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DGTP-004-04
April 30, 2004

Spectrum Management and Telecommunications Policy

Revisions to Allocations in the Band 2500-2690 MHz and Consultation on Spectrum Utilization

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Department of Industry

Radiocommunication Act

Notice No. DGTP-004-04 - Revisions to Allocations in the Band 2500-2690 MHz and Consultation on Spectrum Utilization

The purpose of this notice is to announce the policy paper entitled *Revisions to Allocations in the Band 2500-2690 MHz and Consultation on Spectrum Utilization*, which adds new services to the *Canadian Table of Frequency Allocations* in the band 2500-2690 MHz in accordance with the Minister of Industry's announcement of November 16, 2001. The paper also proposes footnotes to establish the relationship between the various allocations, outlines current spectrum planning activities and requests comments on licensing unassigned spectrum in certain geographic areas.

The November 16, 2001 announcement indicated that mobile and fixed services would be allocated throughout the band 2500-2690 MHz and that incumbent licensees would be able to implement their networks according to existing business plans and conditions of licence. The announcement also indicated that Industry Canada would initiate a consultation process to seek views on licensing considerations arising from the changes in the frequency allocations.

Submitting Comments

Interested parties are invited to submit comments to certain issues raised in the policy paper. These comments are to be submitted by August 9, 2004. Shortly after the close of the comment period, all comments received will be posted on Industry Canada's Spectrum Management and Telecommunications Web site at: <http://strategis.gc.ca/spectrum>.

Respondents are requested to provide their comments 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 General Telecommunications Policy, Industry Canada, 300 Slater Street, Ottawa, Ontario, K1A 0C8.

All submissions should cite the *Canada Gazette*, Part I, publication date, the title, and the notice reference number (DGTP-004-04).

Obtaining Copies

Copies of this notice and documents referred to are available electronically on the Spectrum Management and Telecommunications Web site at: <http://strategis.gc.ca/spectrum>.

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April 30, 2004

Larry Shaw
Director General
Telecommunications Policy Branch

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1. Intent

The intent of this policy paper, announced in Gazette Notice DGTP-004-04, is to make changes in the *Canadian Table of Frequency Allocations*. In this paper the fixed and mobile services will be entered as co-primary allocations throughout the band 2500-2690 MHz; new international footnotes will be entered and a new Canadian footnote will be proposed in order to establish the relationship between the various services; current spectrum planning activities will be described; and comments will be invited on a number of licensing issues.

In commenting on the spectrum not licensed to date in the band 2596-2686 MHz, interested parties may provide views regarding the public interest to develop any particular service under any one or combination of the frequency allocations for broadcasting, fixed and or mobile. The Department wishes to consider the long-term designation of the spectrum and the services which best benefit the public.

Gazette Notice DGTP-004-04 invites interested parties to submit their comments by August 9, 2004 to the Director General, Telecommunications Policy Branch.

2. Background

On November 16, 2001, the Minister of Industry announced certain decisions regarding the band 2500-2690 MHz which for the most part is licensed to wireless cable Multipoint Distribution System (MDS) services and wireless Multipoint Communication System (MCS) services. It was decided that Canada would introduce fixed and mobile allocations throughout the band and incumbent licensees would be able to implement their current business plans in accordance with the terms and conditions of their licences.

These decisions harmonize the spectrum allocations with international allocations and provide increased certainty to current licensees to continue advancing their services to Canadians. It was also stated that Industry Canada would initiate a consultation process to seek views on licensing considerations arising from these changes in frequency allocation.

The frequency band 2500-2690 MHz has been the subject of debate internationally and there have also been new radio technology developments. This is because of the sizeable amount of contiguous spectrum in the band, good radio propagation characteristics at these frequencies and the prospect of relatively low cost equipment. Furthermore, at the World Radiocommunication Conference in 2000 (WRC-2000), the band was identified as one of the possible bands for IMT-2000 radio services, also known as third generation mobile or 3G.

3. Revisions to the Canadian Table of Frequency Allocations

In 1985 the band was divided into two distinct allocations for the fixed service and the broadcasting service in Canada. The lower portion of the band (2500-2596 MHz) was allocated to the fixed service and designated for MCS systems to advance local distribution of telecommunications services. The upper portion of the band (2596-2686 MHz) was allocated to the broadcasting service and designated

for MDS systems to support local broadcasting distribution undertakings (BDU). MCS systems are issued radio licences by Industry Canada. MDS systems are issued broadcasting distribution licences by the Canadian Radio-Television and Telecommunications Commission (CRTC) as well as a broadcasting certificate by Industry Canada. The remaining 4 MHz in the band (2686-2690 MHz) was divided equally between MCS and MDS systems for fixed-return spectrum and is issued radio licences by Industry Canada.

In the November 2001 News Release, the Minister of Industry announced that the fixed and mobile services would be allocated throughout the band 2500-2690 MHz. Consequently, in this policy paper, Industry Canada is updating the *Canadian Table of Frequency Allocations* to enter the fixed and mobile services across the band, and is seeking comments only on the inclusion of new international footnotes and a new Canadian footnote.¹ These footnotes provide the basis for the inter-relationship among various services allocated on a co-primary basis and the provision for any future spectrum policies.

The Canadian Table needs to be updated to reflect the decisions made at the World Radiocommunication Conferences held in 2000 and 2003 (WRC-00 and WRC-03). At these conferences the footnotes and the resolutions referred to therein were modified to accommodate the shared use of the band by mobile, fixed and satellite services.

In summary the allocation changes include:

- Entering the fixed service as co-primary in the sub-band 2596-2686 MHz.
- Entering the mobile service as co-primary in the sub-band 2596-2686 MHz and suppressing the previous secondary mobile allocation.
- Entering a new Canadian footnote relating to the mobile service.
- Incorporating international footnotes adopted at WRC-00 and WRC-03.
- Suppressing Canadian footnote C39 which provides for potential mobile-satellite service allocations.

The detailed revisions to the Canadian Table and proposed footnotes are presented below. The following legend provides the editing nomenclature to show the modifications to the existing Table (2000 Edition).

Convention Used When Making Changes to the Canadian Table of Frequency Allocations

<u>Underlining</u>	When used in the Table, underlining proposes the addition of a radio service or footnote. It is also used in the text of Canadian footnotes to identify proposed additional text.
Strikeout	When used in the Table, a strikeout proposes the deletion of a radio service or footnote in a particular band. It is also used in the text of Canadian footnotes to identify proposed deleted text.
5.xxx	This is the form of the designation of international footnotes.
CXX	This identifies a Canadian footnote.

¹ Users of the band should be familiar with the technical limits in the footnotes to allow sharing between co-primary services allocated in the band. These technical requirements are to be considered during system design.

- MOD This indicates an international footnote modified at a WRC or a Canadian footnote proposed for modification. These appear in both the Table and in the lists of footnotes.
- ADD This is used in a list of footnotes to indicate an international footnote created at a WRC or a proposed new Canadian footnote.
- SUP This is used in a list of footnotes to indicate an international footnote suppressed at a WRC or a Canadian footnote proposed for suppression.

MHz

2 500 - 2 596	<p>FIXED <u>MOBILE except aeronautical mobile CXX</u> Mobile G5</p> <p>5.384A MOD 5.416 MOD 5.418 G39</p>
2 596 - 2 655	<p>BROADCASTING FIXED <u>MOBILE except aeronautical mobile CXX</u> Mobile G5</p> <p>5.339 5.384A 5.416 5.417A 5.418</p>
2 655 - 2 686	<p>BROADCASTING FIXED <u>MOBILE except aeronautical mobile CXX</u> Earth Exploration-Satellite (passive) Mobile G5 Radio Astronomy Space Research (passive)</p> <p>MOD 5.149 5.384A 5.416 5.347A G39</p>
2 686 - 2 690	<p>FIXED <u>MOBILE except aeronautical mobile CXX</u> Earth Exploration-Satellite (passive) Radio Astronomy Space Research (passive)</p> <p>MOD 5.149 5.384A 5.347A G39</p>

3.1 Proposed Modifications

Industry Canada is modifying the *Canadian Table of Frequency Allocations* to incorporate fixed and mobile services as co-primary allocations across the band 2500-2690 MHz and adding a Canadian footnote pertaining to the mobile service. Also, the Department proposes to adopt the changes in footnotes, relevant to Canada for this frequency band, adopted at WRC-00 and WRC-03. These modifications were not proposed in the April 2002 Gazette Notice DGTP-002-02 (*Proposed Revisions to the Canadian Table of Frequency Allocations Consequential to the 2000 World Radiocommunication Conference Decisions*). The Department published a revised Canadian Table in February 2004 which reflects the decisions of WRC-2000 with the exception of the following bands:

- 614-806 MHz;
- 1710-2200 MHz; and
- 2500- 2690 MHz.

3.2 International Footnotes

MOD 5.149 (WRC-2000) In making assignments to stations of other services to which the bands: [... 2 655-2 690 MHz ...] are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from space borne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29).

Note: Please refer to Annex B for the complete text of the footnote

5.339 The bands 1 370-1 400 MHz, 2 640-2 655 MHz, 4 950-4 990 MHz and 15.20-15.35 GHz are also allocated to the space research (passive) and earth exploration-satellite (passive) services on a secondary basis.

ADD 5.347A In the bands:

- 1 452-1 492 MHz,
- 1 525-1 559 MHz,
- 1 613.8-1 626.5 MHz,
- 2 655-2 670 MHz,
- 2 670-2 690 MHz,
- 21.4-22 GHz,

Resolution 739 (WRC-03) applies. (WRC-03)

ADD 5.384A (WRC-2000) The bands, or portions of the bands, 1 710-1 885 MHz and 2 500-2 690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000) in accordance with Resolution 223 (WRC-2000). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

MOD 5.416 (WRC-2003) The use of the band 2 520-2 670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. 9.21.

ADD 5.417A (WRC-2003) In applying provision No. 5.418, in Korea (Rep. of) and Japan, *resolves* 3 of Resolution 528 (Rev.WRC-03) is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2 605-2 630 MHz. This use is limited to systems intended for national coverage. An administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416. The provisions of No. 5.416 and Table 21-4 of Article 21 do not apply. [...]

Note: Please refer to Annex B for the complete text of the footnote.

MOD 5.418 (WRC-2003) *Additional allocation:* in Korea (Rep. of), India, Japan, Pakistan and Thailand, the band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-03). The provisions of No. 5.416 and Table 21-4 of Article 21, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC-03).

Note: Please refer to Annex B for the complete text of the footnote.

3.3 Canadian Footnotes

SUP C39 (CAN-94) The use of the bands 2 500 - 2 520 MHz and 2 670 - 2 690 MHz, by the mobile-satellite service which was allocated at WARC-92, may be the subject of a future policy review for use in Canada after 2005.

C5 For the exclusive use by the Government of Canada

ADD CXX The use of the band 2 500-2 690 MHz by the mobile service is subject to future spectrum policy and licensing considerations.

3.4 Discussion

Fixed Service

In Region 2, the Americas, the *International Table of Frequency Allocations* has a primary allocation for the fixed service throughout the band 2500-2690 MHz. The revision to the Canadian Table is consistent with other countries in the region and particularly with the United States. The frequency sub-band 2500-2596 MHz is currently designated and licensed for fixed MCS systems across Canada.

Mobile Service

In Region 2, the Americas, the *International Table of Frequency Allocations* has a primary allocation for the mobile service in the band 2500-2690 MHz. The revision to the Canadian Table is consistent with other countries in the region and particularly with the United States. At WRC-2000 footnote 5.384A was adopted where a number of frequency bands including the band 2500-2690 MHz were identified for use by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). This identification does not preclude the use of these bands by any of the services to which they are allocated and does not establish priority for a particular service in the International Radio Regulations.

Although the band 2500-2690 MHz has a co-primary allocation to the mobile service, its use will be subject to a service designation through a spectrum policy as well as licensing considerations as per footnote CXX.

The use of the mobile service on a secondary basis by the Government of Canada (GoC) in accordance with footnote C5 has been deleted for this frequency band as the mobile service is now allocated on a primary basis. The use of this band by the GoC will be affected when commercial mobile is implemented on a primary basis.

Broadcasting-Satellite Service

International footnote 5.416 was modified at WRC-03 and applies to the band 2520-2670 MHz for use by the Broadcasting-satellite Service (BSS) limited to national and regional systems for community reception. In 1997, Canada became one of the two notification administrations to the ITU for the specialized BSS network of AirTV intended to serve the airline industry. The Department is currently reviewing applications for licences for three BSS satellites located in orbital positions 55°, 86° and 180° west longitude. An intended use of these satellites is to provide video program delivery and high-speed Internet access to aircraft while in flight.

It is noted that WRC-03 agreed to add an agenda item for the 2007 conference (WRC-07) dealing with this frequency band. Studies are underway in ITU-R Joint Task Group 6-8-9 to review the technical, operational and regulatory provisions applicable to the use of the band by space services in order to facilitate sharing with current and future terrestrial services without placing undue constraint on the services to which the band is allocated.

Should a future conference adopt regulatory provisions affecting this service, it is expected that the new provisions would apply to future systems. For systems which have already initiated the international coordination process, these systems would likely fall under the regulatory provisions in force at the time of the notification. An extract of the current regulatory provisions that apply to Air TV can be found in Annex C.

Broadcasting-Satellite Service (Sound)

International footnote 5.418 applies to the band 2535-2655 MHz for use by the broadcasting- satellite service (sound) for several countries in ITU Region 3 (Asia/Pacific). At WRC-03, international

footnotes 5.417A, 5.417B, 5.417C and 5.417D were added. Broadcasting-satellite service (sound) networks using Highly Elliptical Orbits (HEOs) are being considered in ITU Region 3 in the band 2630-2655 MHz and these operations could impact terrestrial systems in Region 2.

Radio Astronomy Service and the Active Space Services

At WRC-03 footnote 5.347A was added which addresses compatibility between the active space service and radio astronomy in the bands 2 655-2 670 MHz and 2 670-2 690 MHz through Resolution 739 (WRC-03).

Mobile-Satellite Service

When the C39 footnote was created in 1994, the current allocations at 2.5/2.6 GHz were not defined and it was expected that 2005 would be a reasonable time frame to consider all the uses of the band. Consequently, the mobile-satellite service allocation was not entered in the Canadian Table in 1994 and footnote C39 was created to signal this possibility.

The MSS service in North America is allocated spectrum in the 1.5/1.6 GHz bands (L-band), the 2.0/2.1 GHz bands and the 1.6/2.4 GHz bands (known as the big LEO bands). There are currently no plans to initiate a policy review in Canada for additional MSS allocations as the three above mentioned bands should be sufficient to meet the needs of the Canadian mobile-satellite industry. Also there are no indications that the 2.5/2.6 GHz bands will be developed for MSS in North America.

As a consequence, the Department proposes to suppress Canadian footnote **C39**.

Comments on Footnotes

Comments are invited on the proposed changes to the *Canadian Table of Frequency Allocations* with regards to the footnotes in the band 2500-2690 MHz.

4. Background on Service Implementation

The band 2500-2690 MHz was re-arranged in 1985 based on the interest and potential opportunities which were identified at that time. Approximately half of the spectrum was identified for use by telecommunications networks (MCS) and the other half for wireless broadcasting distribution (MDS).

During the first few years, there was limited implementation of MCS and MDS systems. However, in the mid 1990s there was considerable interest in developing this spectrum due to the opening of competition in broadcasting distribution and telecommunications, the technological developments in digital microwave equipment, advancements in video compression technology, the commercialization of the Internet, and demand for high-speed Internet access. With the introduction of competition to cable TV in the 1990s, MDS became one of the first broadcasting distribution alternatives followed by other networks such as Direct-to-Home (DTH) satellite broadcasting. Today, with the prospect of second

generation digital microwave equipment employing non-line-of-sight technologies, integrated antennas, the ability to offer integrated Internet access, simplified installation and reduced costs, there are renewed opportunities to provide services using this spectrum.

4.1 Current MDS Broadcasting Service Licensing (2596-2686 MHz)

In 1994, a number of communities in Southern Manitoba were granted MDS Broadcast Distribution Undertaking (BDU) licences. Licensing processes followed in Saskatchewan, Southern/Eastern Ontario, Southern Quebec and the lower mainland of BC. The map in Figure A shows the general areas where the band 2596-2686 MHz is assigned for MDS broadcasting operations and the remaining areas where the spectrum is unused.

As part of its broadcasting licence obligations, MDS operators must offer specific approved programming packages, meet regulatory requirements and adhere to conditions of licence such as service implementation.

The technical requirements of the broadcasting service in the band 2596-2686 MHz are outlined in the Broadcast Procedures and Rules Part 6, *Application Procedures and Rules for Multipoint Distribution Television Broadcasting Undertakings (MDS-TV)* (BPR, Part 6) which is available on the Spectrum Management and Telecommunications Web site at <http://strategis.gc.ca/spectrum>. Where MDS operators, using the spectrum under the broadcasting allocation, have excess capacity, they may be permitted to offer non-broadcasting services. Operators of radiocommunication services who use excess spectrum capacity must be authorized by Industry Canada under the *Radiocommunication Act* and *Radiocommunication Regulations* and therefore a licence fee applies. A condition of this licence is that spectrum must be available to meet their current broadcasting obligations.

Canadian MDS operators have requested that Industry Canada and the CRTC grant increased flexibility to allow for the use of more MDS broadcast spectrum for high-speed Internet access.

4.2 Current MCS Fixed Service Licensing (2500-2596 MHz)

In 1995, after a public process, Industry Canada issued licences to a number of school boards in Manitoba for the carriage of distance education and MCS channels were licensed in Manitoba for Instructional Television (ITV). In 1999, the Department launched a competitive licensing process for MCS systems in the band 2500-2596 MHz to provide a range of local telecommunications distribution services across Canada, with the exclusion of Manitoba. On March 24, 2000, the Department announced the successful applicants of the MCS spectrum licenses for the remainder of Canada.

In the 2500 MHz Policy and Licensing Procedures², MCS is described as a fixed two-way radio system in which a main hub radio station communicates with different subscribers or response stations at many locations within a given area. Depending on equipment capability and bandwidth availability, MCS can distribute a wide range of service offerings. In addition, the Department indicated that it would not restrict the services which would be offered in this band, subject to the fixed allocation and technical

² 2500 MHz Multipoint Communications Systems Policy and Licensing Procedures, June 1999

limitations, allowing licensees flexibility to react to market conditions and technical advances as they occur.

Following the 2000 World Radiocommunication Conference, there was concern that MCS/MDS would be affected by the future use of 3G in the band and the future of the licensees was considered to be uncertain. The Department undertook an assessment of the situation and in November 2001, the Minister indicated that the fixed and mobile services would be allocated throughout the band 2500-2690 MHz, that incumbent licensees would be able to implement their current business plans in accordance with the terms and conditions of their licences and that Industry Canada would consult on licensing considerations. This decision provided the licensees with an increased level of assurance allowing them to move forward with the delivery of broadband services to Canadians through the implementation of wireless systems.

4.3 Recent Developments in the US

It is important to note several North American developments and in particular those in the United States due to the integrated nature of North American telecommunications networks.

In the United States there are approximately 2500 Multichannel Multipoint Distribution Services (MMDS) licensees and 1275 Instructional Television Fixed Service (ITFS) licensees. However, 4 licensees in the US have licences which cover 80 percent of the population. The US is currently using a channelling plan where the high-power stations are interleaved throughout the band with low-power stations. The current FCC rules accommodate high-power MDS/ITFS which render the deployment of low-power operations difficult due to the large protection distances required for the high-powered stations. The FCC believes that their current rules prevent the efficient use of the spectrum.

On September 24, 2001 the Federal Communications Commission (FCC) announced that fixed incumbents (Instructional Television Fixed Service and Multichannel Multipoint Distribution Service licensees) would not be relocated from the 2500-2690 MHz band and that the mobile service would be allocated on a co-primary basis with the fixed service.³ The new allocation in the US allows certain portable data applications under the existing service rules and provides flexibility for introducing other advanced fixed and mobile applications.

Then, on April 2, 2003, following a request by several licensees, the FCC issued a Notice of Proposed Rule Making (NPRM)⁴ requesting comments into the possibility of re-channelling the band 2500-2696 MHz and to modify their rules. According to the FCC, the proposed rule changes are intended to facilitate the provision of high-speed data and voice services accessible to mobile as well as fixed users on channels that today are used primarily for one-way video operations. The re-channelization would facilitate the development of sharing rules between the high-power and relatively low-power cellular operations including mobile services. Finalization of this docket is expected sometime in 2004.

³ First Report and Order and Memorandum Opinion and Order - FCC 01-256

⁴ *Notice of Proposed Rule Making and Memorandum Opinion and Order FCC 03-56*

4.4 Return Spectrum and Promoting New Technologies

Another issue under consideration in Canada and the US is the need for return spectrum for two-way services. Currently MCS and MDS operators are permitted to use the 2150-2160 MHz band for return spectrum. In Gazette Notice DGTP-007-03, *Consultation on Spectrum for Advanced Wireless Services and Review of the Mobile Spectrum Cap Policy*, the Department proposed that 1710-1755 MHz paired with 2110-2155 MHz spectrum be made available for Advanced Wireless Services. This would displace at least half of the MCS/MDS return spectrum. Some operators have been asking the Department for suitable alternate return spectrum.

In addition, some operators are asking for symmetric forward and return channels. This raises the issue as to whether low-power symmetric operations would best be accommodated within the 2500-2690 MHz band. Considering the mix of technologies envisaged in the band and the flexibility required going forward, this may require that a channelling plan be developed which can accommodate both paired and unpaired channels so that operators may select the technology that best suits their needs. It may be possible to develop a frequency plan to allow for both paired and unpaired channels which would also be technology neutral and allow for greater flexibility in the future.

When considering the frequency arrangements, key issues include frequency coordination along the border areas, economies of scale based on availability of equipment, roaming and global or regional harmonization.

4.5 Alternate Frequency Arrangements

In view of the above, the Department is considering alternate frequency arrangements. If the incumbents current business plans can be accommodated within a new frequency channelling plan, the Department may consider redistributing spectrum between MCS and MDS operators. The redistribution should create a frequency plan that is harmonized within North America, would accommodate low-power and high-power operations and provide the operators with the option of using equipment for paired or unpaired channel plans.

Comments on Channelling Plans

Comments are invited on a possible re-channelization plan that could accommodate existing operations, high-power and low-power stations and both paired and unpaired band plans.

5. Prospective Use of the 2500 MHz Band for Mobile Services

A number of frequency bands were identified at World Radiocommunication Conferences for use by Administrations wishing to implement IMT-2000, also known as 3G. The bands identified for IMT-2000 are 806-960 MHz, 1710-1885 MHz, 1885-2025 MHz, 2110-2200 MHz and 2500-2690 MHz.

Administrations have complete flexibility to implement IMT-2000 in the frequency bands most appropriate for their needs.

Industry Canada released a consultation paper on October 10, 2003 entitled *Consultation on Spectrum for Advanced Wireless Services and Review of the Mobile Spectrum Cap Policy* for the proposed use of the bands 1710-1755 MHz and 2110-2155 MHz (45 MHz paired with 45 MHz) and other smaller spectrum segments. Canada has previously indicated that it would be licensing the 1710 MHz and 2110 MHz spectrum in the 2005/2006 time frame thereby permitting similar services in Canada and the US.

In Europe, additional mobile spectrum is forecasted to be required in the 2008-2010 time frame. The European Commission has mandated the Conference of European Post and Telegraph (CEPT) to develop detailed spectrum arrangements for the 2500-2690 MHz spectrum. It aims to harmonize the frequency range 2500-2690 MHz for IMT-2000/UMTS systems in Europe in 2004.

Discussions are ongoing in the various Study Groups under the ITU-R regarding the use of the 2500 MHz band for IMT-2000. Various channelling plans are being considered within the band 2500-2690 MHz to provide for the introduction of IMT-2000 in parallel with the activities in North America as previously in Section 4.3.

In yet another development, the Institute for Electrical and Electronic Engineers (IEEE) is also studying standards for mobile broadband wireless access systems in frequency bands below 3.5 GHz. The development of standards by the IEEE 802.20 working group may result in yet greater use of this spectrum as the 2.5 GHz band is considered a candidate band for IEEE 802.20 compliant systems.

Considering the proposed licensing of AWS in the 1710 and 2110 MHz bands, and the availability of other frequency bands for mobile telephony services, it is possible that the demand for the 2500 MHz band by mobile services in Canada could be predominantly in areas of high spectrum use (i.e. major urban centres). Another possibility is that the 2500 MHz band would be used for specialized fixed and mobile broadband wireless access applications using high data rates including multi-media applications.

As described earlier, a number of MCS systems have been recently licensed for fixed service and the licensees are expected to roll out services according to their business plans. Insofar as the need to accommodate portable data applications, the Canadian *Radiocommunication Regulations* permit the use of portable stations within the fixed service. In addition, the existing policy for MCS encourages the development of innovative wireless access applications.

If interested parties, including the existing MCS and MDS licensees, were to request the implementation of mobile services, a separate public consultation would be initiated to determine the licensing considerations.

A number of spectrum planning activities and new technologies are emerging that could provide greater opportunities in the future to develop wireless facilities and provide new service offerings to businesses and consumers. The Department seeks views from existing licensees and other interested parties on how greater flexibility within the new frequency allocations could be afforded to better serve the public interest.

Use of the 2500 MHz Band in Canada

The Department invites comments on the long-term use of the band 2500-2690 MHz in Canada considering the new frequency allocations (i.e. mobile and fixed services).

6. Unassigned MDS Spectrum in the band 2596-2686 MHz

The MDS broadcasting spectrum in the 2596-2686 MHz band was allocated to the broadcasting service in 1985. Figure A shows the general areas where MDS broadcast distribution undertaking licences have been granted by the CRTC and their relative occupation of the spectrum. The unassigned spectrum is generally available in the Atlantic Provinces, Alberta and most of northern Canada.

As a result of the changes being made internationally and in particular in the US, and given that this spectrum was designated in 1985 and remains un-used, the Department would like to assess the changing needs and provide this spectrum for the best use and benefit to Canadians. In June 2003, the Department instituted a moratorium on the availability of MDS spectrum in the band 2596-2686 MHz for regions of Canada where MDS broadcasting distribution licences have not been granted. This moratorium is expected to be in force for 18 to 24 months providing sufficient time to carry out spectrum planning through this public consultation process.

In considering the various options for the unassigned 2500 MHz band spectrum, the Department would consider the possible re-channelization that may occur in the band. Since there are currently no incumbents, the Department would also consider whether it is appropriate to license this spectrum at this time. The Department would consider allowing a large amount of spectrum over a wide geographical area to remain unassigned for a period of time in order to establish more clarity on the technology, service and public interest.

Spectrum Currently not Assigned

Comments are invited on the best use of the spectrum in the band 2596-2686 MHz for regions of Canada where this spectrum is unassigned.

7. Internet Access Using MDS Broadcasting Spectrum

A number of MDS broadcasting distribution operators began offering services in the mid 1990s and have invested significant resources to build digital MDS broadcasting systems. Some MDS licensees in the band 2596-2686 MHz have expressed to both the Department and the CRTC an interest in having more spectrum available to provide wireless high-speed Internet access.

The MDS operators have indicated that the complementary offering of high-speed Internet service is an important component of their service offerings. This is facilitated in large part because many components of their digital transmission equipment can be used for both video distribution and Internet access.

The Department has issued radiocommunication authorizations for MDS spectrum used to provide non-broadcasting services under the *Radiocommunication Act* using the licence fees applicable to these types of radiocommunication services. As previously described, MDS operators may be permitted to offer non-broadcasting services using excess capacity and these radio licenses for non-broadcasting services are issued with the condition that the spectrum would continue to be available for broadcasting distribution to meet broadcasting obligations. The operators have indicated that Internet access is a significant part of their business and highly valued by their customers. Consequently, the Internet access services should be treated equally by removing the regulatory uncertainty created by the current conditions of licence.

During the course of renewing their licences with the CRTC, the MDS operators requested among other things, a reduction in their program carriage obligations which, if granted, would allow the operators to increase the amount of spectrum used for Internet access services. Also, MDS operators are undergoing trials of new video compression technologies for the delivery of their broadcasting services which could result in further spectrum capacity being made available for Internet access.

Regardless of the means by which excess capacity is obtained, the result is that significant spectrum capacity may be available for Internet access. The amount of spectrum used for Internet access could potentially become greater than the spectrum used for broadcast distribution.

Proposal:

Considering that MDS operators have requested flexibility to offer both broadcasting as well as more Internet services, and that the Department aims to, foster innovation, encourage a diversity of services, promote the best and most valued use of the spectrum and allow operators to react to market demand, the Department proposes to:

- (i) allow MDS operators, already providing broadcasting distribution services, the use of up to 50 percent of the MDS spectrum for non-broadcasting services; and
- (ii) allow MDS operators flexibility to offer a range of services in this spectrum under the fixed service allocation by removing conditions of licence which make Internet access services secondary in this band; and
- (iii) if the broadcasting distribution service was to be discontinued, the licensee would be permitted to continue operation of the non-broadcast services, as proposed in section (i) above.

Internet Access by MDS Operators

Comments are invited on the proposal to allow MDS operators, already providing broadcasting distribution services, the use of up to 50 percent of the MDS spectrum for non-broadcasting services and to allow MDS operators the flexibility to offer a range of services in this spectrum under the fixed allocation by removing conditions of licence which make Internet access services secondary in this band.

8. Conclusions

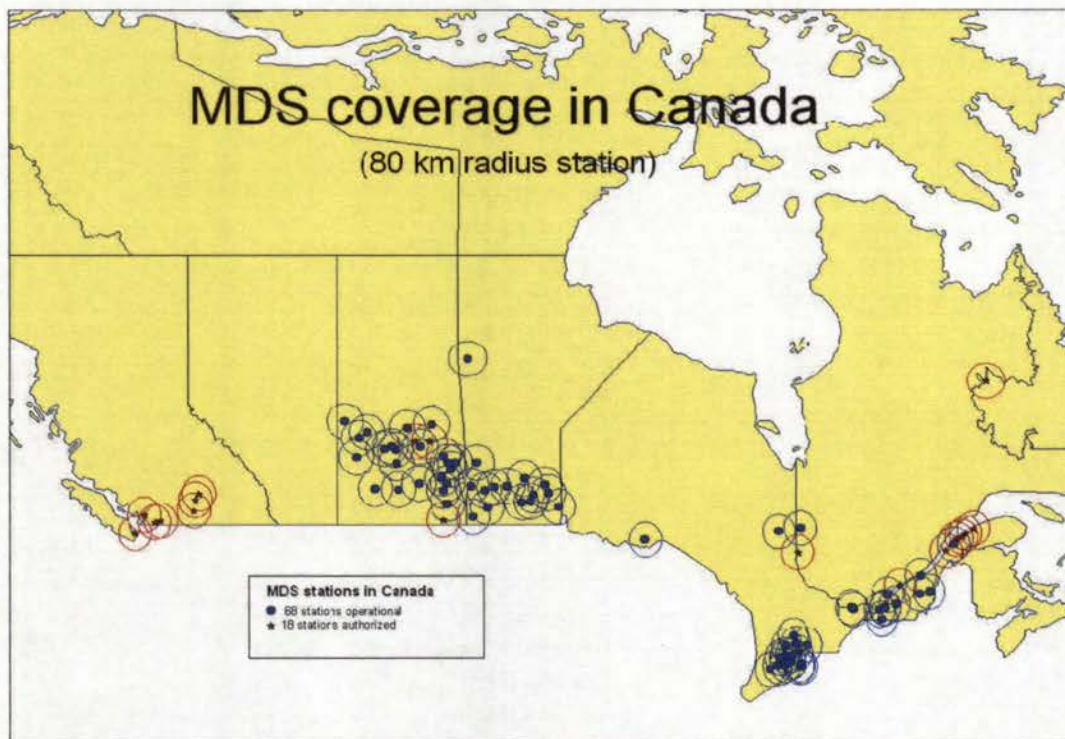
Based on the results of this public consultation and on the footnotes proposed, a revised *Canadian Table of Frequency Allocations* will be announced.

Public comments on these spectrum utilization issues will identify the public interest aspects of various wireless services. This information will be useful to the Department in dealing with a range of emerging issues with existing and potential future use of the spectrum.

Issued under the authority
of the *Radiocommunication Act*

Larry Shaw
Director General
Telecommunications Policy Branch

Figure A - General MDS Coverage in Canada



Note: This map is not indicative of the actual coverage of the stations and is intended as a general overview showing a centre coordinate for the stations authorized and an 80 Km radius. Actual coverage and protection zones may vary.

Annex B

Complete Text of Footnotes

5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,	4 990-5 000 MHz,	94.1-100 GHz,
25 550-25 670 kHz,	6 650-6 675.2 MHz,	102-109.5 GHz,
37.5-38.25 MHz,	10.6-10.68 GHz,	111.8-114.25 GHz,
73-74.6 MHz in Regions 1 and 3,	14.47-14.5 GHz,	128.33-128.59 GHz,
150.05-153 MHz in Region 1,	22.01-22.21 GHz,	129.23-129.49 GHz,
322-328.6 MHz,	22.21-22.5 GHz,	130-134 GHz,
406.1-410 MHz,	22.81-22.86 GHz,	136-148.5 GHz,
608-614 MHz in Regions 1 and 3,	23.07-23.12 GHz,	151.5-158.5 GHz,
1 330-1 400 MHz,	31.2-31.3 GHz,	168.59-168.93 GHz,
1 610.6-1 613.8 MHz,	31.5-31.8 GHz in Regions 1 and 3,	171.11-171.45 GHz,
1 660-1 670 MHz,	36.43-36.5 GHz,	172.31-172.65 GHz,
1 718.8-1 722.2 MHz,	42.5-43.5 GHz,	173.52-173.85 GHz,
2 655-2 690 MHz,	42.77-42.87 GHz,	195.75-196.15 GHz,
3 260-3 267 MHz,	43.07-43.17 GHz,	209-226 GHz,
3 332-3 339 MHz,	43.37-43.47 GHz,	241-250 GHz,
3 345.8-3 352.5 MHz,	48.94-49.04 GHz,	252-275 GHz
4 825-4 835 MHz,	76-86 GHz,	
4 950-4 990 MHz,	92-94 GHz,	

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from space borne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29). (WRC-2000)

5.417A (Previously **5.418bis**)

In applying provision No. **5.418**, in Korea (Rep. of) and Japan, *resolves* 3 of Resolution **528 (Rev.WRC-03)** is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2 605-2 630 MHz. This use is limited to systems intended for national coverage. An administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. **5.416**. The provisions of No. **5.416** and Table **21-4** of Article **21** do not apply. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) in the band 2 605-2 630 MHz is subject to the provisions of Resolution **539 (Rev.WRC-03)**. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2 605-2 630 MHz for which complete Appendix **4** coordination information, or notification information, has been

received after 4 July 2003, for all conditions and for all methods of modulation, shall not exceed the following limits:

$-130 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$0^\circ \leq \theta \leq 5^\circ$
$-130 + 0.4 (\theta - 5) \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$5^\circ < \theta \leq 25^\circ$
$-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. In the case of the broadcasting-satellite service (sound) networks of Korea (Rep. of), as an exception to the limits above, the pfd value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ shall be used as a threshold for coordination under No. 9.11 in an area of 1 000 km around the territory of the administration notifying the BSS (sound) system, for angles of arrival greater than 35 degrees. (WRC-03)

5.417B (Previously **5.418A***bis*)

In Korea (Rep. of) and Japan, use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.417A, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 4 July 2003, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 5 July 2003. (WRC-03)

5.417C (Previously **5.418B***bis*)

Use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.417A, for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of No. 9.12. (WRC-03)

5.417D (Previously **5.418C***bis*)

Use of the band 2 605-2 630 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 4 July 2003 is subject to the application of the provisions of No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.417A, and No. 22.2 does not apply. (WRC-03)

5.418 *Additional allocation:* in Korea (Rep. of), India, Japan, Pakistan and Thailand, the band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528

(Rev. WRC-03). The provisions of No. 5.416 and Table 21-4 of Article 21, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC-03). Geostationary BSS (sound) systems for which complete Appendix 4 coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2 630-2 655 MHz, and for which complete Appendix 4 coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

$-130 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$0^\circ \leq \theta \leq 5^\circ$
$-130 + 0.4 (\theta - 5) \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$5^\circ < \theta \leq 25^\circ$
$-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$	for	$25^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ shall be used as a threshold for coordination under No. 9.11 in an area of 1 500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system. In addition, the pfd value shall not exceed $-100 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ anywhere on the territory of the Russian Federation.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416 for systems for which complete Appendix 4 coordination information has been received after 1 June 2005. (WRC-03)

- 5.418A** In certain Region 3 countries listed in No. 5.418, use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 2 June 2000, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 3 June 2000. (WRC-03)
- 5.418B** Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418, for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12. (WRC-03)

- 5.418C** Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. **9.13** with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.418** and No. **22.2** does not apply. (WRC-03)

Annex C

Excerpt from Article 21 Table 21-4

Table 21-4 (WRC-2000)

Frequency band	Service	Limit in dB(W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5	5°-25°	25°-90°	
2 500-2 690 MHz 2 520-2 670 MHz 2 500-2 516.5 MHz (No. 5.404)	Fixed-satellite Broadcasting-satellite Radiodetermination-satellite	-152 ⁹	-152 + 0.75(δ - 5) ⁹	-137 ⁹	4 kHz

⁹ **21.16.3** These power flux-density values are derived on the basis of protecting the fixed service using line-of-sight techniques. Where a fixed service using tropospheric scatter operates in the bands listed in the first column and there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter, in order to ensure that the interference power at the receiver input of the fixed-service station does not exceed -168 dBW in any 4 kHz band.

LKC
HE 8679 .C2 R49 2004 c.2
Revisions to allocations in the band 2500
2690 MHz and consultation on spectrum
utilization

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