing Options**

Option	Contention-based protocols required? (Section 7.3)	Licensing Process	Tier
<b>Exclusive</b>	No	Competitive	To be determined
<b>Non-exclusive</b>	Yes	First-come, first-served	4

*Comments are invited on the proposed options for exclusive and/or non-exclusive licensing and any other options not outlined in the table, with supporting rationale. Any option could be applied to all or part of the spectrum. In the case of urban/rural service areas, the Department seeks the rationale and criteria for defining urban and rural.*

*It should be noted that the licensing process and requirement for contention-based protocols will be determined based on the option selected.*

**7.3 Contention-based Protocols**

The Department believes that if non-exclusive licences are issued, it will be necessary to employ mitigating measures to reduce interference between systems. Licensees may be required to enter station locations into a public database to provide contact information and facilitate coordination between the licensees. However, the use of such a database by itself is unlikely to provide sufficient protection to licensees.

Hence, it is proposed that non-exclusive licensees operating in the band 3650-3700 MHz be required to use radio equipment that makes use of a contention-based protocol in order to limit their potential to cause or be affected by interference.

The current FCC definition for a *contention-based protocol* is:

A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel.

Comments are invited on whether the Department should adopt the FCC definition, noting that it is subject of a Petition for Reconsideration in the United States.

Examples of protocols used in existing radio systems that the Department would consider as meeting the requirements of a contention-based system include the Carrier-Sense Multiple-Access with Collision Detection (CSMA/CD) protocol used in Wi-Fi gear or any other form of Dynamic Frequency Selection (DFS) or *listen-before-talk* approach. Notwithstanding these examples, the Department would accept other protocols that are consistent with the final definition adopted for contention-based protocols.

*Comments are invited on the proposed definition as well as the Department's proposal to require the use of contention-based protocols for non-exclusively licensed spectrum in the band 3650-3700 MHz. Alternative proposals are welcome and should include details as to how these proposals address the potential for interference between non-exclusive licensees.*

*The Department invites comments on the requirement to enter station and contact information into a publicly accessible database.*

## **8. Licence Term**

Traditionally, FCFS authorizations are issued for one-year terms. Licences assigned through a competitive process have most often been issued for ten-year terms.

The Department proposes that licences for spectrum in the band 3650-3700 MHz be issued for a ten-year term with licence fees payable by March 31<sup>st</sup> of each year.

*Comments are invited on the proposed licence term.*

### **8.1 Licence Fees**

The following discussion applies only to a non-exclusive licensing regime. If exclusive licensing is used, it is anticipated that an auction process will be initiated and fees established by the auction results.

A decision to issue spectrum licences would preclude using radio licence fees already fixed in regulation. Spectrum licensing minimizes the administrative burden for both licensees and the Department, and attracts a fee for the spectrum and geography authorized irrespective of the degree of deployment established. This encourages the expansion of networks by ensuring that the licensee may add additional sites to the network without incurring additional licence fees.

Similar to one of the proposals for this band, the licensing approach outlined in the *Spectrum Utilization Policy, Technical and Licensing Requirements for Broadband Public Safety in the Band 4940-4990 MHz* (SP 4940 MHz, Gazette Notice DGTP-005-06) envisages non-exclusive access to the full 50 MHz of spectrum. Non-exclusive licensing is anticipated to be feasible given the advanced equipment expected to be used in this band. Licensees will be required to share and coordinate with any number of operators.

In developing the proposed fee for the band 4940-4990 MHz, the Department considered existing fees in both Canada<sup>2</sup> and other countries (i.e. the U.S., UK and Australia). Also, over the past few years, the Department made spectrum licences available through an auction process for the bands 2300 MHz and 3500 MHz. The total amount of all bids was over \$68 million which is equal to approximately \$1.6 million per year for national, exclusive use of 50 MHz of spectrum. Auction results established a market-based fee for this spectrum and are considered a good indicator of the value of comparable radio frequency bands. However, consideration must be made for the requirement to share with an unknown number of licensees.

Therefore the Department proposes to use the same fee as that described in SP 4940 MHz, which is \$0.0042 per 50 MHz per population subject to a minimum fee of \$250. The minimum fee reflects an estimate of actual costs for processing and maintenance. Appendix B shows the proposed fee for each Tier 4 service area.

The Department is proposing a fee in an effort to ensure that the appropriate rent is collected, which ensures the spectrum is used efficiently.

Annual fees would be payable to the Department by March 31<sup>st</sup> of each year.

*The Department requests comments on the proposed licence fee of \$0.0042 per 50 MHz per population.*

## 8.2 Eligibility

By opening this spectrum to as wide a range of potential licensees as possible, the Department believes it will encourage new entry and investment as well as entrepreneurial efforts to develop new technologies and services. This approach will promote economic opportunity and competition.

The Department proposes that eligibility not be restricted. However, for those who intend to operate as radiocommunication carriers, applicants must be able to demonstrate that they meet the eligibility criteria for radiocommunication carriers as set out in subsections 9 and 10 of the *Radiocommunication Regulations*. For more information, refer to Client Procedures Circular 2-0-15, [Canadian Ownership and Control](#) (CPC-2-0-15), as amended from time to time (<http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf01763e.html>).

*The Department requests comments on the proposal for open eligibility.*

<sup>2</sup> Existing annual licence fees for exclusive spectrum licences in Canada are: Multipoint Communications System (MCS) - \$0.008 per household per 6 MHz of spectrum; Local Multipoint Communications System (LMCS) - \$0.50 per household per 500 MHz; and PCS/Cellular - \$0.03512361 per MHz per population.

### 8.3 Spectrum Aggregation Limit

During the auctions of the 2300 MHz and 3500 MHz spectrum, the Department established a spectrum aggregation limit to safeguard against anti-competitive behaviour and increase the opportunity for Canadians to have an expanded choice of new and innovative wireless services through a number of service providers. In scenarios where exclusive spectrum is desired and a competitive process is adopted, the Department is considering whether or not it should impose any limit on in-band or out-of-band spectrum aggregation on licensees in the band 3650-3700 MHz.

*The Department invites comments on whether it should impose in-band or out-of band spectrum aggregation limits on licensees in the event a competitive process is adopted, and the rationale for such limits.*

### 8.4 Departmental Service Standards

Industry Canada currently has established service standards for certain licensing processes. In general, where service standards exist, analysis and domestic coordination are required by the Department prior to issuing a licence. Where international coordination is required, the service standard is significantly increased. If non-exclusive spectrum licences for WBS systems in the band 3650-3700 MHz are issued as proposed, the Department proposes using the existing microwave application service standard of four weeks from receipt of a complete application.

*Please provide comments on whether this service standard is appropriate.*

## 9. Technical Considerations

Detailed technical specifications for WBS systems in the band 3650-3700 MHz will be contained in a Radio Standards Specification (RSS) and/or Standard Radio Systems Plan (SRSP) to be developed in consultation with the Radio Advisory Board of Canada. It is proposed that these standards will include the following provisions:

- fixed stations and base stations will be permitted a peak e.i.r.p. of 25 watts/25 MHz of bandwidth;
- mobile stations (including those operating in mobile-to-mobile mode) will only be permitted to transmit if they have first received and decoded an enabling signal transmitted by a base station;
- mobile stations will be permitted a peak e.i.r.p. of 1 watt/25 MHz of bandwidth;
- stations will be permitted to use any antenna that respects the e.i.r.p. limits specified. For systems using smart antennas with multiple beams, the total power in a given direction must respect the above e.i.r.p. limits, however the aggregate power in all directions for systems using smart antennas will be permitted to exceed the single-beam e.i.r.p. limits by up to 8 dB; and

- any emission outside of the authorized band, in a measurement bandwidth of 1 MHz, must be attenuated by at least  $43 + 10 \log(P)$  dB below the transmitter power level P, where P is measured in watts.

These proposed technical requirements are harmonized with current U.S. rules. However, as noted in Section 3, the U.S. rules are subject to several Petitions for Reconsideration which are currently before the FCC.

*The Department invites comment on the proposed technical rules. In particular, will the proposed out-of-band emission limits provide sufficient protection to services operating in adjacent spectrum, including FSS earth stations operating in the conventional C-band (3700-4200 MHz)? How would this compare to the potential impact of in-band WBS emissions below 3700 MHz on FSS receivers?*

## 10. International Coordination

Canada currently does not have an agreement with the U.S. government for the sharing of the band 3650-3700 MHz along the border regions. However, licensees will be subject to any future agreements between Canada and the U.S. regarding use of these systems in the border regions.

Issued under the authority  
of the Radiocommunication Act

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Leonard St-Aubin  
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## Appendix A - Proposed Conditions of Licence

The following conditions of licence apply to licensees of radio frequency spectrum in the band 3650-3700 MHz. It should be noted that the licence is subject to relevant provisions in the *Radiocommunication Act* and the *Radiocommunication Regulations*. For example, the Minister continues to have the power to amend the terms and conditions of spectrum licences (paragraph 5(1)(b) of the *Radiocommunication Act*).

### A1. Licence Fees

Licensees must pay the annual licence fee before March 31<sup>st</sup> of each year for the subsequent year (April 1<sup>st</sup> to March 31<sup>st</sup>).

### A2. Eligibility Criteria

Licensees acting as radiocommunication carriers must comply on an ongoing basis with the eligibility criteria in sections 9 and 10 of the *Radiocommunication Regulations*. Licensees must notify the Minister and obtain approval prior to making any changes that would have a material effect on their eligibility. Such notification must be made in advance of any proposed transactions of which licensees have knowledge. For more information, refer to Client Procedures Circular 2-0-15, *Canadian Ownership and Control* (CPC-2-0-15), as amended from time to time.

### A3. Radio Station Installations

For each radio station, licensees must ensure that:

- radio stations are installed and operated in a manner that complies with Health Canada's *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz - Safety Code 6* including the consideration of existing radiocommunication installations within the local environment;
- where applicable, antenna structures are marked in accordance with the recommendations of Transport Canada with respect to any potential hazard to air navigation;
- prior to the installation of antenna structures, meaningful consultation has taken place with all local municipalities or land-use authorities with the aim of developing consensus solutions. Installation of any antenna structure must be delayed for a period of time sufficient for departmental review where, after considering reasonable alternatives and consultation options, land-use consultation negotiations remain at an impasse; and
- all requirements prescribed in the Client Procedures Circular 2-0-03, *Environmental Process, Radiofrequency Fields and Land-Use Consultation* (CPC-2-0-03), as amended from time to time, are respected; and
- radio installations are installed and operated in a manner that complies with technical boundary and out-of-band emission conditions as specified by the Department.

#### **A4. Provision of Technical Information**

When the Department requests technical information on a particular station or on a network, the information must be provided by licensees to the Department according to the definitions and criteria specified by the Department. Refer to Client Circular Procedure 2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, Appendix B - Site Data Elements, for a list of minimal radiocommunication installation data elements required for the Department's database.

#### **A5. Laws, Regulations, and Other Obligations**

Licensees are subject to, and must comply with, the *Radiocommunication Act*, the *Radiocommunication Regulations*, the International Telecommunication Union (ITU) *Radio Regulations* and the *Canadian Table of Frequency Allocations* pertaining to their licensed radio frequency bands. Licences are issued on the condition that the certifications made in the application materials are all true and complete in every respect.

#### **A6. International and Domestic Coordination**

Canada currently does not have an agreement with the U.S. government for the sharing of the band 3650-3700 MHz along the border regions. However, the Department notes that licensees will be subject to future agreements between Canada and the U.S. for use in the border regions.

#### **A7. Lawful Interception**

The lawful interception of telecommunications is an important and well-established technique used by law enforcement and national security agencies in Canada to conduct investigations. To this end, certain radiocommunication carrier licensees are required to provide for and maintain lawful interception capabilities in accordance with requirements or standards set by Public Safety and Emergency Preparedness Canada (PSEPC). These capabilities address both technical and operational matters related to the lawful interception of telecommunications.

Licensees resulting from this licensing process must, from the inception of service, provide for and maintain lawful interception capabilities. The requirements for lawful access capabilities for circuit-switched voice telephony systems are provided in the *Enforcement Standards for Lawful Interception of Telecommunications* (Rev. Nov. 95) developed by PSEPC (Solicitor General Canada). These standards may be amended from time to time.

The Department may require that the licensee implement any lawful interception solution available to the licensee. Licensees may request that the Minister of Industry forbear from enforcing certain lawful interception capability requirements for a limited period of time. The Minister of Industry, following consultation with the Minister of Public Safety and Emergency Preparedness, may exercise the power to forbear from enforcing a requirement or requirements where, in the opinion of the Minister of Industry, the requirement(s) is (are) not reasonably achievable. Forbearance requests must include specific details and dates when compliance to requirement(s) can be expected.

Building on recent public consultation involving industry, police, privacy advocates and others on the subject of lawful interception requirements, government officials are examining how best to respond to current and future challenges in this area. Applicants should be aware that the requirement to provide lawful interception capability may be imposed via other future legislative provisions and the Department will provide licensees with appropriate guidance until such time as any new legislation may be enacted.

**Appendix B – Proposed Spectrum Licence Fees for Wireless Broadband Services  
in the Band 3650-3700 MHz – Tier 4 (Estimated)**

<b>Service Area Number</b>	<b>Service Area Name</b>	<b>Population<sup>1</sup></b>	<b>Non-exclusive 50 MHz</b>	<b>Minimum Fee<sup>2</sup></b>
4-001	St. John's	228824	\$961.06	
4-002	Placentia	22699	\$95.34	\$250.00
4-003	Gander/Grand Falls/Windsor	179081	\$752.14	
4-004	Corner Brook/Stephenville	91998	\$386.39	
4-005	Labrador	29190	\$122.60	\$250.00
4-006	Charlottetown	85846	\$360.55	
4-007	Summerside	48711	\$204.59	\$250.00
4-008	Yarmouth	64812	\$272.21	
4-009	Bridgewater/Kentville	141495	\$594.28	
4-010	Halifax	372001	\$1,562.40	
4-011	Truro	55955	\$235.01	\$250.00
4-012	Amherst	37559	\$157.75	\$250.00
4-013	Antigonish/New Glasgow	79189	\$332.59	
4-014	Sydney	158271	\$664.74	
4-015	Saint John	144026	\$604.91	
4-016	St. Stephen	27335	\$114.81	\$250.00
4-017	Fredericton	150457	\$631.92	
4-018	Moncton	147023	\$617.50	
4-019	Miramichi/Bathurst	175530	\$737.23	
4-020	Grand Falls	29665	\$124.59	\$250.00
4-021	Edmundston	29078	\$122.13	\$250.00
4-022	Campbellton	35019	\$147.08	\$250.00
4-023	Matane	126219	\$530.12	
4-024	Mont-Joli	43984	\$184.73	\$250.00
4-025	Rimouski	52677	\$221.24	\$250.00
4-026	Rivière-du-Loup	88621	\$372.21	
4-027	La Malbaie	29918	\$125.66	\$250.00
4-028	Chicoutimi-Jonquière	223248	\$937.64	
4-029	Montmagny	60714	\$255.00	
4-030	Québec	770868	\$3,237.65	
4-031	Sainte-Marie	47756	\$200.58	\$250.00
4-032	Saint-Georges	66540	\$279.47	
4-033	Lac Mégantic	23614	\$99.18	\$250.00
4-034	Thetford Mines	45272	\$190.14	\$250.00
4-035	Plessisville	21317	\$89.53	\$250.00
4-036	La Tuque	16517	\$69.37	\$250.00
4-037	Trois-Rivières	257201	\$1,080.24	
4-038	Louiseville	22595	\$94.90	\$250.00
4-039	Asbestos	30455	\$127.91	\$250.00
4-040	Victoriaville	49830	\$209.29	\$250.00
4-041	Coaticook	13085	\$54.96	\$250.00

<b>Service Area Number</b>	<b>Service Area Name</b>	<b>Population<sup>1</sup></b>	<b>Non-exclusive 50 MHz</b>	<b>Minimum Fee<sup>2</sup></b>
4-042	Sherbrooke	208974	\$877.69	
4-043	Windsor	16362	\$68.72	\$250.00
4-044	Drummondville	94035	\$394.95	
4-045	Cowansville	28299	\$118.86	\$250.00
4-046	Farnham	29567	\$124.18	\$250.00
4-047	Granby	84058	\$353.04	
4-048	Saint-Hyacinthe	79713	\$334.79	
4-049	Sorel	65845	\$276.55	
4-050	Joliette	123212	\$517.49	
4-051	Montréal	3652817	\$15,341.83	
4-052	Sainte-Agathe-des-Monts	58730	\$246.67	\$250.00
4-053	Hawkesbury	61651	\$258.93	
4-054	Mont-Laurier/Maniwaki	47789	\$200.71	\$250.00
4-055	Ottawa	1131838	\$4,753.72	
4-056	Pembroke	81064	\$340.47	
4-057	Arnprior/Renfrew	31884	\$133.91	\$250.00
4-058	Rouyn-Noranda	43623	\$183.22	\$250.00
4-059	Notre-Dame-du-Nord	18027	\$75.71	\$250.00
4-060	La Sarre	22586	\$94.86	\$250.00
4-061	Amos	25565	\$107.37	\$250.00
4-062	Val-d'Or	45402	\$190.69	\$250.00
4-063	Roberval/Saint-Félicien	63861	\$268.22	
4-064	Baie-Comeau	52298	\$219.65	\$250.00
4-065	Port-Cartier/Sept-Îles	49526	\$208.01	\$250.00
4-066	Chibougamau	39607	\$166.35	\$250.00
4-067	Cornwall	66849	\$280.77	
4-068	Brockville	70974	\$298.09	
4-069	Gananoque	13011	\$54.65	\$250.00
4-070	Kingston	160574	\$674.41	
4-071	Napanee	39829	\$167.28	\$250.00
4-072	Belleville	143421	\$602.37	
4-073	Cobourg	57326	\$240.77	\$250.00
4-074	Peterborough	147737	\$620.50	
4-075	Lindsay	41194	\$173.01	\$250.00
4-076	Minden	17764	\$74.61	\$250.00
4-077	Toronto	5146581	\$21,615.64	
4-078	Alliston	98133	\$412.16	
4-079	Guelph/Kitchener	535736	\$2,250.09	
4-080	Fergus	24946	\$104.77	\$250.00
4-081	Kincardine	175390	\$736.64	
4-082	Listowel/Goderich	80982	\$340.12	
4-083	Fort Erie	27183	\$114.17	\$250.00
4-084	Niagara-St. Catharines	326422	\$1,370.97	
4-085	Haldimand/Dunnville	34599	\$145.32	\$250.00
4-086	London/Woodstock/St. Thomas	593670	\$2,493.41	

<b>Service Area Number</b>	<b>Service Area Name</b>	<b>Population<sup>1</sup></b>	<b>Non-exclusive 50 MHz</b>	<b>Minimum Fee<sup>2</sup></b>
4-087	Brantford	114564	\$481.17	
4-088	Stratford	46441	\$195.05	\$250.00
4-089	Chatham	78128	\$328.14	
4-090	Windsor/Leamington	351986	\$1,478.34	
4-091	Wallaceburg	31390	\$131.84	\$250.00
4-092	Sarnia	126423	\$530.98	
4-093	Strathroy	40223	\$168.94	\$250.00
4-094	Barrie	234902	\$986.59	
4-095	Midland	42487	\$178.45	\$250.00
4-096	Gravenhurst/Bracebridge	51937	\$218.14	\$250.00
4-097	North Bay	105484	\$443.03	
4-098	Parry Sound	19466	\$81.76	\$250.00
4-099	Elliot Lake	30205	\$126.86	\$250.00
4-100	Sudbury	184488	\$774.85	
4-101	Kirkland Lake	37807	\$158.79	\$250.00
4-102	Timmins	47499	\$199.50	\$250.00
4-103	Kapuskasing	45344	\$190.44	\$250.00
4-104	Kenora/Sioux Lookout	63732	\$267.67	\$250.00
4-105	Iron Bridge	23403	\$98.29	\$250.00
4-106	Sault Ste. Marie	86787	\$364.51	
4-107	Marathon	31862	\$133.82	\$250.00
4-108	Thunder Bay	125562	\$527.36	
4-109	Fort Frances	23163	\$97.28	\$250.00
4-110	Steinbach	44334	\$186.20	\$250.00
4-111	Winnipeg	715944	\$3,006.96	
4-112	Lac du Bonnet	51205	\$215.06	\$250.00
4-113	Morden/Winkler	36530	\$153.43	\$250.00
4-114	Brandon	93350	\$392.07	
4-115	Portage la Prairie	20385	\$85.62	\$250.00
4-116	Dauphin	83738	\$351.70	
4-117	Creighton/Flin Flon	25152	\$105.64	\$250.00
4-118	Thompson	45262	\$190.10	\$250.00
4-119	Estevan	47616	\$199.99	\$250.00
4-120	Weyburn	23121	\$97.11	\$250.00
4-121	Moose Jaw	60784	\$255.29	
4-122	Swift Current	48938	\$205.54	\$250.00
4-123	Yorkton	71002	\$298.21	
4-124	Regina	217845	\$914.95	
4-125	Saskatoon	230243	\$967.02	
4-126	Watrous	29107	\$122.25	\$250.00
4-127	Battleford	89351	\$375.27	
4-128	Prince Albert	133661	\$561.38	
4-129	Lloydminster	31668	\$133.01	\$250.00
4-130	Northern Saskatchewan	29102	\$122.23	\$250.00
4-131	Medicine Hat/Brooks	81509	\$342.34	

<b>Service Area Number</b>	<b>Service Area Name</b>	<b>Population<sup>1</sup></b>	<b>Non-exclusive 50 MHz</b>	<b>Minimum Fee<sup>2</sup></b>
4-132	Lethbridge	150228	\$630.96	
4-133	Stettler/Oyen/Wainwright	53215	\$223.50	\$250.00
4-134	High River	44070	\$185.09	\$250.00
4-135	Strathmore	34451	\$144.69	\$250.00
4-136	Calgary	865861	\$3,636.62	
4-137	Red Deer	134729	\$565.86	
4-138	Wetaskiwin/Ponoka	41647	\$174.92	\$250.00
4-139	Camrose	33071	\$138.90	\$250.00
4-140	Vegreville	14461	\$60.74	\$250.00
4-141	Edmonton	870340	\$3,655.43	
4-142	Edson/Hinton	44083	\$185.15	\$250.00
4-143	Bonnyville	71270	\$299.33	
4-144	Whitecourt	25493	\$107.07	\$250.00
4-145	Barrhead	22305	\$93.68	\$250.00
4-146	Fort McMurray	36494	\$153.27	\$250.00
4-147	Peace River	80807	\$339.39	
4-148	Grande Prairie	68589	\$288.07	
4-149	East Kootenay	56366	\$236.74	\$250.00
4-150	West Kootenay	78607	\$330.15	
4-151	Kelowna	284221	\$1,193.73	
4-152	Vancouver	2023697	\$8,499.53	
4-153	Hope	30365	\$127.53	\$250.00
4-154	Victoria	382745	\$1,607.53	
4-155	Nanaimo	159657	\$670.56	
4-156	Courtenay	105968	\$445.07	
4-157	Powell River	30156	\$126.66	\$250.00
4-158	Squamish/Whistler	54315	\$228.12	\$250.00
4-159	Merritt	19699	\$82.74	\$250.00
4-160	Kamloops	90473	\$379.99	
4-161	Ashcroft	17019	\$71.48	\$250.00
4-162	Salmon Arm	44711	\$187.79	\$250.00
4-163	Golden	7273	\$30.55	\$250.00
4-164	Williams Lake	41196	\$173.02	\$250.00
4-165	Quesnel/Red Bluff	25279	\$106.17	\$250.00
4-166	Skeena	69804	\$293.18	
4-167	Prince George	98974	\$415.69	
4-168	Smithers	41642	\$174.90	\$250.00
4-169	Dawson Creek	62333	\$261.80	
4-170	Yukon	30766	\$129.22	\$250.00
4-171	Nunavut	24730	\$103.87	\$250.00
4-172	Northwest Territories	39672	\$166.62	\$250.00

<sup>1</sup> The population associated with these areas is based on Statistics Canada's 1996 census data. Actual fees will be based on the most current Statistics Canada data.

<sup>2</sup> A minimum spectrum licence fee of \$250 applies.