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Spectrum Management and Telecommunications

# **Decisions on the Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz and Consultation on Changes Related to the Band Plan**

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## 1. Intent

Through the release of this paper, Industry Canada hereby announces the decisions from the consultation process undertaken in *Canada Gazette* Notice No. DGRB-005-09 – *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz*. The Department is also taking this opportunity to initiate the consultation on the band plan, including mapping incumbents into a new band plan.

The Department will release a separate decision paper in the near future concerning the conditions of licence related to Research and Development, as proposed for BRS, and Learning Plans, which apply to Multipoint Communication System (MCS) licences.

## Part A – Firm Transition Date, Eligibility and Service Area

### 2. Background

The 2006 policy decision, DGTP-002-06 – *Policy Provisions for the Band 2500-2690 MHz to Facilitate Future Mobile Service*, announced a spectrum utilization policy that designates this band for mobile, fixed and broadcasting use. The impetus for this policy was the decision made at WRC-2000 to identify the band 2500-2690 MHz for IMT-2000 radio services (also known as third generation mobile or 3G services). The International Telecommunication Union's (ITU) identification of this band created significant interest, as it is the only band identified by the ITU for next generation mobile services on a global basis. In November 2001,<sup>1</sup> Industry Canada indicated that the fixed and mobile services would be allocated throughout the band 2500-2690 MHz. The term used in this and future documents for policy, technological and licensing purposes in this band will be Broadband Radio Service (BRS) where any of the mobile, fixed or broadcasting services may be deployed.

Although the 2006 policy provided some details in terms of the spectrum for the new flexible licences under BRS, it did not fully address eligibility criteria for conversion of Multipoint Communication System (MCS) and Multipoint Distribution Service (MDS) authorizations to BRS licences, nor whether site-specific MCS licences should be eligible for conversion to BRS spectrum licences.

In March 2009, in keeping with Industry Canada's policy of consulting two years prior to the end of a licence term, the Department published DGRB-005-09 – *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz*.<sup>2</sup> The consultation requested comments on the Department's proposals that:

- (1) a firm transition date be established and that date be set as March 31, 2011, to coincide with the expiry date of the licence terms for all MCS spectrum licences;

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<sup>1</sup> News Release Announcing Introduction of Fixed and Mobile Services in 2500 MHz Frequency Band  
<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/02881.html>

<sup>2</sup> DGRB-005-09 — Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz  
<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09300.html>

- (2) the criteria set out in the consultation paper be used in determining which operations would be eligible for converting to BRS licences to enable the Department to process requests pursuant to the 2006 policy;
- (3) the same conversion criteria be applied for the issuance of BRS licences for any remaining qualified MCS licences and MDS operations, should they not be already converted to BRS by the proposed transition date;
- (4) the geographic service area for converted BRS licences be either Tier 3 or Tier 4 service areas; and
- (5) the proposed conditions of licence be attributed to the converted BRS spectrum licences until such time as the consultations to finalize the policy and licensing framework, which may include additional conditions, are concluded.

### **3. Moratorium**

The March 2009 consultation paper also announced that an immediate moratorium was being placed on new applications for broadcasting certificates in the band 2500-2690 MHz. All applications for broadcasting certificates already in the possession of Industry Canada would be processed, culminating in the issuance of a broadcasting certificate should all requirements be met. All outstanding documents necessary for the processing of these applications were to be received by the Department within three (3) months of the date of the notice; otherwise the application would be returned. Two MDS incumbents submitted additional documentation, and the related applications are currently being processed.

**Effective immediately, applications for broadcasting certificates in the band 2500-2690 MHz will be accepted from BRS licensees only.**

### **4. Establishment of a Firm Transition Date**

As noted in the consultation paper, the licence terms for MCS and MDS incumbents in the band 2500-2690 MHz expire in 2011 and, as noted above, a consultation process is generally undertaken no later than two years prior to the end of the licence term.

Industry Canada initiated the consultation process in DGRB-005-09 to determine whether to allow the renewal of MCS licences and MDS authorizations, and whether to continue with voluntary conversion to BRS or adopt a firm transition date and related transition policies.

In the paper, the Department noted that continuing with voluntary conversion as set out in the 2006 policy would result in a piecemeal outcome, which would make transition to a new band plan extremely challenging. Given that MCS licences and MDS authorizations expire in 2011, the Department consulted on whether their renewal at the end of the current licence term would be appropriate or whether March 31, 2011, should be set as the firm transition date to BRS licences.

Most of the comments received in response to the consultation agreed with a firm date being set for transitioning the MCS and MDS authorizations to BRS licences, with general agreement on the March 31, 2011 date proposed by Industry Canada. Some qualified their agreement with the proviso that there be flexibility in the timeline for incumbents to transition to the reduced spectrum. One of the licensees was against setting a firm date, and requested that its existing MCS spectrum licences be renewed and that a transition period be identified if a BRS licensee wished to deploy in the same area.

Given that most MCS and MDS authorizations expire in 2011, Industry Canada has decided to establish March 31, 2011, as the firm date for transition to BRS. This will facilitate harmonization with international developments and allow for the introduction of mobile services with the transition of all systems to a new band plan to be phased in over time.

For those who have not voluntarily converted prior to March 31, 2011, the existing MCS spectrum licences will expire on March 31, 2011, and BRS spectrum licences will be issued effective April 1, 2011, to eligible MCS and MDS licensees. In keeping with the 2006 policy, these licences will cover approximately two thirds of the incumbent's current spectrum holdings.

**Industry Canada has decided to establish March 31, 2011, as the firm transition date to BRS licences.**

## **5. Criteria to be Used When Issuing BRS Licences**

In the consultation paper, Industry Canada identified the three types of MCS licences that have been issued to date:

- (1) site-specific licences for school divisions in Manitoba for the carriage of distance education and Instructional TV (ITV);
- (2) site-specific licences for the provision of Internet access in Manitoba; and
- (3) spectrum licences for the provision of a range of fixed local telecommunications distribution services across Canada, except in Manitoba.

The Department also identified the two types of CRTC authorizations considered in the consultation:

- (1) licensed MDS;<sup>3</sup> and
- (2) licence-exempt radiocommunication distribution undertakings (RDUs).

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<sup>3</sup> Since the March 2009 consultation, the CRTC has allowed terrestrial broadcasting distribution undertakings (BDUs) with fewer than 20,000 subscribers to apply for exemption from the licensing requirement. For the purposes of this decision paper, the MDS operations, for which applications have been made to the CRTC for licence exemption under this new order, will be covered under "licensed MDS," whether or not they were exempted by the CRTC after March 2009.

## **5.1 Eligibility Requirements and Treatment of Incumbents**

### **5.1.1 Manitoba School Divisions and Commercial MCS Licensee in Manitoba**

With respect to the situation with school divisions and the commercial MCS site-specific licensee in Manitoba, the Department proposed three options for consideration:

- (1) Option 1 – Eligible for conversion to BRS;
- (2) Option 2 – Subject to a transition policy; or
- (3) Option 3 – Grandfathered (i.e. not subject to transition)

A list of licensees is included in Annex A.

#### **Manitoba School Divisions**

A variety of comments were received on this issue. The Manitoba school divisions commented as two separate groups on this issue: the largest of the school divisions requested that its operations be grandfathered indefinitely; and the other school divisions requested that their operations be grandfathered as well, but with an option to transition to either the TDD or to the FDD spectrum in any future band plan, as required, with preference for the FDD spectrum. These proposals from the school divisions received support from other respondents only with regard to grandfathering the operations. Two comments received suggested that a transition policy be put into effect to move the school divisions to other available spectrum that would better suit their current and future operational needs. It was suggested that Industry Canada find ways to fund the transition.

The Department recognizes that school divisions operate on tight budgets and that the financial cost of implementing any option other than grandfathering could be prohibitive in the near term. It should also be noted that funding transition is not within the Department's mandate. Due to the nature of the services provided by the school divisions and taking into consideration that they are not commercial operations, the Department has decided to grandfather the school division licences, subject to the terms set out in the decision box below. Furthermore, the Department believes that it should enable the school divisions to upgrade their equipment and add links if required, as long as this does not increase the frequencies licensed or the geographic footprint of the existing network, i.e. has no additional impact on a future BRS operation. Industry Canada would assess requests for additional links and may seek input from the BRS licensee for that service area.

With respect to the request by some of the school divisions to be able to transition to TDD or FDD spectrum at a later date, the school divisions will be required to come to a mutually acceptable agreement with the BRS licensee. As noted in Annex B, a BRS licence may be transferred or subdivided in geography or frequency and a subordinate licensing process is also available to assist school divisions in their discussions with the BRS licensee. Any request in this regard requires the prior approval of the Minister of Industry. The Department encourages the use of secondary market measures and recommends that current and future BRS licensees and school divisions work together to facilitate a mutual understanding that permits the continuation of services provided by the school divisions, as well as the implementation of BRS in Manitoba.

### **Commercial MCS Licensee – Craig Wireless Manitoba**

Several respondents to this request for comments indicated that the commercial MCS licensee should be eligible to convert to BRS, whereas one respondent argued that a transition policy should be enacted in order to free up spectrum to provide for a future “national licence.” The Department recognizes that Craig has ongoing operations that use small amounts of MCS spectrum, an established client base and that it remains in compliance with its current licence conditions. However, its licences are site-specific and were not awarded based on a competitive licensing process.

In light of this, the Department has decided to grandfather the commercial MCS site-specific licences, which will allow the licensee to continue providing services to its client base while allowing Industry Canada to assign BRS spectrum in a future licensing process, subject to the terms set out in the decision box below. The provisions with respect to upgrading equipment and adding links if required, which are applicable to the school divisions, are also applicable to the commercial MCS site-specific licences.

**Industry Canada has decided to grandfather all site-specific MCS licences in Manitoba.**

**The following applies to all site-specific MCS licences in Manitoba:**

- (1) These operations may continue on a standard basis and be protected from harmful interference from BRS.**
- (2) These licensees may continue to offer their existing services using currently licensed stations as described in their site-specific licences; however, return channels in the band 2150-2162 MHz are subject to the transition policy described in DGTP-002-07, *Consultation on a Framework to Auction Spectrum in the 2 GHz Range including Advanced Wireless Services*.<sup>4</sup>**
- (3) Requests for additional spectrum or geographic expansion in the band 2500-2690 MHz will not be entertained by Industry Canada; however, new links which do not increase the amount of spectrum licensed nor add to the existing geographic footprint may be considered;**
- (4) Licences are transferable in accordance with RP-010 — *Policy Guidelines Concerning the Transfer of Radio Licences*.**

**The existing fee order DGRB-013-99 will apply to MCS and BRS licences. A future consultation will be undertaken to determine a new fee for BRS (see Section 6).**

<sup>4</sup> <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08760.html#t3.2>

### **5.1.2 MCS Spectrum Licences**

In implementing the 1999 MCS policy, Industry Canada issued spectrum licences through a competitive process to two Canadian carriers (Inukshuk Internet Inc. and SaskTel) for all parts of Canada except Manitoba. Inukshuk Internet subsequently transferred two licences in northern Canada to SSI Micro.

The primary issue related to these MCS spectrum licences is the setting of a firm date for transitioning to BRS licences. The decision on the date, set out in Section 4 above, will apply to these MCS spectrum licensees.

### **5.1.3 CRTC-licensed MDS Broadcasting Stations**

In the March 2009 consultation, the Department indicated that there are three components to the authorization of CRTC-licensed MDS systems (a CRTC Decision, an Industry Canada broadcasting certificate and a CRTC broadcasting licence), that the requirements for MDS broadcasting stations are further elaborated in section 22 of the *Broadcasting Act*, and that CRTC licences for MDS stations will expire on August 31, 2011. Industry Canada invited comments on which component(s) should be required in order for an MDS operation to qualify for conversion to BRS in a given area.

The consultation paper also indicated that, in response to requests from MDS operators, the CRTC had agreed that MDS operators could use up to 50% of their MDS spectrum for non-broadcasting purposes. This usage required a separate spectrum licence from Industry Canada that is renewed annually. The Department noted that these licences cover the same frequencies as the MDS authorizations and, as such, are subject to the same considerations as the MDS authorizations.

Comments received on the eligibility criteria for MDS authorizations to convert to BRS licences included all possible options. Recommendations received stated that the incumbent should be required to have a deployed system in a particular area or that the incumbent should be required to have one or all of the three elements indicated in the consultation (CRTC Decision, Industry Canada broadcasting certificate and CRTC broadcast licence).

The Department recognizes the significant shifts in both equipment and services that have taken place in this band in Canada and internationally since the 2000 World Radiocommunication Conference (WRC-2000) decision to identify the band for IMT-2000 services. These shifts have made planning and deployment of systems challenging, as the ultimate outcome was uncertain. In this context, the Department has decided that preliminary activities for the establishment of a broadcasting operation are sufficient. As a result, operations that have a valid CRTC Decision and an Industry Canada broadcasting certificate in place will be eligible to convert to BRS licences.

**An MDS authorization will require a valid CRTC Decision and a valid Industry Canada broadcasting certificate to qualify for conversion to a BRS licence. Unless voluntarily converted prior to March 31, 2011, BRS spectrum licences will be issued by Industry Canada – effective April 1, 2011 – for eligible MDS authorizations. In keeping with the 2006 policy, these BRS licences will cover approximately two thirds of the incumbent’s current spectrum holdings.**

#### 5.1.4 Licence-exempt Broadcasting Stations in Rural Areas

In the consultation paper, Industry Canada noted that the CRTC allows for the operation of licence-exempt broadcasting stations under certain circumstances. The Department also noted that licence-exempt broadcasting stations are low power and located in remote areas of the country where it is likely that their existence will not hinder the future deployment of BRS.

In light of this, Industry Canada requested comments on whether these CRTC licence-exempt systems should be treated differently from the CRTC-licensed systems. If it was decided that they are not eligible for conversion and a firm transition date to BRS is adopted, the Department asked what would constitute a suitable notification period for these stations to retune to available frequencies or cease operating, keeping in mind that notification would be given only if the MDS station would prevent the deployment of a BRS system.

Seven of the eight comments received on this issue recommended allowing the operations to continue, but indicated that the incumbent should be required to transition out of the band upon notification that the BRS licensee has plans to deploy; the suggested notification periods ranged from six months to two years.

Having considered the comments received and, based on the limited number of stations that are in very remote areas, Industry Canada has decided that these stations will not be eligible for conversion to BRS and that they will be subject to a transition policy.

It is the general policy of Industry Canada to effect the displacement of frequency assignments only where and when required, so as to minimize disruption. The Department recognizes the significance of providing reasonable notice to inform spectrum users of any conditions or circumstances that might result in the displacement of services.

All costs associated with displacement of frequency assignments will remain the responsibility of the spectrum users who are to be displaced. The Government of Canada bears no responsibility for any or all costs and expenses incurred by the displacement of frequency assignments and, accordingly, it does not have a responsibility or intent to financially compensate spectrum users who are displaced. As new services are introduced, arrangements may be made between new radio users and incumbents on a voluntary basis, as a contractual matter between private parties, to the extent that such arrangements are consistent with the provisions of the spectrum transition policy. These are long-standing principles that have been used successfully for many years to introduce new radio services while taking into account the needs of new operators and the incumbents.

**CRTC licence-exempt broadcasting stations in rural areas will not be eligible for conversion to BRS and will be subject to a transition policy whereby:**

- **they may continue to operate in accordance with their current authorization;**
- **no additional authorizations in spectrum or geographic area will be considered by the Department;**
- **should the MDS operation prevent the deployment of a BRS system, the BRS licensee must identify to Industry Canada the stations and frequencies that may prevent its BRS deployment;**
- **Industry Canada will notify the MDS operator and the latter may continue to operate for up to two years following the date of the notice; and**
- **after the two-year notification period, the MDS operator must vacate the spectrum or operate on a no-protection, non-interference basis.**

## **5.2 Geographic Service Areas**

A major consideration in the March 2009 consultation paper involved the geographic service areas to be authorized for converted MCS and MDS authorizations. Industry Canada sought comments on whether Tier 3 or Tier 4 licence areas are the most appropriate for the conversion of MDS authorizations and site-specific MCS licences to BRS spectrum licences.

In the paper, the Department noted that there are certain advantages to using Tier 4 areas to define the BRS authorizations for operators converting from MDS. In particular, by using the smallest tier areas, the Department is able to most closely match the contour maps of the MDS authorization. In very few cases, where an existing operation significantly overlaps two Tier 4 areas, the assignment of more than one Tier 4 area may be required. Where operators plan to continue to offer fixed services, the smaller licensed areas may be more practical and offer opportunities for more operators to be licensed.

The use of Tier 3 areas has other advantages. Tier 3 areas are larger and more likely to provide licensees with contiguous service areas between urban centres, which would facilitate the deployment of large-scale, high mobility systems.

Although the Department gave the options of Tier 3 or Tier 4, four respondents, including three incumbents, recommended that Tier 2 be allowed. One MDS incumbent requested Tier 2 in order to level the playing field with the MCS incumbents that have province-wide licences, whereas another MDS incumbent argued that the sizeable coverage indicated in its broadcasting licences warranted granting it a Tier 2 licence. However, the majority of the comments favoured Tier 3 and highlighted the mobility aspect. The remaining comments recommended the Tier 4 areas and suggested that smaller areas would ultimately allow smaller operators to participate, particularly in rural areas.

In view of the comments received and taking into consideration the current deployments of networks and the reasons behind the 2006 policy decision, Industry Canada has decided that Tier 3 service areas will be used for the conversion of eligible MCS and MDS authorizations to BRS spectrum licences. Two MCS licensees (Inukshuk and SSI Micro) hold MCS spectrum licences with geographic service areas in northern Canada that are equivalent to Tier 4 service areas. These MCS licences will be converted to Tier 4 BRS licences.

Geographic areas for licences issued through future licensing processes may be different from those established through this decision. A future consultation will take place to determine the licensing framework for the unassigned licences, including the size of the Tiers to be licensed.

**All eligible authorizations will be converted to BRS licences, with the geographic service areas based on the existing authorizations as follows:**

- (1) Licensees holding MCS spectrum licences on a province-wide basis will be issued Tier 3 BRS licences and, in three cases (Yukon, Northwest Territories and Nunavut), Tier 4 licences will be issued;**
- (2) MDS operators will be issued Tier 3 licences where their MDS authorizations meet the eligibility criteria indicated in Section 5.1 above.**

**Existing BRS licences issued in accordance with the voluntary conversion process will be modified from Tier 4 to the corresponding Tier 3 service area on the basis indicated above.**

## **6. Licence Fees**

As noted in the consultation paper, the Department will consult on a new licence fee applicable to all BRS licences issued to incumbents through either the voluntary conversion process or the transition policy.

In the interim, the radio authorization fees established in *Canada Gazette* Notice DGRB-013-99 will continue to apply to MCS spectrum licences. This fee will also be used for all BRS licences issued pursuant to the conversion or transition processes until such time as a new fee order has been established. The existing licence fees will continue to apply to site-specific MCS licences.

## **7. Conditions of Licence**

Industry Canada proposed conditions of licence in the March 2009 consultation paper. The Department also noted in the consultation paper that all conditions of licence and authorizations (i.e. MCS, BRS and MDS broadcasting certificates) would be subject to change following the consultation on the policy and licensing framework for the auction of spectrum in the band 2500-2690 MHz. This would allow for licence conditions to be aligned and consistent with those of future licences in this frequency band. There was general support for the conditions as proposed; however, alternative suggestions were made

with respect to the licence term. Two comments indicated that licence terms should be longer (from 15 to 25 years), with one of the comments indicating that the words “high expectation of renewal” should be included in the licence term condition. Regarding the Lawful Intercept condition, comments received suggested that changes be made to provide for cost recovery and transition periods. One suggestion was that implementation targets be developed, whereas others recommended that no targets be set. Finally, the Radio Advisory Board of Canada requested clarification on the need for broadcasting certificates once BRS licences are issued.

In reviewing the comments related to the licence term, the Department has decided that BRS licences will be issued with a 10-year term, similar to other long-term spectrum licences. However, to provide greater certainty to licensees, and in view of the similarities with the Advanced Wireless Services (AWS) spectrum, the licences will have a high expectation of renewal where conditions of licence have been met and the licensee can demonstrate population coverage which is, at a minimum consistent, with the roll-out targets set out in Annex C unless a fundamental reallocation of spectrum to a new service is required or an overriding policy need arises. Licence renewal will be subject to a public consultation process that will take into consideration the extent of population coverage across the licensed area.

No comments were received in relation to the Eligibility condition, which indicated that radiocommunication carriers, service providers and users would be permitted to hold a BRS licence. However, taking into consideration that this frequency band has been identified internationally for IMT-2000 and that, globally, this band is being licensed for commercial subscriber-based services, Industry Canada has decided that a BRS licensee must be eligible to become a radiocommunication carrier and, as such, must comply on an ongoing basis with the eligibility criteria set out in section 10(2) of the *Radiocommunication Regulations*.

With respect to a recommendation to include mandatory roaming, the Department’s intent in mandating roaming for PCS, cellular and AWS licensees was to promote competition and support the orderly development of radiocommunication in light of the policy objectives of the *Telecommunications Act*. Mandated roaming was considered a follow-up to the requirement for incumbent cellular licensees holding PCS licences to offer roaming to new PCS licensees. No extensive mobile BRS networks are currently available on which new entrants could roam. However, mobile systems will be deployed in the near future. Industry Canada does not intend to mandate roaming at this time, but may consult on mandated roaming between all BRS licensees and other spectrum licensees in mobile bands (e.g. cellular, PCS, AWS and BRS) in a future consultation.

In response to comments on Lawful Intercept, the Department notes that concerns about cost and timing related to this condition are outside the scope of the consultation on the conditions of licence and that interested parties should express their concerns during any legislative process that the government might undertake concerning lawful interception. It should be noted that the condition allows for the licensee to request that the Minister of Industry forbear from enforcing certain lawful interception capability requirements for a limited period of time where there are technical reasons as to why the condition cannot be met.

Since the publication of the March 2009 consultation paper, the Department has undertaken a review of the wording in all conditions of licence with a view to standardizing the language for each condition for all future licences. The conditions of licence for BRS licences, which appear in Annex B, reflect the standardization of the wording. The change to the wording does not change the intent of the condition as proposed in the consultation paper. It should be noted that, in accordance with the *Broadcasting Act*, the CRTC is the regulatory body in determining all aspects related to broadcasting. BRS licensees intending to operate broadcast services must comply with CRTC requirements and are advised to contact the CRTC for more information.

The need for inclusion of the Research and Development condition formed part of the consultation on the *Framework for Spectrum Auctions in Canada*. That decision will apply to existing and future spectrum licences. In the *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz*, it was proposed that conditions of licence for the BRS licences be consistent with existing licences for similar services (e.g. Cellular, Personal Communication Services and Advanced Wireless Services). Interim BRS licences issued to date include the R&D condition pending the outcome of the consultation on that issue. The proposed conditions of licence for BRS licences did not include a Learning Plan requirement, which exists only on the MCS spectrum licences. Following the closing of the comment period, the Department received input from the educational community asking that the Learning Plan requirement continue. The Department is considering this issue and will release the decision on R&D and Learning Plans in a decision separate from this paper.

## **Part B – Consultation on Band Plan**

### **8. The Frequency Band Plan**

At the World Radiocommunication Conference in 2000 (WRC-2000), the band 2500-2690 MHz was globally designated to IMT systems. Recent technological evolutions and market trends enabling multimedia applications over broadband access systems have resulted in a significant increase in spectrum demand for broadband wireless applications. In order to support such growth in spectrum demand, the BRS band plan in the 2500-2690 MHz range should support:

- harmonization of equipment specifications to the extent possible;
- economies of scale and greater equipment availability;
- orderly deployment of broadband radio systems, enabling efficient use of the limited radio spectrum;
- deployment of systems with reduced capital and operational costs, enabling affordable services to consumers; and
- international interoperability and roaming.

In the past, when implementing new radio services, Canada has often adopted harmonized spectrum allocations, band plans and radio equipment specifications with the United States. This typically presented the following advantages over other choices:

- wide selection of low cost equipment due to the size of the U.S. market;
- simplified cross-border frequency coordination procedures due to harmonized frequency arrangements; and
- cross-border roaming enabled by the interoperable equipment.

As a result of the specifics of the BRS band plan adopted by United States,<sup>5</sup> and given that the European Commission (EC) adopted a common band plan for this band,<sup>6</sup> there are now two international band plan options available to Canada. These two options are discussed below.

### 8.1 Option 1 – Harmonize with the U.S. band plan

In the United States, the BRS band plan was specifically designed to enable migration to BRS by the incumbent MDS and Instructional Television Fixed Services (ITFS) licensees. The U.S. Federal Communications Commission (FCC) has allowed a mixture of 3 x 5.5 MHz and 6 MHz channel widths, providing compatibility with equipment used in the past for high powered broadcasting stations. The band plan adopted in the United States (henceforth referred to as “Option 1”) is shown in the figure below:

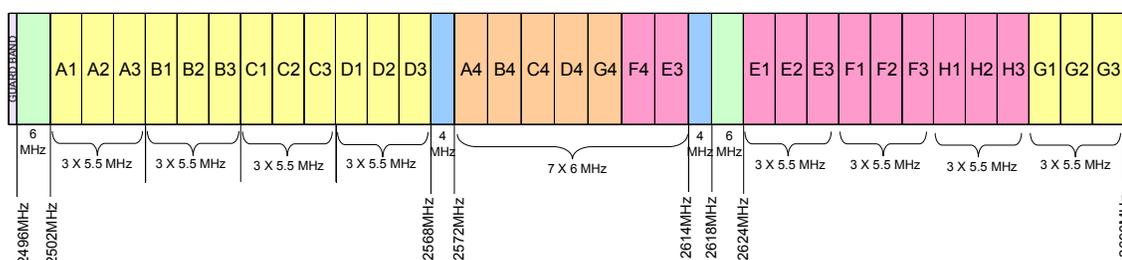


Figure 1 - Option 1 band plan model<sup>7</sup>

Although the Option 1 model was developed by the FCC to address the requirements of U.S. incumbents, its advantages may be less relevant in Canada, as the Canadian context is different.

Some of the characteristics of the Option 1 band plan model are that:

- the band is structured in 16.5 MHz blocks, except the 2572-2614 MHz range, which is based on 6 MHz channels;
- the band plan is technology-flexible, as there are no specific designations for frequency division duplex (FDD) and time division duplex (TDD) frequency ranges, and the licences are issued in an unpaired configuration; and
- the band starts at 2495 MHz (i.e. 5 MHz below the band designated for BRS in Canada).

Harmonizing the Canadian BRS band plan with that in the United States would facilitate cross-border roaming if the Canadian carrier chooses the same technology as used in the United States. It should be noted that cross-border roaming is now less dependent on a harmonized band plan and is facilitated by the emergence of terminal equipment capable of operating in multiple bands.

<sup>5</sup> Refer to NPRM and Memorandum Opinion and Order FCC 03-56.

<sup>6</sup> [EC decision 477, 2008](#)

<sup>7</sup> Reproduced from the FCC, <http://wireless.fcc.gov/services/brsebs/data/BRS-EBS-BandPlans.pdf>.

This band plan, however, presents a few challenges with respect to implementing it in a multi-operator environment in Canada, including:

- large geographic separations would be needed between operators using the same frequency; and
- the 16.5 MHz block width is not consistent with the standardized equipment being developed for this band.<sup>8</sup>

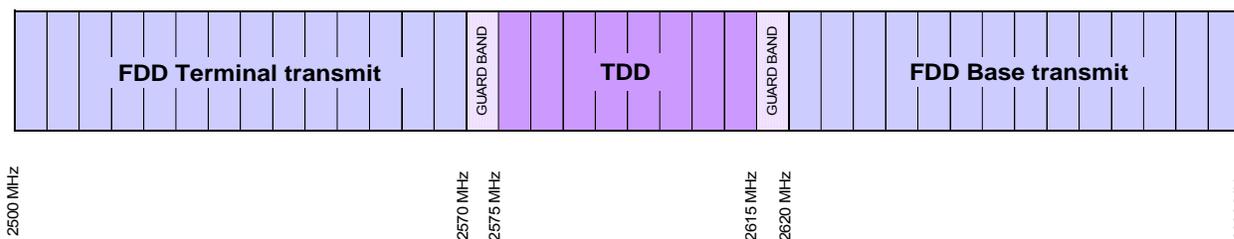
In order to minimize interference between operations, it is generally recognized that a minimum of a 5 MHz guard band is necessary between FDD and TDD operations, as well as another 5 MHz guard band between unsynchronized TDD systems operating in the same service area. Should there be multiple licensees within the same geographic area, implementation of the Option 1 model could result in less usable spectrum for the licensees. In the United States, one licensee holds a significant amount of available spectrum nationwide, which reduces this guard band requirement.

The Option 1 model, used in the United States, allows use of both FDD and TDD equipment anywhere in the band. Should this band plan model be adopted in Canada, the incumbents could operate in their assigned blocks and departmental measures may not be needed for further implementation.

## 8.2 Option 2 – Harmonize with the international band plan

The Department notes that, although comments were not requested regarding the band plan in the March 2009 consultation, a number of comments were received in support of the adoption of an international band plan based on the Frequency Arrangement C1 in the Report ITU-R M.1036 (henceforth referred to as “Option 2”), shown in Figure 2 below.

In parallel with the March 2009 consultation, the Department conducted a Stakeholder Proposal Development (SPD) process in which incumbents met with the goal to develop, among other issues, a unified proposal for the new band plan. The SPD discussions led to the unanimous proposal for the recommendation that the BRS band plan be based on the Option 2 model.



**Figure 2 - Option 2 band plan model**

<sup>8</sup> Technologies proposed to be employed in the 2.5 GHz band, such as WiMax and LTE, use channel widths in increments of 5 MHz (i.e. 5, 10, 15, 20 MHz).

This band plan model features two paired (FDD) bands with a duplex separation of 120 MHz, and a centre portion of 50 MHz of unpaired (TDD) spectrum. FDD and TDD spectrum designations are both specified with technical constraints to be reflected in technical rules. For FDD systems, base transmission is permitted only in the 2620-2690 MHz range, whereas the terminal equipment is permitted to transmit in the 2500-2570 MHz range. The band plan is channelized with a 5 MHz granularity.

Studies performed and discussed in international fora<sup>9</sup> show that a minimum guard band of 5 MHz is necessary to address potential interference between TDD and FDD systems operating in adjacent bands in the same geographical area. As a result, as shown in Figure 2, two 5 MHz guard bands are provided in the Option 2 model at 2570-2575 MHz and 2615-2620 MHz. Consequently, the unpaired (TDD) block contains 50 MHz of contiguous spectrum, including 10 MHz of guard bands.

The rationale supporting the use of this band plan is that equipment planned or being manufactured for this band is based on IMT standards that include multiples of 5 MHz channel bandwidths, rather than the various channel bandwidths suitable for broadcasting.

Implementing the Option 2 model of the band plan would offer a number of advantages:

- allow the deployment of both FDD and TDD systems;
- promote spectral efficiency because guard bands, which are mostly unusable spectrum, would not be required between operators in adjacent FDD frequency blocks;
- permit global harmonization which would enable economies of scale for equipment and international roaming;
- facilitate equipment compatibility with other mobile bands licensed in Canada on a paired basis; and
- access a wider range of services and applications which would be developed on a global basis.

It should be noted that the paired (FDD) portion of the Option 2 band plan should be licensed in a paired structure. Consequently, the currently unpaired incumbent spectrum holdings in the band 2500-2690 MHz may need to be reorganized if the Option 2 band plan is adopted. The physical migration of the network facilities to the new band plan may need to be implemented over a period of time after the transition to BRS licences on March 31, 2011 (see Section 9.5).

Furthermore, the 2006 policy specifies the spectrum blocks to be returned to the Department as 2535-2568 MHz and 2657-2690 MHz. Should the Option 2 band plan be adopted, these blocks would need to be shifted slightly to align with the Option 2 band plan, specifically to 2540-2570 MHz and 2660-2690 MHz.

In the PCS and AWS bands, the Department created technology-neutral rules permitting operation of TDD systems in paired FDD bands. These TDD systems must operate within the technical rules for FDD and avoid creating any interference to FDD systems. It should be noted that, so far, no TDD systems have been deployed in the PCS and AWS bands. The possibility of a similar provision whereby TDD systems would be allowed to operate within the FDD portion of the Option 2 band plan may be considered. Such a provision would be accompanied by conditions that these TDD systems must be

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<sup>9</sup> Report ITU-R M.2030; ECC Report 119.

engineered to coexist without interfering with the FDD systems in adjacent frequency blocks or neighbouring areas.

Notwithstanding the above, should the Option 2 band plan be selected for implementation in Canada, exceptions may be granted to incumbent MCS licensees in remote and rural areas, which may be allowed to continue to use current technology (TDD) for an interim period.

As mentioned, within the context of the Option 2 band plan model, two guard bands are provided in the frequency ranges 2570-2575 MHz and 2615-2620 MHz, where systems cannot be deployed without a significant probability of interference to operations in adjacent FDD and TDD blocks. Pan-European rules state that systems in these ranges can only operate at reduced power levels with no interference, no protection conditions. Should the Option 2 band plan model be selected, technical rules governing the operation of systems in the FDD, TDD blocks, including specific provisions for the guard bands, will be developed in consultation with the industry.

**Given the benefits of the internationally harmonized band plan, Industry Canada proposes to adopt the Option 2 model of the band plan for BRS in the band 2500-2690 MHz.**

**The Department seeks comments on its proposal to adopt the Option 2 model and on the following related elements:**

- 1. Should operation of the TDD systems be permitted in the FDD portion of the band plan and, if so, under what conditions?**
- 2. Should the guard band blocks 2570-2575 MHz and 2615-2620 MHz be held in reserve by Industry Canada or should they form part of the unpaired block (TDD)?**
- 3. If the guard bands are to be held in reserve, should they be considered for future use by licence-exempt wireless systems?**

**Please provide comments on any additional technical details related to the band plan which are not addressed above.**

## **9. Mapping of Incumbents into Option 2 Band Plan**

In the past, when a frequency band was restructured for the introduction of new mobile commercial services, the existing use was discontinued. The existing licensees were subject to a transition process, possibly to other bands, to free up the spectrum for the new services. In the case of the band 2500-2690 MHz, the MCS and MDS incumbent licensees have been offered the opportunity to transition their fixed or broadcasting licences to flexible-use BRS licences by returning to the Department approximately one third of the spectrum and retaining approximately two thirds of their original spectrum holding, as BRS licences.

In the event that the Option 2 band plan is adopted, the band plan for BRS will include both paired and unpaired frequency bands. Furthermore, in the FDD portions of the band, the technical rules may mandate operations using paired frequencies in FDD mode (refer to Section 8.2). Given that incumbents hold single blocks of spectrum either in the upper (base transmit) or lower (mobile transmit) parts of the band, four issues arise in mapping the incumbents into the new band plan:

1. Industry Canada and an MCS incumbent each hold one unpaired half of the remaining<sup>10</sup> paired spectrum in certain areas (i.e. Alberta, the Maritimes, Yukon, Northwest Territories, Nunavut and parts of British Columbia, Ontario and Quebec).
2. An MCS incumbent and an MDS incumbent each hold one unpaired half of the remaining<sup>10</sup> paired spectrum in certain areas (i.e. Saskatchewan, parts of Ontario and Quebec).
3. The use of the TDD central block may not be practical if there is more than one operator in this block.
4. Industry Canada and an MDS incumbent each hold one unpaired half of the remaining<sup>10</sup> paired spectrum in Manitoba.

FDD and TDD radio systems are not interoperable. Furthermore, they cannot be co-sited unless sufficient frequency separation exists and additional filtering is implemented on both systems. An operator deploying a TDD system may encounter serious operational challenges in deploying an FDD overlay on the same set of sites.

To address these issues and others, the Department may use one of two methods to reorganize the incumbents in the band plan:

1. Rely on secondary market spectrum trading such as spectrum exchanges between incumbents, etc.
2. Alternatively, the Department may take more direct action, for example, by reassigning spectrum holdings, among other possible measures.

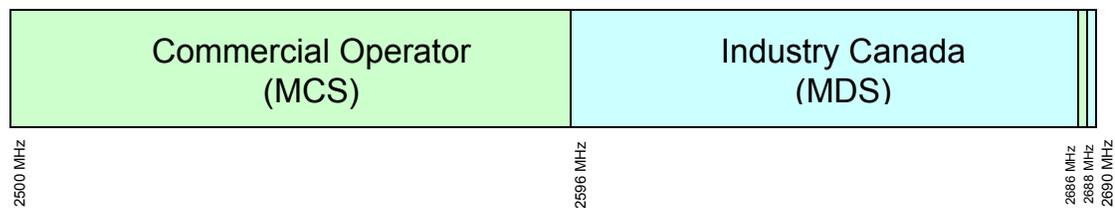
The following sections examine the four issues identified above with respect to adopting either of these two methods to map the incumbents into the Option 2 band plan.

### **9.1 Regions where the Department holds the MDS spectrum**

In certain regions, including Alberta, the Maritime Provinces, the Territories, and parts of British Columbia, Ontario and Quebec, the 2500-2690 MHz band is currently divided between an MCS incumbent and the Department (MDS spectrum holder), as shown in Figure 3.

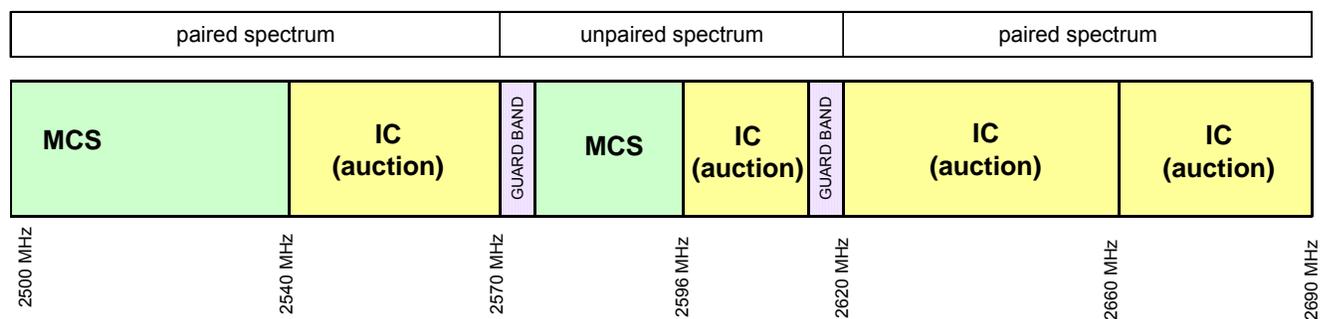
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<sup>10</sup> Remaining after the 2540-2570 and 2660-2690 MHz blocks are returned to the Department as described in Section 8.2.



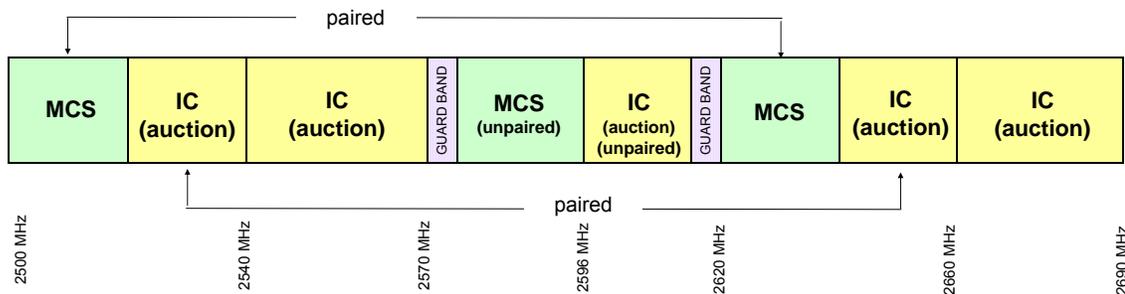
**Figure 3 - Current 2500-2690 MHz band spectrum attribution between incumbents**

Taking into account the spectrum to be returned (2540-2570 MHz), the incumbents would be mapped into the new band plan as shown in Figure 4.



**Figure 4 - BRS band plan after the adoption of the new band plan, in areas where the Department holds the MDS spectrum**

The MCS incumbent and the Department would each hold portions of the FDD spectrum in the bands 2500-2540 MHz and 2620-2660 MHz. In order to enable the use of this spectrum, the Department could exchange 20 MHz of MDS spectrum for 20 MHz of the MCS incumbent’s spectrum holdings. This would be undertaken in accordance with the duplex separation specified in the band plan, as per Figure 5 below:



**Figure 5 - Configuration of the band after exchange between the Department and MCS incumbent to facilitate the use of paired (FDD) spectrum**

In this case, there are two options available to Industry Canada to facilitate this exchange:

1. Through a spectrum exchange, allow the MCS incumbent and the Department to trade 20 MHz of spectrum in order to convert the incumbent’s single block of 40 MHz to two FDD blocks of 20 + 20 MHz. Should this exchange not occur, the Department would auction the single 40 MHz block of spectrum, namely 2620-2660 MHz, with the view that post-auction spectrum trading on the secondary market may eventually result in FDD use of this spectrum.
2. Through a direct reassignment of spectrum by the Department, the MCS incumbent would be mapped into the new band plan as per Figure 5.

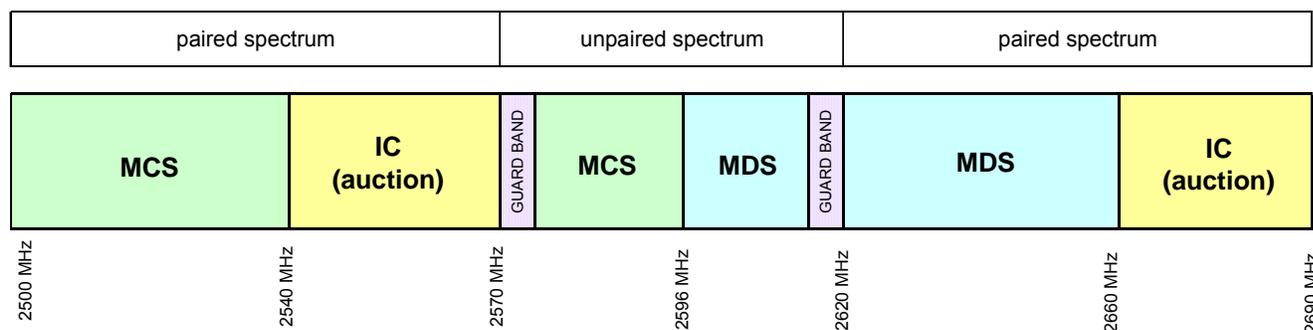
The Department notes that regulatory intervention set out in Option 2 could facilitate the transition to the new band plan in a timely manner. Furthermore, it would provide for paired spectrum consistent with the proposed new band plan, for the future auction.

**The Department proposes to mandate the exchange of 20 MHz of the MDS spectrum held by Industry Canada for 20 MHz of the MCS spectrum licensed to the MCS incumbent as indicated in Figure 5.**

**Industry Canada seeks comments on this proposal.**

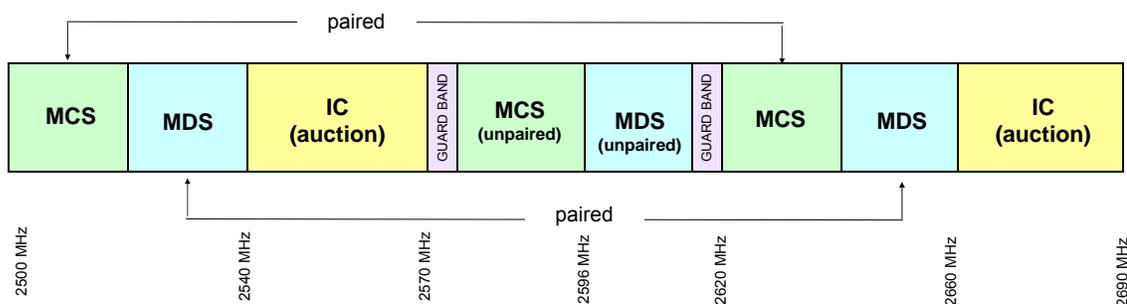
## 9.2 Regions where MCS and MDS incumbents hold portions of spectrum

In the rest of the country (except the province of Manitoba), incumbents hold both the MCS and the MDS portions of the spectrum. The configuration of the band after the return of the 2540-2570 MHz and 2660-2690 MHz frequency blocks is shown in Figure 6.



**Figure 6 - BRS band plan after the adoption of the new band plan, in areas where MCS and MDS incumbents each hold one half of the paired spectrum**

Neither the MCS nor the MDS incumbent will have paired spectrum except in parts of Ontario and Quebec where Inukshuk Wireless Partnership holds both the MCS and the MDS spectrum. In order to enable the use of paired spectrum, the MCS and MDS incumbents could exchange spectrum, which would result in each operator holding 20 + 20 MHz as shown in Figure 7.



**Figure 7 - Possible outcome - configuration of the band after trading between incumbents to facilitate the use of paired (FDD) spectrum**

Also, the incumbents could agree to other arrangements that involve financial transactions, service areas, etc. In this case, there are two options available to the Department:

1. Through spectrum trading on secondary markets, allow the MCS and MDS incumbents to reconfigure their current spectrum to the new band plan. This could involve exchanges of both paired and unpaired spectrum, financial transactions, or business arrangements involving service areas.
2. Through direct reassignment of spectrum, the MCS and MDS incumbents could be mapped into the new band plan as shown in Figure 7. Each licensee would have 20 + 20 MHz of paired spectrum.

The Department notes that in Saskatchewan, part of Northern Ontario and part of Eastern Quebec, there are different MCS and MDS incumbents and as a result, mutually agreeable arrangements, as in Option 1, may be established without the requirement for government intervention. Further, it is noted that the availability of spectrum for auction would not be affected in these cases.

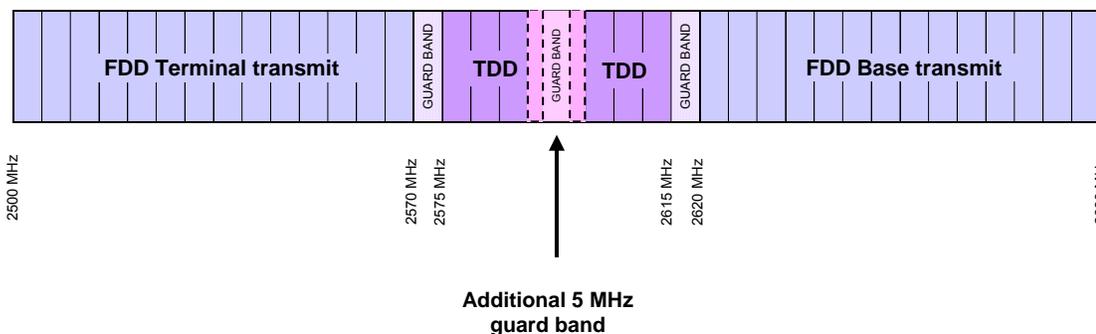
The Department notes that regulatory intervention set out in Option 2 could facilitate the transition to the new band plan in a timely manner.

**Industry Canada seeks comments on whether government intervention is required where there are different MCS and MDS incumbents in the same geographic areas.**

### 9.3 Effective use of the unpaired (TDD) block

If the Option 2 model is implemented, the unpaired (TDD) portion (2575-2615 MHz) of the band would be divided in most areas of the country between the MCS (2575-2596 MHz) and MDS (2596-2615 MHz) incumbents. In parts of Ontario and Quebec, the entire 2575-2615 MHz band is held by one incumbent.

If two operators occupy the unpaired (TDD) portion (2575-2615 MHz) of the BRS band in the same service area, a 5 MHz guard band between operators will typically be necessary to minimize interference to their networks.



**Figure 8 - Two TDD operators in the centre block**

As a result, each operator would have either 16.5 MHz or 18.5 MHz of usable spectrum. However, some current technologies which may be employed in this portion of the band operate on 5, 10, and 15 MHz channel bandwidths. Therefore, possibly only 15 MHz of each block would be effectively usable.

To avoid implementing this additional 5 MHz guard band in the TDD block and to fully benefit from the spectrum available, the entire unpaired (TDD) block (2575-2615 MHz) would need to be operated as a single block. Alternatively, a possible solution to ensure effective use of the TDD block to avoid the frequency guard bands would be to synchronize the two TDD networks. In practice, such a measure could encounter a number of limitations as follows:

- both operators would need to use the same TDD technology (e.g. both use WiMax, LTE, or another TDD technology);
- the two networks would need to use a common timing reference clock;
- the two operators would need to agree on using the same TDD asymmetry factor, limiting their flexibility in offering diverse application and services to end users.

Assuming a successful deployment of systems in this band over the medium to long term, across extended geographical areas, and considering that a TDD operator may have multiple neighbours (in frequency and/or geography), the above-mentioned factors may need to be considered in establishing TDD coordination agreements with more than one other operator. In this context, all networks operating within large regional and potentially national service areas may be required to use synchronized TDD systems and a single technology (e.g. either LTE, WiMax, or another TDD technology).

In order to facilitate efficient use of the unpaired block of spectrum, the Department could rely on market forces to determine how the unpaired block would be operated by a single or multiple operators (e.g. commercial negotiations, secondary market trading, etc.). Alternatively, the Department could set specific technical rules enabling coexistence.

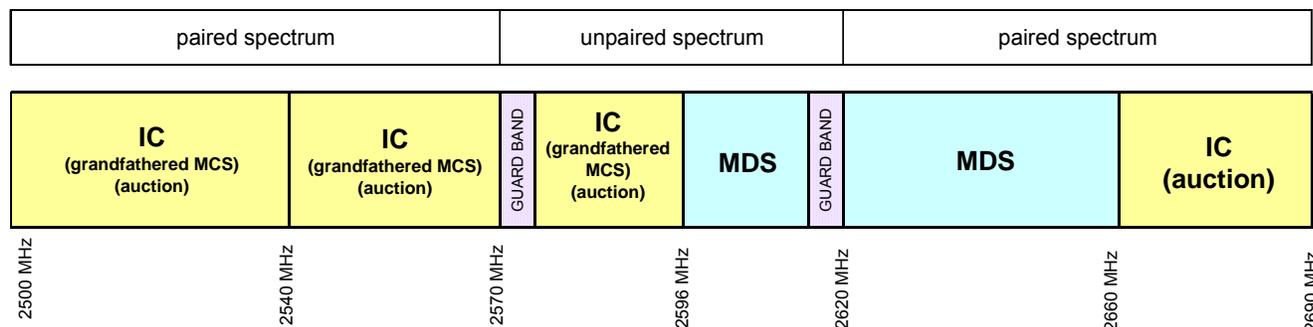
The Department notes that the current MCS and MDS spectrum licence holdings divide at 2596 MHz and thus are not multiples of 5 MHz. If the above solution based on TDD synchronization is implemented, the efficient use of the unpaired TDD block may be further facilitated if this division occurred at a frequency multiple of 5 MHz.

**The Department seeks comments on the challenges faced by more than one operator in making efficient use of the TDD block. Should Industry Canada rely on market forces or should it develop specific technical rules to facilitate coexistence between two or more operators and alignment with the Option 2 Band Plan?**

#### 9.4 Manitoba

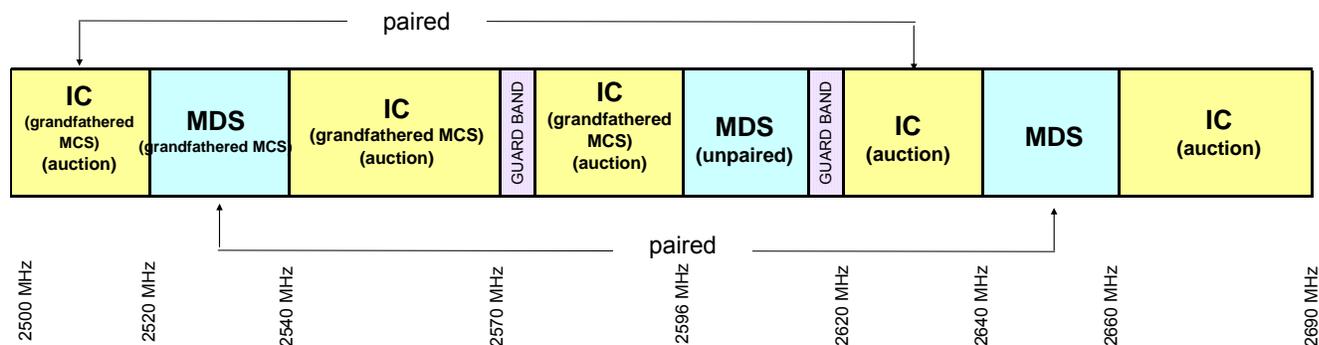
The MCS site-specific licences in Manitoba will be grandfathered as per Section 5.1.1. This MCS spectrum is held by the Manitoba school boards and a commercial licensee. Furthermore, it should be noted that the commercial licensee also holds the MDS spectrum.

As noted in Section 5.1.1, the MCS incumbents in Manitoba will be afforded protection from interference from BRS systems in accordance with departmental standards. The incumbents can be mapped into the band as shown in Figure 9:



**Figure 9 - Spectrum grandfathered and available for auction in Manitoba**

Industry Canada recognizes the complexity in reassigning spectrum in Manitoba. Spectrum trading, as proposed in Section 9.1, may not be as straightforward in this province. Nonetheless, in order to maximize the use of paired frequencies, the Department could exchange certain blocks (e.g. 20 MHz) of the MCS spectrum with an equivalent amount of the MDS incumbent’s spectrum holdings such that the duplex separation specified in the band plan is maintained, as shown in Figure 10.



**Figure 10 - Mapping of incumbents after exchange between the Department and MDS incumbent to facilitate the use of paired (FDD) spectrum**

In this case, there are two options available to Industry Canada to facilitate this exchange:

1. Through a spectrum exchange, allow the MDS incumbent and the Department to trade 20 MHz of spectrum in order to convert their single block of 40 MHz to two FDD blocks of 20 + 20 MHz. Should this exchange not occur, the Department would auction the single 40 MHz block of spectrum, namely 2500-2540 MHz, with the view that post-auction spectrum trading on the secondary market may eventually result in FDD use of this spectrum.
2. Through a direct reassignment of spectrum, the Department and the MDS incumbent would be mapped into the new band plan as per Figure 10.

The Department notes that regulatory intervention set out in Option 2 could facilitate the transition to the new band plan in a timely manner. Furthermore it would provide for paired spectrum consistent with the proposed new band plan, for the future auction.

**The Department proposes to mandate the exchange of 20 MHz of the MDS spectrum for 20 MHz of the MCS spectrum as indicated in Figure 10.**

**Industry Canada seeks comments on this proposal.**

## 9.5 Timing

In order to enable the orderly planning and deployment of BRS radio systems, a specific time deadline may be imposed for the completion of all the spectrum exchanges or transactions discussed above in Section 9. As well it is recognized that a period of time beyond March 31, 2011 will be needed to update or replace the existing MCS and MDS radio systems with new systems based on the new BRS band plan and new broadband technologies. This will include transition of current users to new systems.

In particular, it is recognized that where spectrum to be auctioned is affected, transition timing will have to be determined prior to the auction in order to ensure transparency for incumbents and auction participants.

**Industry Canada is seeking comments on the timing aspects related to the physical migration of the existing network facilities to the new band plan, including the timing required for the completion of all transactions regarding spectrum exchanges.**

## 10. Next Steps

Following a decision on the consultation questions raised in sections 8 and 9, and as indicated in Section 9 of DGRB-005-09, *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz*, Industry Canada will initiate a consultation on the policy and licensing frameworks for this spectrum.

Also, as indicated in DGRB-005-09, the Department will consult on a licence fee for BRS licences; the consultation may take place after the auction of available spectrum.

## 11. Submitting comments

Respondents are requested to provide their comments in electronic format (WordPerfect, Microsoft Word or Adobe PDF) to the following e-mail address: [spectrum.operations@ic.gc.ca](mailto:spectrum.operations@ic.gc.ca), along with a note specifying the software, version number and operating system used.

Written submissions should be addressed to the Senior Director, Spectrum Management Operations, Industry Canada, 300 Slater Street, Ottawa, Ontario, K1A 0C8.

All submissions should cite the *Canada Gazette*, Part I, the publication date, the title and notice reference number DGSO-001-10. Parties should submit their comments no later than August 11, 2010, to ensure consideration. After the close of the comment period, all comments received will be posted on Industry Canada's [Spectrum Management and Telecommunications website](http://www.ic.gc.ca/spectrum) at <http://www.ic.gc.ca/spectrum>.

The Department will also provide interested parties with the opportunity to reply to comments from other parties. Reply comments will be accepted until September 10, 2010.

## 12. Obtaining Copies

All spectrum-related documents referred to in this paper are available on the [Spectrum Management and Telecommunications website](http://www.ic.gc.ca/spectrum) at [www.ic.gc.ca/spectrum](http://www.ic.gc.ca/spectrum).

For further information concerning the process outlined in this document or related matters, contact:

Manager, Emerging Networks  
Spectrum Management Operations Branch  
Industry Canada  
300 Slater Street, 15th floor  
Ottawa, Ontario K1A 0C8  
Telephone: 613-990-4411  
Fax: 613-991-3514  
E-mail: [spectrum.operations@ic.gc.ca](mailto:spectrum.operations@ic.gc.ca)

**Annex A – List of Site-specific MCS Licences in Manitoba (as of May 2010)**

Licensee	Location	Latitude	Longitude	Tx	Rx
BORDER LAND SCHOOL DIVISION	DOMINION CITY, MB-SCHOOL ITV SYSTEM	490827	970957	2502.25	2563.75
BORDER LAND SCHOOL DIVISION	VITA, MANITOBA-SCHOOL ITV SYSTEM	490746	963347	2503.75	2562.25
BORDER LAND SCHOOL DIVISION	WOODMORE, MANITOBA-ITV REPEATER	490804	965358	2562.25	2503.75
BORDER LAND SCHOOL DIVISION	WOODMORE, MANITOBA-ITV REPEATER	490804	965358	2563.75	2502.25
CRAIG WIRELESS MANITOBA INC.	BALDY MOUNTAIN, MANITOBA	512814	1004312	2533	
CRAIG WIRELESS MANITOBA INC.	BRANDON AREA, MAN-SUBSCRIBER STNS.	495049	995710		2533
CRAIG WIRELESS MANITOBA INC.	BRANDON AREA, MAN-SUBSCRIBER STNS.	495049	995710		2539
CRAIG WIRELESS MANITOBA INC.	CHATFIELD AREA, MAN-SUBSCRIBER STNS	504702	973417		2533
CRAIG WIRELESS MANITOBA INC.	CHATFIELD, MANITOBA	504945	973333	2533	
CRAIG WIRELESS MANITOBA INC.	DAUPHIN AREA, MAN.-SUBSCRIBER STNS.	510858	1000300		2533
CRAIG WIRELESS MANITOBA INC.	ELIE AREA, MAN.-SUBSCRIBER STATIONS	495406	974532		2533
CRAIG WIRELESS MANITOBA INC.	ELIE, MANITOBA-CHMI TV TX SITE	495226	974427	2533	
CRAIG WIRELESS MANITOBA INC.	FOXWARREN AREA, MAN-SUBSCRIBER STNS	503102	1010907		2533
CRAIG WIRELESS MANITOBA INC.	FOXWARREN, MANITOBA	503114	1010425	2533	
CRAIG WIRELESS MANITOBA INC.	HAYFIELD, MANITOBA-CKX TV TX SITE	494005	1000042	2533	
CRAIG WIRELESS MANITOBA INC.	HAYFIELD, MANITOBA-CKX TV TX SITE	494005	1000042	2539	
CRAIG WIRELESS MANITOBA INC.	MINNEDOSA/SHOAL LAKE, MB-SUBSC STNS	502106	1001214		2533
CRAIG WIRELESS MANITOBA INC.	NEWDALE, MANITOBA	502038	1001109	2533	
CRAIG WIRELESS MANITOBA INC.	RIDING MOUNTAIN, MANITOBA	502840	993450	2533	
CRAIG WIRELESS MANITOBA INC.	RIDING MTN AREA, MB-SUBSCRIBER STNS.	503155	992800		2533
CRAIG WIRELESS MANITOBA INC.	SELKIRK AREA, MAN.-SUBSCRIBER STNS.	500837	965303		2533
CRAIG WIRELESS MANITOBA INC.	SELKIRK, MANITOBA	500924	965839	2533	
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821		2533
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821		2557
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821		2539
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821		2551
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	2533	
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	2539	
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	2551	
CRAIG WIRELESS MANITOBA INC.	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	2557	
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	2502.25	
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137		2569.75
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137		2571.25
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137		2575
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137		2581
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	2503.75	
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913		2569.75
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913		2571.25
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913		2575
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913		2587
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	2505.25	
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218		2569.75
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218		2571.25
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218		2581
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218		2587
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	2569.75	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	2571.25	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	2575	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	2581	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	2587	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113		2502.25
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113		2503.75
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113		2505.25

Decisions on the Transition to Broadband Radio Service (BRS) in the  
Band 2500-2690 MHz and Consultation on Changes Related to the Band Plan

DGSO-001-10

Licensee	Location	Latitude	Longitude	Tx	Rx
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	2569	
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	2574.25	2505.25
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	2577.25	2502.25
Prairie Rose School Division	ELIE MB - BON HOMME COLONY SCHOOL	495233	975330		2521
Prairie Rose School Division	ELIE MB - BON HOMME COLONY SCHOOL	495233	975330		2545
Prairie Rose School Division	ELIE MB - WALDHEIM COLONY SCHOOL	495136	974949		2545
Prairie Rose School Division	ELIE MB - WALDHEIM COLONY SCHOOL	495136	974949		2521
Prairie Rose School Division	ELIE, MANITOBA-ST. PAUL COLLEGIATE	495427	974534	2521	
Prairie Rose School Division	ELIE, MANITOBA-ST. PAUL COLLEGIATE	495427	974534	2545	
PRAIRIE ROSE SCHOOL DIVISION	ELM CREEK, MB-ELM CREEK COLL (IITV)	494027	980011	2502.25	2577.25
PRAIRIE ROSE SCHOOL DIVISION	ELM CREEK, MB-ELM CREEK COLL (IITV)	494027	980011		2569
PRAIRIE ROSE SCHOOL DIVISION	MIAMI, MAN-MIAMI COLLEGIATE (IITV)	492222	981414	2505.25	2574.25
PRAIRIE ROSE SCHOOL DIVISION	MIAMI, MAN-MIAMI COLLEGIATE (IITV)	492222	981414		2569
Prairie Rose School Division	POPLAR PT MB - POPLAR PT COL. SCH.	500227	975641		2521
Prairie Rose School Division	POPLAR PT MB - POPLAR PT COL. SCH.	500227	975641		2545
Prairie Rose School Division	ST.EUSTACHE MB -IBERVILLE COL. SCH.	495819	974118		2521
Prairie Rose School Division	ST.EUSTACHE MB -IBERVILLE COL. SCH.	495819	974118		2545
Prairie Rose School Division	ST.FRANCOIS MB - LAKESIDE COL. SCH.	495440	973355		2521
Prairie Rose School Division	ST.FRANCOIS MB - LAKESIDE COL. SCH.	495440	973355		2545
Prairie Rose School Division	ST.FRANCOIS MB - MAXWELL COL. SCH.	495714	973848		2521
Prairie Rose School Division	ST.FRANCOIS MB - MAXWELL COL. SCH.	495714	973848		2545
Prairie Rose School Division	ST.FRANCOIS MB-BARRICKMAN COL. SCH.	495609	973617		2521
Prairie Rose School Division	ST.FRANCOIS MB-BARRICKMAN COL. SCH.	495609	973617		2545
PRAIRIE SPIRIT SCHOOL DIVISION #50	BALDUR, MANITOBA-IITV SYSTEM	492308	991418	2516.275	
PRAIRIE SPIRIT SCHOOL DIVISION #50	BALDUR, MANITOBA-IITV SYSTEM	492308	991418		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	BALDUR, MANITOBA-TRI LEAF COLONY	492014	991354		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	2582.7	
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2501.05
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2503.15
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2505.25
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2507.35
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2510.5
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2513.65
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2516.275
PRAIRIE SPIRIT SCHOOL DIVISION #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200		2518.9
PRAIRIE SPIRIT SCHOOL DIVISION #50	CARTWRIGHT, MANITOBA-IITV SYSTEM	490553	992008	2566.25	
PRAIRIE SPIRIT SCHOOL DIVISION #50	CARTWRIGHT, MANITOBA-IITV SYSTEM	490553	992008		2539.3
PRAIRIE SPIRIT SCHOOL DIVISION #50	CYPRESS RIVER, MB-CYPRESS R COLONY	493447	990910		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENBORO, MANITOBA-IITV SYSTEM	493330	991655	2507.35	
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENBORO, MANITOBA-IITV SYSTEM	493330	991655		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENBORO, MANITOBA-MILLSHOF COLONY	493559	992029		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	2513.65	
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	2539.3	
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931		2566.25
PRAIRIE SPIRIT SCHOOL DIVISION #50	HOLLAND, MANITOBA-OAKRIDGE COLONY	493558	984800		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	MANITOU, MANITOBA-IITV SYSTEM	491206	983234	2505.25	
PRAIRIE SPIRIT SCHOOL DIVISION #50	MANITOU, MANITOBA-IITV SYSTEM	491206	983234		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	2510.5	
PRAIRIE SPIRIT SCHOOL DIVISION #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	2539.3	
PRAIRIE SPIRIT SCHOOL DIVISION #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756		2568.35
PRAIRIE SPIRIT SCHOOL DIVISION #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756		2564.15
PRAIRIE SPIRIT SCHOOL DIVISION #50	PILOT MOUND, MAN.-WINDY BAY COLONY	492052	985400		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	PILOT MOUND, MANITOBA-IITV SYSTEM	491209	985401	2503.15	
PRAIRIE SPIRIT SCHOOL DIVISION #50	PILOT MOUND, MANITOBA-IITV SYSTEM	491209	985401		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	SOMERSET, MANITOBA-ITV SYSTEM	492427	983936	2501.05	
PRAIRIE SPIRIT SCHOOL DIVISION #50	SOMERSET, MANITOBA-ITV SYSTEM	492427	983936		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	ST. CLAUDE, MANITOBA-ITV SYSTEM	493936	982050	2564.15	
PRAIRIE SPIRIT SCHOOL DIVISION #50	ST. CLAUDE, MANITOBA-ITV SYSTEM	493936	982050		2539.3

Decisions on the Transition to Broadband Radio Service (BRS) in the  
 Band 2500-2690 MHz and Consultation on Changes Related to the Band Plan

DGSO-001-10

Licensee	Location	Latitude	Longitude	Tx	Rx
PRAIRIE SPIRIT SCHOOL DIVISION #50	SWAN LAKE, MANITOBA-ITV SYSTEM	492447	984733	2518.9	
PRAIRIE SPIRIT SCHOOL DIVISION #50	SWAN LAKE, MANITOBA-ITV SYSTEM	492447	984733		2582.7
PRAIRIE SPIRIT SCHOOL DIVISION #50	TREHERNE MANITOBA-SHADY LANE COLONY	494422	983908		2539
PRAIRIE SPIRIT SCHOOL DIVISION #50	TREHERNE, MANITOBA-IITV SYSTEM	493720	984154	2568.35	
PRAIRIE SPIRIT SCHOOL DIVISION #50	TREHERNE, MANITOBA-IITV SYSTEM	493720	984154		2539.3
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317		2509
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317		2563
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317		2515
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	2509	
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	2515	
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	2563	
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849		2509
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849		2563
ST JAMES ASSINIBOIA SCHOOL DIV #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849		2515

## **Annex B – Conditions of Licence**

The following conditions apply to licences for the BRS spectrum band 2500-2690 MHz. The Minister has the power to amend the terms and conditions of spectrum licences (paragraph 5(1)(b) of the *Radiocommunication Act*.) Such power would be exercised only after consultation.

### **1. Licence Term**

This licence will expire on the date indicated above [March 31, 2021]. Licensees must pay the annual licence fee before March 31 of each year for the subsequent year (April 1 to March 31). This licence will have a high expectation of renewal where conditions of licence have been met and the licensee can demonstrate population coverage which is at a minimum consistent with the roll-out targets set out in Annex C unless a fundamental reallocation of spectrum to a new service is required or an overriding policy need arises.

The process for issuing licences after this term and any issues relating to renewal will be determined by the Minister of Industry following a public consultation.

### **2. Licence Transferability and Divisibility**

The licensee may apply, in writing, to transfer its licence in whole or in part (divisibility) in both the bandwidth and geographic dimensions. Departmental approval is required for each proposed transfer of a licence, whether the transfer is in whole or in part. The transferee(s) must also provide an attestation and other supporting documentation demonstrating that it meets the eligibility criteria and all other conditions, technical or otherwise, of the licence.

The Department may define a minimum bandwidth and/or geographic dimension (such as the grid cell) for the proposed transfer. Systems involved in such a transfer shall conform to the technical requirements set forth in the applicable standard.

The licensee may apply to use a subordinate licensing process.

For more information, refer to Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time.

### **3. Eligibility**

A licensee operating as a radiocommunication carrier must comply on an ongoing basis with the eligibility criteria in section 10(2) of the *Radiocommunication Regulations*. The licensee must notify the Minister of Industry of any change that would have a material effect on its eligibility. Such notification must be made in advance for any proposed transactions within its knowledge.

For more information, refer to Client Procedures Circular CPC-2-0-15, *Canadian Ownership and Control*, as amended from time to time.

#### **4. Displacement of Incumbents**

The licensee must comply with existing and future transition policies related to the displacement of fixed systems as may be issued.

#### **5. Radio Station Installations**

The licensee must comply with Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems*, as amended from time to time.

#### **6. Provision of Technical Information**

When Industry Canada requests technical information on a particular station or network, the information must be provided by the licensee according to the definitions, criteria, frequency and timelines specified by the Department. For more information, refer to Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time.

#### **7. Compliance with Legislation, Regulations and Other Obligations**

The licensee is subject to, and must comply with, the *Radiocommunication Act*, the *Radiocommunication Regulations* and the International Telecommunication Union's *Radio Regulations* pertaining to its licensed radio frequency bands. This licence is issued on condition that the certifications made in relation to the licence are all true and complete in every respect. The licensee must use the assigned spectrum in accordance with the *Canadian Table of Frequency Allocations* and the spectrum policy applicable to this band.

#### **8. Technical Considerations**

The licensee must comply on an ongoing basis with all relevant *Radio Standards Specifications* and *Standard Radio System Plans*, as amended from time to time.

#### **9. International and Domestic Coordination**

The licensee must comply with the current and future agreements established with other countries. Although frequency assignments are not subject to site licensing, the licensee may be required to furnish all necessary technical data for each relevant site.

The licensee must use its best efforts to enter into mutually acceptable sharing agreements with other parties, which will facilitate the reasonable and timely development of their respective systems, where applicable, and to coordinate with other licensed users in Canada and internationally, where applicable.

#### **10. Lawful Interception**

A licensee operating as a radiocommunication carrier and using this spectrum for circuit-switched voice telephony systems must, from the inception of service, provide for and maintain lawful interception capabilities as authorized by law. The requirements for lawful interception capabilities are provided in

the *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications*. These standards may be amended from time to time.

The licensee may request the Minister of Industry to forbear from enforcing certain assistance capability requirements for a limited period. The Minister, following consultation with Public Safety Canada, may exercise the power to forbear from enforcing a requirement or requirements where, in the opinion of the Minister, the requirement is not reasonably achievable. Requests for forbearance must include specific details and dates indicating when compliance to the requirement can be expected.

## **11. Research and Development (R&D)**

A licensee operating as a radiocommunication carrier must invest, as a minimum, 2 percent of its adjusted gross revenues resulting from its operations in this spectrum averaged over the 10-year term of the licence, in eligible R&D activities related to telecommunications. Eligible R&D activities are those which meet the definition of scientific research and experimental development adopted in the *Income Tax Act*.

Adjusted gross revenues are defined as total service revenues, less inter-carrier payments, bad debts, third party commissions, and provincial and goods and services taxes collected. Businesses with less than \$5 million in annual gross operating revenues are exempt from R&D expenditure requirements, except where they have affiliations with licensees that hold other licences with the R&D condition of licence and where the total annual gross revenues of the affiliated licensees are greater than \$5 million.

To facilitate compliance with this condition of licence, the licensee should consult the Department's *Guidelines for Compliance with the Radio Authorization Condition of Licence Relating to Research and Development* (GL-03).

## **12. Implementation of Spectrum Usage**

The Department will take into account implementation in considering eventual renewal of BRS licences.

## **13. Mandatory Antenna Tower and Site Sharing**

A licensee operating as a radiocommunication carrier must comply with the mandatory antenna tower and site sharing requirements set out in Client Procedures Circular CPC-2-0-17, *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements*, as amended from time to time.

To facilitate compliance with this condition of licence, the licensee should consult the Department's *Guidelines for Compliance with the Conditions of Licence Relating to Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements* (GL-06).

## 14. Annual Reporting

The licensee must submit an annual report for each year of the licence term, including the following information:

- a statement indicating continued compliance with all conditions of licence;
- an update on the implementation and spectrum usage within the area covered by the licence;
- existing audited financial statements with an accompanying auditor's report;
- a report of the R&D expenditures for licensees operating as radiocommunication carriers whose annual gross operating revenues exceed \$5 million (the Department reserves the right to request an audited statement of R&D expenditures with an accompanying auditor's report);
- supporting financial statements where licensees are claiming an exemption based on an annual gross revenue of less than \$5 million; and
- a copy of any existing corporate annual report for the licensee's fiscal year with respect to the authorization.

All reports and statements are to be certified by an officer of the company and submitted, in writing, within 120 days of the licensee's fiscal year end, to the address below. Where a licensee holds multiple licences, the reports should be broken down by service area. Confidential information provided will be treated in accordance with section 20(1) of the *Access to Information Act*.

Manager, Emerging Networks  
Spectrum Management Operations Branch  
Industry Canada  
300 Slater Street, 15th floor  
Ottawa, Ontario K1A 0C8

### Annex C – Roll-out Targets

The following table lists the roll-out targets per service area.

<b>Tier</b>	<b>Service Area Name</b>	<b>Population*</b>	<b>Minimum Population Coverage</b>
3-01	Newfoundland and Labrador	505,565	30%
3-02	Prince Edward Island	135,851	30%
3-03	Mainland Nova Scotia	771,997	40%
3-04	Cape Breton	141,381	30%
3-05	Southern New Brunswick	166,961	50%
3-06	Western New Brunswick	209,611	30%
3-07	Eastern New Brunswick	351,936	30%
3-08	Bas du fleuve/Gaspésie	296,745	15%
3-09	Québec	949,006	50%
3-10	Chicoutimi-Jonquière	367,232	40%
3-11	Eastern Townships	526,975	30%
3-12	Trois-Rivières	778,473	30%
3-13	Montréal	3,990,036	50%
3-14	Upper Outaouais	119,510	10%
3-15	Ottawa/Outaouais	1,334,081	50%
3-16	Pembroke	110,968	15%
3-17	Abitibi	185,761	30%
3-18	Cornwall	66,426	50%
3-19	Brockville	84,243	40%
3-20	Kingston	168,774	50%
3-21	Belleville	190,723	40%
3-22	Cobourg	62,477	30%
3-23	Peterborough	205,182	50%
3-24	Huntsville	78,020	30%
3-25	Toronto	6,128,278	50%
3-26	Barrie	646,962	30%
3-27	Guelph/Kitchener	659,242	50%
3-28	Listowel/Goderich/Stratford	133,845	15%
3-29	Niagara-St. Catharines	367,063	50%
3-30	London/Woodstock/St. Thomas	800,331	50%
3-31	Chatham	107,300	50%
3-32	Windsor/Leamington	395,102	50%
3-33	Strathroy	169,442	50%
3-34	North Bay	125,297	40%
3-35	Sault Ste. Marie	133,591	50%
3-36	Sudbury	175,018	50%
3-37	Kirkland Lake	116,249	30%

3-38	Thunder Bay	235,561	40%
3-39	Winnipeg	977,059	50%
3-40	Brandon	170,054	20%
3-41	Regina	343,498	40%
3-42	Moose Jaw	99,066	25%
3-43	Saskatoon	521,897	40%
3-44	Edmonton	1,316,455	50%
3-45	Medicine Hat/Brooks	183,253	30%
3-46	Lethbridge	163,665	40%
3-47	Calgary	1,235,692	50%
3-48	Red Deer	223,784	25%
3-49	Grande Prairie	172,548	25%
3-50	Kootenays	129,986	15%
3-51	Okanagan/Columbia	392,028	40%
3-52	Vancouver	2,463,413	50%
3-53	Victoria	413,325	50%
3-54	Nanaimo	178,019	40%
3-55	Courtenay	109,263	50%
3-56	Thompson/Cariboo	173,815	40%
3-57	Prince George	189,196	40%
3-58	Dawson Creek	64,312	30%
3-59	Yukon, Northwest Territories and Nunavut	101,357	20%
4-170	Yukon	30400	20%
4-171	Nunavut	29474	20%
4-172	Northwest Territories	41483	20%

\* Population based on 2006 census