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December 2005

Spectrum Management and Telecommunications

Proposals and Changes to the Spectrum in Certain Bands Below 1.7 GHz

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Department of Industry

Radiocommunication Act

Notice No. DGTP-004-05 — Proposals and Changes to the Spectrum in Certain Bands Below 1.7 GHz

The purpose of this notice is to announce a consultation paper which makes provisional and proposed changes to allocations in the *Canadian Table of Frequency Allocations*, and to the spectrum utilization of certain frequency bands below 1.7 GHz for several radio applications.

On several of the provisional changes and proposals, the Department received strong support after extensive industry debate. In particular, the band 220-222 MHz has been given significant attention.

Industry Canada invites public comment on the provisional changes and proposals outlined in the consultation paper that cover radio applications such as multi-use radios (MURS), trunked mobile and fixed wireless access applications, medical telemetry and utility telemetry applications.

Interested parties should submit their comments by January 25, 2006 for provisional decisions and by April 19, 2006 for all policy proposals. 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>.

Submitting Comments

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 Branch, 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-004-05).

Obtaining Copies

Copies of this notice and documents referred to are available electronically on the [Spectrum Management and Telecommunications Web site](#) at: <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/home>.

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November 29, 2005

Larry Shaw
Director General
Telecommunications Policy Branch

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1. Introduction

The purpose of this paper, announced in DGTP-004-05, is to make provisional and proposed changes to allocations in the *Canadian Table of Frequency Allocations*, and to the spectrum utilization of certain frequency bands below 1.7 GHz for several radio applications.

Spectrum accommodations are proposed or made for radio applications such as multi-use radios (MURS), trunked mobile, fixed wireless access applications and medical and utility telemetry applications.

Gazette Notice DGTP-004-05 invites interested parties to submit their comments to the Director General, Telecommunications Policy Branch, by January 25, 2006 for provisional decisions and by April 19, 2006 for all policy proposals.

2. Background

The demand for spectrum below 1.7 GHz for wireless services, particularly in major urban areas, continues to grow unabated. The Department has been approached by several parties to access spectrum for a wide range of new radio applications. For example, new mobile applications are anticipated for public safety, commercial and utility operation as well as new consumer radios. New fixed applications include medical and utility telemetry such as wireless monitoring in hospitals and health care facilities, automatic meter reading (AMR) and utility line load management. Interest has also been expressed to designate some unused and reserve spectrum in bands in the 900 MHz range for mobile and fixed wireless access (FWA) applications including broadband access. There is also a demand to align utility telemetry and medical telemetry applications with those in the United States.

Since the last major review of frequency bands below 896 MHz in 1995¹, demand has continued for more spectrum for a range of new radio applications including public safety. The Department has had to extensively manage the land mobile bands and introduce a narrow band redeployment of these bands to release sufficient frequencies for spectrum users. Also, a number of new radio service applications have been identified for spectrum accommodation.

3. Provisional Allocation Changes in the Frequency Bands 216-220 MHz and 220-225 MHz

The Department proposes provisional changes to the *Canadian Table of Frequency Allocations* in the bands 216-220 MHz and 220-225 MHz.

¹ *Spectrum Utilization Policy for the Mobile, Broadcasting and Amateur Services in the Frequency Range 30-896 MHz, Part II (SP 30-896, Part II)* - Gazette Notice DGTP-004-95.

3.1 Discussion

In 1993, the Department consulted on its spectrum policy for the range 30-960 MHz. Among the bands discussed was the sub-band 220-222 MHz (part of the band 220-225 MHz) and its potential reallocation from the amateur service to the mobile and fixed services. At the time, the U.S. had reduced the spectrum of the amateur service in the band 220-225 MHz and reallocated the sub-band 220-222 MHz to the mobile and fixed radio services. This was due to an urgent need for spectrum for mobile service requirements as well as to make more efficient use of this spectrum.

In Canada, given the need then for additional mobile spectrum and the benefit of aligning amateur spectrum for long-haul communications, there was a rationale to consider the same allocation changes. However, at the time the availability of narrow band mobile radio equipment had just emerged and the U.S. had just begun to licence radio systems for a range of radio applications. The potential success of these applications was unknown. As a result, there was no immediate interest. The amateur radio community, however, was opposed to the re-allocation of part of the band 220-225 MHz, as it anticipated significant usage growth in the band.

In December 1999, a Canada/U.S. sharing arrangement was concluded concerning the use of the sub-band 220-222 MHz in order to secure appropriate spectrum along the Canada/U.S. border for the future evolution of radio services. This arrangement set aside 100 kHz of paired spectrum for the exclusive use of the amateur service within Canada and along the border. The arrangement was judged necessary because the U.S. had re-allocated the sub-band 220-222 MHz to mobile and fixed services and were well advanced in deploying radio systems along the border. This arrangement enabled the official sharing of the band along the Canada/U.S. border and for different radio service uses to co-exist.

Since the early 1990s, there have only been one or two amateur repeater stations making light use of the sub-band 220-222 MHz. Most of the amateur use of the 220-225 MHz band has been concentrated in the spectrum between 222-225 MHz.

The use of the 220 MHz band is very light, in comparison with amateur radio use at the more popular 144 MHz and 420 MHz bands. There is an amateur emergency measures organization (EMO) network operating in the Maritime provinces between 220 and 224 MHz, but only one channel pair is in use. The majority of radio repeaters operate in a 1 + 1 MHz paired band configuration. In this band plan, the receive channels for the repeater stations are assigned in the sub-band 222.31- 223.37 MHz with corresponding transmit channels assigned in the sub-band 223.91-225 MHz. It is reasonable to operate 3 or more repeaters in each large city across Canada in the band 222-225 MHz with well-coordinated deployment within frequency and distance separations.

The Department studied the number of repeater installations in the band 222-225 MHz to estimate the level of spectrum use over the last ten years or so. When comparing the number of repeaters from 1995 to now, there have been some decreases in certain areas and some increases in others. In British Columbia, the number increased from 5 to 11 repeaters. The Prairie provinces saw a decrease from 4 to 3 repeaters. In Ontario, the decrease was from 15 to 8 repeaters. Quebec and the Maritime provinces had a increase of 2 repeaters each. However, based upon the projection that 3 or more repeaters could be accommodated in each large city, and assuming there will be moderate spectrum

utilization, the Department is of the view that there is sufficient spectrum to accommodate the amateur service in the band 222-225 MHz for the medium to long term (see Annex 1).

Today, there continues to be a high demand for mobile spectrum below 1 GHz. The Department has received representations on the pressing need for the sub-band 220-222 MHz for mobile service and other radio applications. Among the applications are those which accommodate the communications of public safety, railways, utilities, government and other operations. These needs, combined with the availability of cost-effective radio equipment, require the Department to reconsider the use of this band. There are many manufacturers supplying equipment in the band 220-222 MHz in North America and the international market.

The Radio Advisory Board of Canada (RABC) established a working group to study how the sub-band 220-222 MHz could be re-allocated to be aligned with the the U.S. and best be utilized. The RABC working group was made up of representatives from the Radio Amateurs of Canada, the railways, public safety, utilities, commercial radio service providers and equipment manufacturers. A set of recommendations was submitted to the Department to re-allocate the band 220-222 MHz to mobile and fixed services due to the growing need for new spectrum (see Annex 2). The Radio Amateurs of Canada participated actively in the working group, gaining an appreciation for the need to find new mobile spectrum and expressing their views over the band re-allocation. In the past few months, the wireless industry through an RABC committee, has been developing technical standards, a frequency plan and proposals for the designation of national frequencies and particular radio applications in the band 220-222 MHz.

The use of the band 220-222 MHz is already well deployed in the U.S. with over 36,000 commercial and 4,200 private radio assignments. The high level of radio system roll out in this band and the critical mass of radio equipment in use, have generated sufficient interest for Canada to open this spectrum for mobile and fixed service use and align it with the U.S. In addition, the current Canada/U.S. sharing arrangement is sufficiently flexible to enable Canada to deploy new radio systems and thus meet socio-economic needs.

In summary, re-allocating the frequency 220-222 MHz band to mobile and fixed use would open important spectrum to meet the needs of radio applications such as public safety, railways, utility telemetry and other operations. Canadian and U.S. use of this spectrum would be harmonized and would result in a common North American radio equipment market.

3.2 Provisional Allocations in the Bands 220-222 MHz and 219-220 MHz

In light of the public interest to open new spectrum for mobile and fixed radio services, the benefit of aligning this spectrum in a North American context, making a more efficient use of the spectrum and the public consultation carried out by the wireless industry (under the RABC), the Department is of the view that making provisional allocation changes is justified.

The Department is, herein, making provisional allocation changes in the sub-band 220-222 MHz, as follows:

- The amateur service allocation is reduced from primary to secondary radio service status.

- The mobile and fixed services are allocated on a primary basis.
- Canadian footnote C11 will permit limited operation of the amateur service on a secondary basis.

To further harmonize with the U.S., the Department considers it appropriate to permit amateur use in the frequency band segment 219-220 MHz on a secondary basis (i.e. no-protection, no-interference basis). Amateur use of the band would be permitted, by the Department under exceptional circumstances such as assisting in community disaster relief efforts. Furthermore, in recognition of the need to continue accommodating the amateur service and aligning the spectrum in a North American context, the Department is making a provisional frequency allocation change in the sub-band 219-220 MHz, as follows.

Canadian Table

MHz

216-220	FIXED LAND MOBILE 5.242 MARITIME MOBILE <u>Amateur C11</u>
220- 222	<u>FIXED</u> <u>MOBILE</u> AMATEUR <u>Amateur C11</u>
222-225	AMATEUR

ADD C11 In the band 219-220 MHz, the amateur service is permitted on a secondary basis. In the band 220-222 MHz, the amateur service may be permitted in exceptional circumstances on a secondary basis to assist in disaster relief efforts.

5.242 Additional allocation: in Canada, the band 216-220 MHz is also allocated to the land mobile service on a primary basis.

3.3 Implementation of Spectrum Allocation Changes

Given the public discussion carried out over the past two years on the need to re-allocate the sub-band 220-222 MHz for mobile and fixed services, the availability of spectrum capacity in the band 222-225 MHz and the accommodation being made in the sub-bands 219-220 MHz and 220-222 MHz for the amateur service, the Department is making these frequency allocation changes provisional. All the information presented shows that this will advance the public interest and make a greater and more efficient use of the spectrum to meet pressing mobile service needs.

Thirty days after the release of this document these frequency allocation changes will be implemented for the bands 216-220 MHz and 220-222 MHz, unless the Department receives compelling arguments to the contrary.

4. Provisional Spectrum Policy for the Frequency Band 220-222 MHz

The aim of the allocation changes made in Section 3 for the 220-222 MHz band is to accommodate a range of mobile and fixed service applications to meet the radiocommunication needs of a number of user groups.

4.1 Discussion

The re-assignment of this band is expected to make a more efficient use of the spectrum while providing some relief to the very congested land mobile bands at 150 MHz and 450 MHz. Section 3.1 provided the background, rationale and justification for making provisional allocations. The same arguments support early spectrum utilization policy changes. In order to accelerate the release of this spectrum, the Department is herein setting out a provisional spectrum utilization policy.

4.2 Provisional Spectrum Utilization Policy

The Department is of the view that a general alignment of the spectrum utilization with the U.S. (i.e. the frequency band plan, technical radio standards and general service applications), will provide an early opportunity for Canadian users to benefit from similar radio technology and services. Some aspects of spectrum policy, technical standards and operational guidelines will serve as the basis for a provisional spectrum utilization policy for the band 220-222 MHz.

The Department is, herein, establishing a provisional spectrum utilization policy in the band 220-222 MHz, comprised of these specific provisions:

- The spectrum is to accommodate a wide number of users and to be assigned using the authorization process deemed most suitable for efficient deployment of the frequency band in question. It is anticipated that this spectrum will be licensed using a first-come, first-served (FCFS) licensing process (similar to the “managed” FCFS approach used in the 150 MHz and 450 MHz land mobile bands).
- Flexibility will be afforded to encourage users to deploy various technologies and services.
- The frequency plan will be aligned on a North American basis and will be based on supporting narrowband technology with pairs of 5 kHz channels distributed across the band.
- For land mobile systems, the base station transmit frequencies will be in the sub-band 220-221 MHz and the mobile terminal transmit frequencies will be in the sub-band 221-222 MHz.

- The conventional Canada-U.S. split of spectrum sharing zone-percentages by frequency coordination agreement will determine the amount of spectrum available in Canada along the border areas. Customarily this ranges from an average of 50% across most of Canada to as low as 15% in Windsor, to a high of 70% in Toronto.
- Channels will be identified as national frequencies while others will be identified as regional or local frequencies.
- Some channels may be earmarked for a particular usage such as public safety, railway operation and utility telemetry.
- Applicants for spectrum in an FCFS licensing process, will have to demonstrate some public interest, convenience or necessity for the service.
- Technical standards and operating parameters will be developed, and further licensing guidelines may be developed.

In terms of spectrum sharing along the border for the band 220-222 MHz, Canada and the U.S. would have 400 channels (5 kHz bandwidth) to share out of 2 MHz of spectrum. A large part of Canada would have some 210 channels to use (over 50%). Accordingly, the spectrum availability along the border could vary and there could be some constraints or abundance of available channels. In the Toronto/Buffalo border area, Canada would have access to some 280 channels (70%). In the Windsor/Detroit border area, the ratio is reversed with Canada only having access to some 80 channels (20%).

The limited spectrum in the Windsor/Detroit border area constrains common nation-wide frequency availability. Consequently, a pragmatic approach to a domestic utilization plan would be to develop national and regional/local plan where regional spectrum managers would have latitude to make channels available in a manner that balances the public interest with the demands for the channels in accordance with the afore-mentioned spectrum principles.

4.3 Some Technical Considerations

The work to develop the technical standards, channel plan and operational parameters is already well-underway by industry through the RABC. In terms of the emerging frequency channelling plan and formula being considered by industry, the lower edge of channel 1 would start at 220 MHz, spaced 5 kHz apart from the next channel, for a total of 200 channels. The centre frequency corresponding to the channel number would be determined by the following formula, where n is the channel number:

$$f = 220.0025 \text{ MHz} + (n-1) \cdot (.005) \text{ where } n = 1 \text{ to } 200$$

$$f = 221.0025 \text{ MHz} + (n-1) \cdot (.005) \text{ where } n = 1 \text{ to } 200$$

The standard channel width for this spectrum is 5 kHz and assignments of centre frequencies would begin 2.5 kHz from the band edge. Different channel widths than specified above would be considered if they allow for the use of equipment which is more spectrally efficient (e.g. more voice channels or bits/hertz than would otherwise be obtained).

Effective radiated power (e.r.p.) and height above average terrain (HAAT) limits, would be limited to that necessary to provide the required service as determined by the system requirements and will be subject to the certain limitations to be developed through more discussion with industry.

In the 221-222 MHz band, the maximum effective radiated power allowable for mobile units would be 50 watts. Portable units are considered mobile units. Fixed stations transmitting in this band would be permitted up to 50 watts e.r.p. using an antenna with a maximum height of 7 metres above average terrain. Transmissions from antennas that are higher than 7 metres above average terrain will be permitted if the effective radiated power is reduced below 50 watts e.r.p. by $20 \log_{10}(h/7)$ dB. (**Note:** h is the height of the antenna above average terrain, in metres.)

These technical parameters, along with the geographic separation between co-channel base stations, interference contour and the minimum carrier to interference (C/I) ratio, will be refined through the further work and discussion between the Department and industry through the RABC. The final technical standards and operational parameters will form the basis of a revised frequency sharing agreement that the Department will negotiate with the U.S. if required.

4.4 Implementation

Given the public discussion carried out over in the past two years regarding urgency to establish a spectrum utilization policy for the band 220-222 MHz to support important mobile and fixed services, the Department is making this spectrum utilization policy provisional. All the information presented shows that these changes will advance the public interest and make a greater and more efficient use of a limited spectrum resource.

Thirty days after the release of this document the provisional utilization policy for the band 220-222 MHz will be implemented, unless the Department receives compelling arguments to the contrary. Associated technical and operational guidelines, as well as licensing policy will also be developed and released.

5. Proposed Spectrum Designations in the Frequency Band 216-220 MHz

The band 216-220 MHz is allocated to the fixed, land mobile and maritime mobile radio services on a co-primary basis. The spectrum has been opened up for fixed and maritime mobile services but has been held in reserve for land mobile licensing. Licensing for this spectrum is done on a first-come, first-served basis. Fixed radio applications are permitted in the band with appropriate separation from maritime mobile systems, that is 170 km away from navigable waterways. Waterways must be of sufficient depth or width to be used by boats and ships. Some frequency separation between fixed assignments and television channel 13 at 216 MHz is required to control excessive out-of-band emissions into/from the broadcasting service.

5.1 Discussion

Generally, the band 216-220 MHz has continued to be under-utilized for all radio application purposes, including those of the maritime mobile service. A current review of the licence database indicates that there are only 66 radio station assignments across the country. Of these 66 assignments, 23 are ship stations operating on the West Coast. There are only a handful of fixed and mobile assignments as 50% of all assignments are for experimental applications such as utility telemetry and animal migration tracking.

During the 1995 spectrum policy review for this frequency band, the Department reserved the sub-band 218-219 MHz for emerging mobile applications and specifically for Interactive Video Data Services (IVDS). Since that time, representations have been received from industry requesting that the band be aligned with the U.S. for similar radio applications. Table 1 outlines the use of this spectrum in Canada and the U.S. In fact, IVDS never emerged in North America. Instead, a range of mobile and fixed radio applications has emerged in the U.S. and consequently so has the availability of radio equipment to support them.

The Department is of the view that greater use of the sub-band 218-219 MHz should be made due to the shortage of prime mobile spectrum below 1 GHz. It would be beneficial if a wide range of mobile and fixed applications could emerge to accommodate public safety, private and commercial mobile, utility telemetry and others.

Table 1 - Canada/U.S. Comparison of Existing Uses of the Band 216-220 MHz

Frequency Band (MHz)	216-217	217- 218	218- 219	219- 220
Canada	Maritime mobile use is light and has continued to decrease. Fixed radio applications are permitted with restrictions and use is very low. Hydro line monitoring telemetry applications and seasonal wild life tracking activities currently operate on an experimental basis.		This spectrum was designated for Interactive Video Data Services (IVDS), but the application never emerged.	Maritime mobile use is light and has continued to decrease. Fixed radio applications are permitted with restrictions and use is very low.
U.S.	Private Land Mobile			
	Current telemetry use is grandfathered and on a secondary basis.	Telemetry and tracking applications are currently permitted on a secondary basis.		
	Licence-exempt auditory assistance devices	Maritime users operate Automated Maritime Telecommunications Services (AMTS) applications for fixed point-to-point control links.	Short-Distance Communication Service	Also allocated on a secondary basis to the amateur service. The band plan of the American Radio Relay League for 219-220 MHz designates this band for amateur radio digital data communications.

In general, in Canada the band 216-220 MHz is available to maritime mobile applications and some limited fixed radio operation. During the last review of this band, the availability of the band to land mobile applications was placed in reserve for new and emerging mobile applications.

In the U.S., the full band is available for private land mobile applications. Other radio applications in the sub-bands include maritime mobile, fixed applications such as utility telemetry and auditory assistance communications and amateur use on a secondary basis.

Sub-band 216-217 MHz

It is noted that in the sub-band 216-217 MHz, the U.S. permits the use of licence-exempt auditory assistance devices to enhance the ability of the hearing impaired in indoor venues like cinemas and theatres etc. In this regard, it is understood that indoor use of these low-power auditory assistance devices should not pose interference to the reception of television channel 13.

Sub-band 217-218 MHz

Current maritime mobile use of the sub-band 217-218 MHz is light. As previously-noted there are only 66 radio frequency assignments across the country.

Sub-band 218-219 MHz

The 1995 spectrum policy designated the sub-band 218-219 MHz for applications like IVDS, but there has been no interest. Similarly in the U.S., no applications emerged for IVDS. In fact, this sub-band has recently been re-designated to the short-distance communication service for radio applications that transmit information, product and service offerings to subscribers and receive interactive responses within a specified service area.

Sub-band 219-220 MHz

In the U.S., the sub-band 219-220 MHz forms part of the 217-220 MHz frequency range used for telemetry and tracking applications. In addition, the amateur service is permitted on a secondary basis by domestic footnote to operate certain applications.

Currently on a developmental and experimental basis, utility telemetry applications and wildlife monitoring applications operate in this sub-band in certain locations across Canada.

5.2 Proposed Designation Changes to the Band 216-220 MHz

As the land mobile application has been on reserve by spectrum policy since 1995, awaiting the development of new radio applications, it is now timely to open the allocation to full use including land mobile applications. The Department proposes that service designations for the 216-220 MHz band be aligned with those of the U.S. to support similar applications. These new designations could lead to the development of a band plan, technical standards and licensing considerations and hence a better use of this spectrum for a range of new radio applications and radio equipment. With this in mind, the Department proposes to permit a greater flexibility in the use of this spectrum as coordinated and licensed.

Therefore, in the band 216-220 MHz, the Department proposes to:

- (i) open the band for land mobile applications;
- (ii) permit flexible use of the spectrum within the frequency allocations and to licence a range of radio systems and services;
- (iii) remove the designation of spectrum for IVDS applications in the sub-band 218-219 MHz;
- (iv) permit licence-exempt auditory assistance devices to operate in the sub-band 216-220 MHz on a no-protection, no-interference basis; and
- (v) permit amateur service to operate in exceptional circumstances in the sub-band 219-220 MHz on a secondary no-protection, no-interference basis.

The Department invites comment on the following issues:

What types of new radio applications could be accommodated in the 216-220 MHz band including land mobile services?

Based on the previous, what criteria should be considered in the development of a frequency band plan and technical standards to further the use of this band?

Should new radio applications be similar to those in the United States?

6. Multi-use radios in the 150 MHz Band

Multi-use radio Service (MURS) devices have been available in the U.S. to provide consumer and business two-way, short-distance voice and data communications.

6.1 Discussion

MURS devices have been permitted since 2002 to operate using five VHF frequencies known by users as the VHF “colour dot” frequencies. These frequencies are 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz and 154.600 MHz. MURS are permitted to emit no more than 2 watts maximum transmitter output. MURS may operate in an authorized bandwidth of 11.25 kHz (on frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz) and of 20.0 kHz (on 154.570 and 154.600 MHz). MURS are stand-alone consumer/business devices and as such are not permitted to interconnect to the public switched telephone network, may not have an antenna that can be modified and cannot be operated in continuous carrier mode.

In Canada, many commercial/industrial mobile and public safety licensees are authorized on these five frequencies. A large number of these frequencies are licensed on a private/commercial basis. The remaining users are made up of government (i.e. municipal, provincial or federal government) and public safety (i.e. police, fire and ambulance). It is expected that the operation of MURS devices will cause, in certain situations, harmful interference to land mobile use. Also, operation of MURS devices could, in certain situations cause interference to users on adjacent land mobile frequencies, as set out in the suballocation channelling plan in Standard Radio System Plan 500, *Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 138-144 MHz and 148-174 MHz* (SRSP-500). Table 2 below estimates the number of stations that could be affected by MURS operation.

Table 2 - Number of Stations by Region Using the Five MURS Frequencies

	Base	Mobile	Total
Atlantic	164	1344	1508
Quebec	113	2577	2690
Ontario	238	5756	5994
Prairie & Northern	368	10112	10480
Pacific	148	8177	8325

In total, there may be in excess of more than 28,000 incumbent stations that could be affected by the 5 frequencies used by MURS. Some of these frequencies include those for government operations, public safety and commercial/industrial operations. It is noted that some stations are authorized on a province-wide basis.

The Department is of the view that MURS use could significantly affect both existing radio stations on the five MURS frequencies and on adjacent frequencies. For MURS frequencies in the 151 MHz range, the U.S. permits an 11.25 kHz authorized bandwidth with 12.5 kHz channel spacing. Canada follows a 30/15/7.5 kHz channel plan, so this could have a potential impact on one 15 kHz channel and three 7.5 kHz channels for each MURS frequency. For the two MURS frequencies in the 154 MHz range, the U.S. permits a 20 kHz authorized bandwidth with 25 kHz channel spacing. Again, in Canada a 30/15/7.5 kHz channel plan is followed and a number of 30/15 and 7.5 kHz channels could be affected depending on the licensee and the equipment used. Table 3 illustrates the 5 frequencies and adjacent frequencies that could be potentially affected by permitting MURS in Canada.

Table 3 - Adjacent Channels Potentially Affected by MURS

Frequency (MHz)	Bandwidth (kHz)			Affected Frequencies
	MURS Channel	30 kHz (± 7.5)	15 kHz (± 7.5)	7.5 kHz (± 3.75)
151.820	NA	NA	C1287	151.8125
	NA	B643	C1288	151.8200
	NA	NA	C1289	151.8275
151.880 (11.25 kHz)	NA	NA	C1295	151.8725
	NA	B647	C1296	151.8800
	NA	NA	C1297	151.8875
151.940 (11.25 kHz)	NA	NA	C1303	151.9325
	NA	B651	C1304	151.9400
	NA	NA	C1305	151.9475
154.570 (20 kHz)	NA	NA	C1653	154.5575
	A414	B826	C1654	154.5650
	NA	NA	C1655	154.5725
	NA	B827	C1656	154.5800
154.600 (20 kHz)	NA	NA	C1657	154.5875
	A415	B828	C1658	154.5950
	NA	NA	C1659	154.6025
	NA	NA	C1660	154.6125
	A416	NA	NA	154.6200

NA - Not applicable

6.2 Considerations

Canadians are large consumers of electronic devices and radio technologies and want similar radio products as those available in the U.S. market. In the past, the Department has moved quickly to provide access to family radio and general mobile radio devices in response to industry-led programs to accommodate incumbent radio users in the affected bands. The Department opened the market for new consumer radio devices over a short transition period for incumbents with the full participation of the distributors/manufacturers. This has greatly assisted in the Department in countering the importation of illegal radio devices.

In this spectrum policy initiative and in recent policies, the Department has taken specific steps to free up spectrum below 1.0 GHz to meet the demands of mobile and fixed services. For example, new mobile spectrum is being designated in the bands 216-220 MHz, 220-222 MHz and in unused spectrum around 900 MHz. Also, the spectrum redeployment plan for bands in the 150 MHz and 450 MHz ranges, in a post 2006/2007 time frame, will free up new frequencies. This will be due to the Phase II (of the plan) efficiencies for narrow band radio equipment of 7.5kHz and 6.25 kHz channel bandwidths. These spectrum policies will also help provide alternative frequencies and a migration for currently licensed radio users in the band 150 MHz, who may need to be accommodated in order to permit the sale and distribution of MURS products in Canada. However, given the large number of licensed users that could potentially be affected in the MURS frequencies, the Department must develop a longer transition plan before potentially opening the Canadian market to MURS devices.

6.3 Proposed Transition Plan to Permit MURS

The Department is of the view that establishing a long transition period for licensed incumbents before permitting the sale and distribution of MURS devices for consumers is a reasonable approach. Therefore, in accordance with Spectrum Utilization Policy Gen, *General Information Related to Spectrum Utilization and Radio Systems Policies* (SP-Gen), a five-year transition period from the issuance of the spectrum policy is proposed. Notification would be provided to licensed incumbents at the start of the transition period (Year 0) and two years before the end of the transition period (starting at Year 4). In this regard the Department proposes for the frequency bands 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz, 154.600 MHz and in affected adjacent spectrum that:

- (i) a five-year transition period be established after a spectrum policy is released to permit the distribution and sale of MURS devices;
- (ii) all licensees be served formal notification letters on the publication date of the spectrum policy (Year 0) and two years before the end of the transition period (starting at Year 4);
- (iii) the Department will seek to accommodate affected licensees that wish to move in other frequency bands; and
- (iv) incumbent licensees electing to stay in these frequencies could do so on a secondary basis, but may be subjected to interference from the operation of MURS devices and would have to accept such interference. A moratorium on the continued licensing of the affected frequency bands would also consequently be invoked.

The Department invites comment on this proposed transition plan to permit the distribution, sale and use of MURS devices in Canada.

7. Proposal to Release Spectrum for Mobile and Fixed Services in the 900 MHz Range

The bands 901-902 MHz, 940-941 MHz (held in reserve) and 944-952 MHz², partially designated for digital cordless telephones, will be reviewed in this section.

7.1 Discussion

A primary goal of the Department is to provide additional spectrum for mobile applications and other fixed wireless access to alleviate spectrum congestion in major urban centres. The following provides background information on these frequency bands.

Trunked Radio Systems at 896-901 MHz and 935-940 MHz

In the early 1980s, in a related spectrum policy³, the Department designated the paired frequency bands 896-901 MHz and 935-940 MHz to be used by the mobile service for both trunked and conventional mobile radio systems, to carry voice or data communications. Priority was given to the use of trunked systems in these bands particularly in areas of high spectrum congestion.

Today this spectrum is heavily utilized and supports a considerable number of commercial mobile radio applications. The current 5+5 MHz of spectrum is insufficient to meet the growth of existing and new commercial radio service applications. The Department wishes to consider increasing spectrum for these services and open the adjacent reserve bands 901-902 MHz and 940-941 MHz.

Cordless Telephone Spectrum at 944-952 MHz

In 1991, the band 944-952 MHz was designated for digital cordless telephones and the sub-band 944-948.5 MHz was released for licensing. However, the public and residential components for digital cordless telephones did not materialize. The only applications to emerge were for business wireless PBX (Private Branch Exchange) systems on a licence-exempt basis.⁴

² See *Spectrum Utilization Policy for the Fixed, Mobile, Radiolocation and Amateur Services in the Band 896 to 960 MHz (SP 896 MHz)*, as amended in September, 1991. Digital cordless telephones are covered in the *Spectrum Utilization Policy in the Frequency Range 944-960 (SP-944 MHz)*, released in July of 1998.

³ SP 896 MHz - *Spectrum Utilization Policy for the Fixed, Mobile, Radiolocation and Amateur Services in the Band 896 to 960 MHz*.

⁴ By the end of the first quarter of 2000, the existing installed base of CT2 Plus systems numbered 4,000 in Canada with approximately 100,000 portable phones operating on these systems. These systems are geographically spread across Canada but are primarily located in urban areas. The Department was advised that the number would continue to grow at a rate of about 200 systems/4,000 handsets per quarter until the end of 2001, after which the sale of CT2 Plus systems in Canada would end. The emergence of competing technologies such as 2.4 GHz/5.0 GHz Internet Protocol (IP)-Mobility has significantly reduced the market opportunity for CT2 Plus-based products.

On June 25, 1998, following public consultation in *SP-944 MHz* (Gazette Notice DGTP-011-98), Industry Canada concluded that, given the lack of deployment of digital cordless telephones, the band 944-952 MHz would be better used by other applications. Future mobile applications were deemed to be a suitable technical choice. In particular, it was concluded that the spectrum could be re-designated in urban areas where mobile service spectrum use was very congested. In accordance with spectrum utilization policy *SP-944 MHz*, the designation of spectrum for digital cordless telephones in the band 944-948.5 MHz ceased as of July 1, 2002. Consequently, the Department believes that it is now timely to consider designating the band 944-952 MHz for new wireless applications.

7.2 Proposal to Release the Bands 901-902 MHz and 940-941 MHz

A logical use of the bands 901-902 MHz and 940-941 MHz is to expand the trunked mobile bands 896-901 MHz and 935-940 MHz, respectively, and make efficient use of the spectrum. Therefore, the Department proposes to:

- (i) open and add the bands 901-902 MHz and 940-941 MHz as an extension to the trunked mobile bands 896-901 MHz and 935-939 MHz. (The new paired bands will be 896-902 MHz and 935-940 MHz - see Annex 2-A); and
- (ii) continue with the existing designation of trunked mobile with some flexibility of certain mobile and fixed applications where justified.

The Department invites comment on the following issues:

What band plan and technical standards should be established to efficiently use the bands 896-902 MHz and 935-941 MHz?

How best could these bands be aligned with those in the U.S. to bring about efficient use for the sharing of spectrum along the border?

7.3 Proposal for Designating Spectrum in the Band 944-952 MHz

Since the mid 1990s, the Department has studied a range of options to make efficient use of the band 944-952 MHz. In recent years, there has been interest to add the band 944-952 MHz to the band 953-960 MHz for developing broadband wireless access and subscriber radio services in remote rural and northern areas of Canada. Also, new wireless access technology standards such as the IEEE 802.16-2004 WiMAX standard, offer the prospect of providing economical solutions to support advanced communication in rural areas. It is important that the bands 953-960 MHz and 944-952 MHz, be both allocated for fixed and mobile service applications on a co-primary basis to be readily available for assignment. In this regard, the Department proposes the allocation change to the *Canadian Table of Frequency Allocations* that follows:

Canadian Table**MHz**

944-952	MOBILE 5.317A MOD C7 Fixed <u>FIXED</u>
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5.317A Administrations wishing to implement International Mobile Telecommunications 2000 (IMT-2000) may use those parts of the band 806-960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (see Resolution **224 (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. (**WRC-2000**)

MOD C7 International Footnote **5.317A** provides Administrations with the flexibility to implement International Mobile Technology (IMT) 2000 in parts of the band 806-960 MHz which are allocated to the mobile service on a primary basis. For the time being, the application of **5.317A** is limited to the bands designated for cellular mobile telephony and trunked mobile systems. The bands 824-849 MHz and 869-894 MHz are designated for cellular telephony services and the bands 806-821 MHz, 851-866 MHz, ~~896-901~~ 896-902 MHz and ~~935-940~~ 935-941 MHz are designated for trunked mobile services and, as such, can evolve to accommodate IMT-2000 service capabilities.

In order to facilitate the advancement of communications in rural areas in the band 944-952 MHz, the Department will authorize this additional spectrum using a streamlined FCFS licensing process. The licensing of this spectrum in urban areas and their vicinities will likely require a competitive licensing process, and thus further consideration.

Some aspects of spectrum policy, technical standards and operational guidelines will serve as the basis for the development of a spectrum utilization policy for the band 944-952 MHz. For remote rural and northern communities the Department proposes that these aspects would be:

- (i) The use of spectrum would be for fixed and mobile services.
- (ii) A streamlined FCFS licensing process should be considered in the same context as the provision made in the band 953-960 MHz (i.e. remote rural areas are those that would not preclude the deployment and licensing of future radio systems in urban and surrounding areas).
- (iii) For fixed service applications, existing technical standards may be adequate or new ones may be required.
- (iv) As a principle, the Department does not wish to limit the type of technical or service application.

NB Interest was expressed to add the band 944-952 MHz to the existing band 953-960 MHz to ensure sufficient spectrum for broadband Internet access in rural settings.

The Department invites comment on elevating the fixed service to primary status in the band 944-952 MHz and on opening the band 944-952 MHz as additional spectrum to the band 953-960 MHz for wireless access in remote rural and northern areas of Canada.

8. Realignment of Spectrum for Medical Telemetry, Utility Telemetry and Flexible Radio Applications

In this section, the Department proposes a realignment of some spectrum to accommodate the operation of medical telemetry, utility telemetry and flexible radio applications.

Background

Low-power medical telemetry devices are currently permitted to operate on a secondary basis in a range of frequency bands from 54 MHz to 806 MHz in accordance with Radio Standard Specification 210.⁵ Wireless medical telemetry applications are important in health care management for monitoring of patient vital signs. It has been established that spectrum is needed to accommodate the growing needs of medical telemetry applications in hospitals.

The use of the band 608-614 MHz is already permitted by RSS-210 and is a favoured band for licence-exempt medical telemetry applications due to the light use status of the spectrum. As such, it will not be the subject of spectrum realignment in this consultation. However, the television broadcasting bands 174-216 MHz, 470-608 MHz and 614-746 MHz are in the process of accommodating new digital television services (DTV) and high powered stations. Recent U.S. experience has demonstrated that medical telemetry equipment operating in proximity to digital television stations receives significant interference. Hence, the continued use of medical telemetry equipment in proximity to digital television stations at co-frequency is not recommended. Considering the potential for an increase in interference with the roll out of DTV in the bands 174-216 MHz, 470-608 MHz and 614-746 MHz, the Department advises against the long-term use of these bands for medical telemetry. Providing some additional spectrum for medical telemetry applications in other bands would provide for growth and reasonable, free-from-interference spectrum. Spectrum in the 1400 MHz range is being proposed for medical telemetry applications.

In October of 1999, Gazette Notice DGTP-06-99 announced amendments to the microwave spectrum utilization policies in the 1-3 GHz Frequency Range (SP 1-3 GHz). In that spectrum policy, 6 MHz of spectrum, in one megahertz blocks, was designated in the sub-bands 1427-1430 MHz and 1493.5-1496.5 MHz to facilitate narrowband multi-point communications service (N-MCS) for utility telemetry applications such as automatic meter reading (AMR). The use of these sub-bands overlaps channels S1 and S1' of the subscriber radio service (SRS) that uses 3.5 MHz channel bandwidths. It was established that spectrum in channels S1 and S1' would be shared on a geographical basis between SRS

⁵ i.e. 54-72 MHz, 76-88 MHz, 174-216 MHz, 216-217 MHz 470-608 MHz, 608-614 MHz and 614-806 MHz. See the current version of Radio Standard Specification 210, *Low-power Licence-exempt Radiocommunications Devices (All frequency Bands) Category 1 Equipment* (RSS-210).

and AMR telemetry systems for rural and urban areas, respectively. Spectrum access would be given to AMR systems in urban areas and their vicinities. At sufficient distance from urban areas, access to channels S1 and S1' for SRS systems would be given priority. This requires new AMR systems to be coordinated with existing SRS operation and to come to some inter-user arrangement, if spectrum is to be released for these AMR systems.

When the SP 1-3 GHz was released, the Department was aware that the band 1427-1429 MHz was designated in the U.S. for AMR applications on a secondary basis to government services. In addition to this, the FCC was reviewing the opening up of new spectrum for medical telemetry applications on a protected basis in several bands, including the band 1429-1432 MHz. The accommodation of medical telemetry in harmonized spectrum was seen as an important requirement. To that end, the Department decided to withhold the 1 MHz block at 1429-1430 MHz for wireless AMR until the spectrum requirements for medical telemetry had been decided in the FCC proceedings.

In June 2000, the FCC released a Report and Order (FCC 00-211) which made 14 MHz of spectrum available for new wireless medical telemetry services (WMTS) in the 608-614 MHz, 1395-1400 MHz and 1429-1432 MHz bands. Service rules were adopted which would allow WMTS to be 'licensed by rule' to valid health care providers. Provisions were also made to have a frequency coordinator maintain a database of all WMTS equipment identified by location and characteristics such as frequency, power and type of emission. The database was intended for eligible users and manufacturers to plan specific frequency use within a geographic area.

Subsequently in January 2002, the FCC released another Report and Order (FCC 01-382) which allocated 27 MHz of spectrum from the 216-220 MHz, 1390-1395 MHz, 1427-1435 MHz, 1670-1675 MHz and 2385-2390 MHz bands for non-government use. This spectrum had been transferred from the Federal Government. In this order, the designation of the band 1429-1432 MHz for WMTS was shifted downward to 1427-1429.5 MHz. AMR or utility telemetry, which had been on a secondary basis in the 1427-1429 MHz band, was elevated to primary status in the band 1429.5-1432 MHz. These changes were consistent with the American Hospital Association's preference that the spectrum available for WMTS would not be directly adjacent to high-power mobile applications.

8.1 Suitability of Spectrum

A first step in the proposed realignment of spectrum is to assess the suitability of the new U.S. bands 1395-1400 MHz and 1427-1429.5 MHz to accommodate medical or utility telemetry applications in Canada with regard to the existing service allocations and designations.

The Band 1395-1400 MHz

The band 1395-1400 MHz is part of the band 1370-1400 MHz that is allocated on a co-primary basis for the fixed, mobile and radiolocation services.⁶ Over the years, this spectrum has been mainly used by the Department of National Defence. In the early 1990s, this band was studied as potential replacement spectrum for digital radio broadcasting (DRB). DRB was eventually accommodated in the band 1452-1492 MHz, within the existing SRS band plan in the band 1427-1525 MHz.

Within this radiolocation service allocation, there are a number of short/long-range radars in Canada such as those in the Northern Warning System and for coastal surveillance in northern areas of Canada, generally located above the 58th parallel. Also, there are radar stations in operation in more southern regions of Canada, more specifically in Holdberg, British Columbia, North Bay, Ontario, Sydney and Barrington, Nova Scotia, and Gander, Newfoundland. Accordingly, there is a potential for radio interference to medical telemetry applications in hospitals located within 40 kilometres of the radar operations in parts of the northern Yukon, the North West Territories and Northern Nunavut and in vicinity of radar stations operating in Holdberg, North Bay, Sydney, Barrington and Gander.

It should be noted that in the U.S. the band 1395-1400 MHz is designated for medical telemetry, but is constrained by adjacent band interference from high-power radars located below 1390 MHz. These radar sites are grandfathered and protected in the U.S. Therefore, a Canada/U.S. frequency sharing and coordination arrangement is envisaged to establish appropriate technical criteria to protect telemetry applications to the extent practical on each side of the border.

The Band 1427- 1432 MHz

In Canada, the band 1427-1429 MHz is allocated on a co-primary basis to the fixed and space operation services. The bands 1429-1452 MHz and 1492-1518 MHz are also allocated on a co-primary basis for fixed and mobile services.

In the U.S., the band 1427-1432 MHz has been opened for telemetry and commercial service, while the band 1435-1525 MHz is used extensively for aeronautical mobile telemetry systems by government users. The band 1427-1432 MHz is divided between medical telemetry and utility telemetry applications as sub-bands 1427-1429.5 MHz and 1429.5-1432 MHz, respectively.

In Canada, the band 1427-1432 MHz overlaps channels S1 and S2 of the SRS band plan in the band 1427-1452 MHz, that is paired with the sub-band 1492-1500.5 MHz for channels S1¹ and S2¹ in the band 1492-1517 MHz.⁷ The band 1427-1432 MHz has been supporting SRS systems for a number of years and there may be some systems operating within certain urban centres or vicinities. Care would be

⁶ By international footnotes, care must be taken for other services to not cause interference to radio astronomy operations in the band and by domestic footnote, fixed and mobile applications must take into account the existing and future needs of high-power radar systems. See International Telecommunications Union footnotes 5.149 and 5.339.

⁷ See Standard Radio System Plan 301.4, *Technical Requirements for Fixed Line-of-Sight Radio Systems Operating in the Bands 1427-1452 and 1492-1517 MHz*, (SRSP-301.4) Issue 3, September 29, 2001.

required to ensure that there are no point-to-multipoint SRS systems operating in channel S1 (the band 1427-1430.5 MHz) that could cause interference to medical telemetry operation.

8.1.1 Medical Telemetry Equipment

Medical telemetry applications in the bands 1395-1400 MHz and 1427-1429.5 MHz are restricted in the U.S. to indoor use in medical institutions. Medical telemetry equipment is most likely to be used inside large hospitals and is not normally used outside these medical facilities. In Canada, it is proposed that these applications be permitted on a licence-exempt basis as low-powered devices to be used inside medical facilities.

The previous section characterized the spectrum in the bands 1395-1400 MHz and 1427-1429.5 MHz for medical telemetry applications on a licence-exempt, no-protection, no-interference basis and identified the potential sources of interference from licensed services. As medical telemetry equipment is already permitted in several bands on a licence-exempt basis, the Department is of the view that similar if not identical power limits would be applied to those already set out in technical standard RSS-210.⁸

8.1.2 Proposed Spectrum Policy for Medical Telemetry Applications

By opening the bands 1395-1400 MHz and 1427-1429.5 MHz to licence-exempt medical telemetry applications, medical facilities will have new spectrum in which to operate these devices in a manner that is aligned from a North American manufacturing perspective. This could afford medical facilities the availability of a greater range of medical telemetry equipment and applications.

Therefore, the Department proposes that:

- (i) medical telemetry applications be permitted, on a licence-exempt and no-protection, no-interference basis, in the frequency bands 1395-1400 MHz and 1427-1429.5 MHz; and
- (ii) medical telemetry applications be permitted in accordance with technical parameters to be established in RSS-210.

The Department invites comment on this proposed spectrum policy for medical telemetry applications.

NB See Annex 4 for the current Canada/U.S. designations and the proposed Canadian realignment.

⁸ For example, in RSS-210, medical telemetry applications are not permitted to have a spectral density that exceeds a field strength of 200 millivolts/m, measured with a quasi-peak meter (nominal 120 kHz bandwidth) at a distance of 3 metres, when the transmitter is modulated with signals representative of those encountered in a real system operation. Systems using wider bandwidth than 120 kHz will be permitted output power proportionate to its bandwidth. Limits are also set for out-of-band emissions.

8.2 Spectrum Policy for Utility Telemetry Applications

This section advances a series of spectrum designations aimed at harmonizing the spectrum use with the U.S. for utility telemetry and automatic meter reading. As outlined in the previous section, the FCC made a switch of spectrum by designating the band 1427-1429.5 MHz for medical telemetry applications and the band 1429.5-1432 MHz for utility telemetry. Similarly, the Department has proposed in the previous section that the band 1427-1429.5 MHz be designated for medical telemetry and is proposing here that the band 1429.5-1432 MHz be designated for utility telemetry and AMR applications. To facilitate these changes, a moratorium is being placed on the licensing of AMR and SRS (channel S1) applications in the band 1427-1429.5 MHz until the decision for utility systems and medical telemetry systems has been made in the final spectrum utilization policy. The original requirement for N-MCS/AMR applications indicated that these systems would need access to a 1 MHz block of spectrum. However, current system requirements have been scaled down to the point where several competing systems could deploy within the same 1 MHz of spectrum, at least in the short term.

Recognizing the timing of the consultation and final decisions for the bands, the Department is of the view that these provisions will need to be made to permit on-going planning and implementation of N-MCS systems for AMR applications. The Department will therefore add a designation to N-MCS for AMR in the band 1429.5-1430.5 MHz band.

These steps could lead to the alignment and harmonization of this spectrum. Therefore, the Department will provisionally:

- (i) place a moratorium on the authorization, of SRS operations in the band 1427-1430.5 MHz (Channel S1) and on the authorization of utility telemetry operations in the band 1427-1429.5 MHz, until the relationship between these systems and medical telemetry systems has been decided in the final spectrum utilization policy; and
- (ii) designate the band 1429.5-1430.5 MHz to N-MCS for AMR applications.

Thirty days after the release of this document provisions to designate this spectrum for N-MCS AMR applications will be implemented, unless the Department receives compelling arguments to the contrary.

NB While the band 1430-1430.5 MHz band was not originally designated to N-MCS for AMR applications, it is still within the bandwidth of SRS channel S1 and therefore the increased impact on coordination, including adjacent channel concerns with S2, are deemed to be minimal.

There are several spectrum resources and wireline facilities that could accommodate AMR applications, including the licence-exempt bands (i.e. 902-928 MHz), as well as the integration of meter reading service on existing wireless networks (i.e. PCS, mobile data networks, etc.). Therefore, the Department intends to assess N-MCS for AMR applications in the band 1429.5-1430.5 MHz in urban areas. With the current spectrum resources available for AMR applications, it is anticipated that additional spectrum

for AMR applications in the band 1429.5-1430.5 MHz would be on a first-come, first-served basis in urban areas.

Should the number of applications received exceed the supply in one or a number of areas, the Department will consider initiating a competitive process after consulting with applicants. The approach is consistent with the policy paper entitled *Guidelines for Licensing and Spectrum Release Plan*, (RP-20).

8.2.1 Additional Spectrum for Telemetry Applications

In addition, it is proposed to designate the band 1430.5-1432 for utility telemetry. The relationship between AMR systems and SRS systems would remain the same as already developed (i.e. preference is given to AMR systems within urban areas and their vicinities. Outside of urban areas, access for SRS systems is given priority).

Therefore, the Department proposes that:

- (i) the band 1430.5-1432 MHz be designated and licensed for N-MCS for AMR applications;
- (ii) a wide range of telemetry applications be permitted in the band 1429.5-1432 MHz; and
- (iii) in the band 1430.5-1432 MHz, priority be given to N-MCS for AMR applications in urban areas and their vicinities, while outside of urban areas priority would be given to SRS systems.

The Department invites comment on this proposed designation of the band 1430.5-1432 MHz to N-MCS for AMR applications, on the potential wide range of telemetry applications that could be permitted, the basis upon which additional telemetry applications could be effectively introduced and on the urban/rural sharing priority of this spectrum for N-MCS and SRS applications.

8.2.2 Proposed Spectrum Policy for New Applications in the Bands 1390-1395 MHz and 1432-1435 MHz

In the U.S., there have been a number entities requesting the allocation of the bands 1390-1395 MHz and 1427-1435 MHz to relieve crowded land mobile bands below 1 GHz. Proposals were made for new services, to be for commercial, public safety and utility telemetry applications as well as a request to allocate some spectrum to Little LEO (Low Earth Orbit) satellite systems. The FCC responded by making a total of eight megahertz of spectrum available for use by the mobile service (except aeronautical mobile).

The bands 1390-1395 MHz and 1432-1435 MHz were allocated to the fixed and mobile services (except aeronautical mobile). The bands 1392-1395 and 1432-1435 MHz were made available on a paired basis, while the band 1390-1392 MHz is on an unpaired basis.

In the U.S., the band 1390-1395 MHz is used for long-range radars, military test range telemetry links, tactical radio relays, and radio astronomy. There are 17 military radar sites in the band which require protection until the year 2009. High-power radars continue to operate in the lower adjacent band which could affect the performance of receivers in the band 1390-1395 MHz. In addition, there is no frequency assignment in the geographic areas where radioastronomy is conducted and airborne and satellite downlink operations are prohibited. The band 1432-1435 MHz is used by the military for tactical radio relay communications, aeronautical telemetry and telecommand, and various types of weapon systems with operations at 23 sites which will need to be protected indefinitely. The protection areas range from 3 kilometres to 160 kilometres in radius and are scattered around the continental United States and Alaska.

In Canada, within the radiolocation service allocation in the band 1370-1400 MHz, there are a number of short/long-range radars such as those in the Northern Warning System and for coastal surveillance in northern areas of Canada. These are generally located above the 58th parallel. Also, there are radar stations in operation in more southern regions of Canada, more specifically in Holdberg, British Columbia, North Bay, Ontario, Sydney and Barrington, Nova Scotia, and Gander, Newfoundland.

The Department is therefore proposing a number of allocation changes to the band 1390-1400 MHz which will facilitate the co-channel operation of flexible use systems in the fixed and mobile services.

First, it is proposed to remove the allocation to the radiolocation service in the band 1390-1400 MHz. Radiolocation systems licensed prior to October 1, 2005 will continue to operate on a co-primary basis with the other services in the band. There will still be a potential for adjacent band interference from high-power radars, but since there is not expected to be significant growth in the requirement for radars at new locations in the band 1370-1390 MHz, this situation should be able to be coordinated with the new services in the adjacent band 1390-1400 MHz.

Second, domestic footnote C5 currently limits the use of the fixed and mobile services in the band 1370-1400 MHz to the government of Canada. It is proposed to remove the application of C5 to the band 1390-1400 MHz and allow the use of fixed and mobile services for commercial purposes.

Third, domestic footnote C27 gives high-power stations in the radiolocation service priority over the fixed and mobile services in the band 1370-1400 MHz. The Department is proposing to modify the footnote to remove the band 1390-1400 MHz to reflect the allocation change proposed above. Priority for radiolocation will remain in the band 1370-1390 MHz.

Fourth, a new domestic footnote C27B will be added to grandfather the current radiolocation systems in the band 1390-1400 MHz licensed prior to October 1, 2005.

These proposed modifications to the *Canadian Table of Frequency Allocations* are shown in Annex 7.

Recognizing the value of harmonizing spectrum use with that in the U.S., the Department proposes to align the designations in the bands 1390-1395 and 1432-1435 MHz for fixed and mobile (except aeronautical mobile) flexible use. The band 1432-1435 MHz extends the overlap of new services to the first three channels of the SRS channel plan (S1, S2, and S3).

In making the following proposal, the Department is aware that significant progress has been made since 1975 when the 1500 MHz band was opened for SRS to improve rural telephone service. Very few new SRS systems are being built and significant new spectrum at 2.3 GHz, 2.5 GHz and 3.5 GHz has been licensed for wireless access in all regions of Canada.

The Department therefore proposes to:

- designate the bands 1390-1392 MHz, 1392-1395 MHz and 1432-1435 MHz for new wireless applications.

The Department invites comment on this proposal to designate 1390-1392 MHz, 1392-1395 MHz and 1432-1435 MHz for new wireless applications.

There is likely sufficient initial demand for mobile spectrum in urban areas to trigger the requirement for a competitive licensing process. Thus, the licensing mechanism to release this spectrum would be the subject of a future consultation. The requirement for a Canada/U.S. frequency sharing and coordination arrangement will need to be examined prior to licensing flexible use systems in these bands.

8.2.3 Proposed Spectrum Policy for the Band 1492-1504 MHz

The band 1492-1504 MHz corresponds to channels S1', S2' and S3' of the subscriber radio system (SRS) channel plan with the return pairings in the 1427-1437.5 MHz band.

As discussed in Section 8.1 of this document, SP 1-3 GHz made provisions for 6 MHz of spectrum to facilitate narrowband multi-point communications service (N-MCS) for utility telemetry applications such as automatic meter reading (AMR) which included a designation in the band 1493.5-1496.5 MHz (SRS channel S1').

In November 2004, the Canadian Radio-television and Telecommunications Commission (CRTC) held a public hearing on three applications to provide subscription digital audio broadcasting services. Two proposed the use of specialized U.S. satellite facilities as a means of distributing the Canadian services, while the third proposal was for a terrestrial based service.

In discussions with the CRTC and the terrestrial subscription radio applicant, the Department indicated that stand-alone terrestrial subscription radio distribution undertakings could use un-allotted spectrum in the band 1452-1492 MHz. However, an additional 5 MHz of spectrum above 1492 MHz (1492-1497 MHz) will be provided for the Windsor to Montreal corridor where there is insufficient capacity within the band 1452-1492 MHz.

Should the proposals for the band 1427-1435 MHz (SRS channels S1, S2, and S3), be adopted, there would be a minimum incremental impact on the corresponding paired SRS channels in the band 1492-1504 MHz (channels S1', S2' and S3').

Therefore, the Department further proposes that the:

- (i) designation for telemetry in the band 1493.5-1496.5 MHz be expanded to the entire band 1492-1504 MHz with the exception of the Windsor to Montreal corridor, and should accommodate all kinds of flexible fixed and mobile service use to support utility telemetry applications; and
- (ii) designation for SRS in the band 1492-1504 MHz would be expanded to allow implementation of wireless access applications and to support Time Division Duplex (TDD) mode systems.

The Department invites comment on these proposals for expanded use of the spectrum in the band 1492-1504 MHz and the timing of a consultation on the licensing mechanism that would lead to the spectrum being put to its most efficient use.

NB See Annex 5 for the overview of the proposed spectrum policies for this and other sections.

8.3 Spectrum Policy for Flexible Uses of the Band 1670-1675 MHz

During recent modifications to the *Canadian Table of Frequency Allocations* which incorporated the decisions of the 2003 World Radiocommunication Conference (WRC-03), allocations to the fixed and mobile services were added to the band 1670-1675 MHz in addition to the allocation for mobile-satellite service (MSS). In the consultation for those modifications, the Department understood that one of the potential designations for use of the band was for MSS applications, paired with frequencies within the band 1518-1525 MHz.

The Department also determined that MSS spectrum should be harmonized as a minimum over the North American market to ensure the viability of the service, and that some regulatory provisions adopted at WRC-03 restrict the availability of the MSS spectrum (Earth-to-space) in part of North America. While the MSS allocation to the bands 1518-1525 MHz and 1668-1675 MHz is entered in the Canadian Table, the use of these bands for MSS is being withheld.

At the same time the Department noted that the Region 2 allocations to both fixed and mobile services in the band 1670-1675 MHz had not been adopted in Canada. This band was designated and licensed in the U.S. for flexible use by fixed and mobile services under a nationwide licence format to provide innovative wireless distribution applications. As there may be some opportunity in Canada for new service applications in this spectrum, the Department entered fixed and mobile allocations into the band 1670-1675 MHz in the Canadian Table. Domestic footnote C31A indicates that the use of fixed and mobile services is subject to future policy review.

A number of entities have expressed interest in having this band opened for flexible use of fixed and mobile services similar to that currently permitted in the U.S. There are currently a number of trials being conducted under developmental licences in the band.

The Department therefore proposes that:

- the band 1670-1675 MHz be designated for fixed and mobile applications (except aeronautical mobile).

The Department invites comment on designating the band 1670-1675 MHz, for flexible mobile and fixed service applications and on the timing of a licensing process.

It is anticipated that there will be sufficient initial demand for mobile spectrum in urban areas to trigger the requirement for a competitive licensing process. Thus, the licensing mechanism to release this spectrum would be the subject of a future consultation.

9. Conclusion

Based on the results of the public consultation initiated in this document and further internal evaluation, Industry Canada will make appropriate revisions which are in the public interest, to the related spectrum utilization policies for the frequency bands under discussion.

The Department invites comment on the spectrum designation proposals and related criteria and questions presented herein.

Issued under the authority
of the Radiocommunication Act

Larry Shaw
Director General
Telecommunications Policy Branch

Annex 1 - Number of Assignments in the Bands 216-220 MHz and 220-222 MHz**216-220 MHz**

	Pacific	PNR	Ontario	Quebec	Atlantic
Base Station (FB)	3	0	0	0	0
Fixed Station (FX)	9	0	2	0	0
Land Mobile Station (ML)	4	0	2	1	0
Mobile Station (MO)	0	0	20	0	0
Radiolocation Mobile Station (MR)	0	2	0	0	0
Ship Station (MS)	23	0	0	0	0
Total	39	2	24	1	0

* 34 of these assignments are experimental

220-222 MHz

	Pacific	PNR	Ontario	Quebec	Atlantic
Base Station (FB)	0	0	0	3	0
Fixed Station (FX)	0	0	0	0	0
Land Mobile Station (ML)	0	0	0	7	0
TV Broadcasting Station	0	0	1	0	0
Total	0	0	1	10	0

* the 10 assignments in Quebec are experimental

Annex 2 - Radio Advisory Board of Canada Recommendations to Re-Allocate the Band 220-222 MHz

2003-12-30

The Radio Advisory Board of Canada (RABC or the Board) recently received an expression of interest and a request to consider making a proposal to Industry Canada regarding the use of spectrum in the vicinity of 220 MHz. Interested parties included commercial, industrial, public safety and railway users. In response, the RABC, through the Mobile and Personal Communications Committee (M&PC) set up a sub-committee to consider this request. At this time the RABC is pleased to provide Industry Canada with the results of its review of these requests. The Board believes that this input is an appropriate action and in line with the Department's periodic reviews such as SP 30-896 MHz - Part II. The RABC hopes that Industry Canada will find the input useful for keeping its spectrum utilization policy in line with current public needs in Canada.

- The sustained development and expansion of new applications requiring land mobile spectrum, continues to grow and drive the demand for additional spectrum, particularly below 1 GHz. These new applications combined with the traditional land mobile requirements have produced a demand that outstrips current spectrum availability. While there is an urgent need for spectrum in the 700 MHz band, there is also a requirement for spectrum in the VHF bands with its unique propagation characteristics. Spectrum in the 216-222 MHz bands would meet these requirements.
- The RABC proposes that Industry Canada initiate a new proceeding, as soon as possible, to consider the use of land mobile applications in the bands between 216 and 222 MHz.... as discussed below. Furthermore, due to the very light usage of this band, the Board believes that there is opportunity for land mobile activity to begin almost immediately.
- The amateur mobile to mobile operation should follow the Department's transition policy as stated in SP Gen (Section 3.4). As noted above, allocating this band on a secondary basis will provide some relief for the users of the amateur service in the 220-222 MHz band and will facilitate cross border communication through harmonization with the U.S. Making it available at the beginning of the transition will provide mobile to mobile operation immediate relief.
- If required in addition to the above during the transition, mobile to mobile usage should be limited to a specific sub-set of frequencies. This will allow timely access to this band by land mobile users.
- Details of the current fixed amateur repeaters should be catalogued. The Radio Amateurs of Canada (RAC) have provided information from a recent survey...
- The fixed amateur repeaters should be phased out in accordance with SP GEN. The length of time could be extended in rural areas. In the interim these repeaters would be treated as licensed systems by the Department and would not be assigned to land mobile use until the agreed transition period has ended.

- Frequencies within this band should be set aside permanently for emergency communications. The RABC recommends that the frequencies be those identified for such use in the current 220 MHz Interim Sharing Agreement between Canada and the United States for this band. They are Channels 161 to 170 and 181 to 185.

Annex 3 - Current Status of Proposed Extended Bands and Released Spectrum

The shaded sections represent the bands that are proposed to be combined into new extended frequency bands and those where the spectrum is proposed to be released.

Frequency Band MHz	Current Allocation	Current Use
896-901	FIXED, MOBILE (except aeronautical mobile), Radiolocation	Mobile for trunked and conventional mobile systems, carrying voice or data (paired)
935-940	MOBILE (except aeronautical mobile), Fixed, Radiolocation	Mobile for trunked and conventional mobile systems, carrying voice or data (paired)
901-902	FIXED, MOBILE (except aeronautical mobile), Radiolocation	For potential growth and expansion of the conventional and trunked mobile services or other applications (Reserved)
932-932.5 and 941-941.5	FIXED, MOBILE (except aeronautical mobile), Radiolocation	Multipoint Communications Systems (paired)
932.5-935 and 941.5-942	FIXED, Mobile (except aeronautical mobile), Radiolocation	Fixed Links (paired)
940-941	FIXED, Mobile (except aeronautical mobile), Radiolocation	Reserved
944-952	MOBILE, Fixed	Reserved

Annex 4 - Changes to Frequency Bands From Proposed Opening of Bands/Spectrum Release

The shaded sections represent the newly combined bands and the newly released spectrum.

Frequency Band MHz	Allocation Status	Proposed Use /Reservation
896-902	FIXED, MOBILE (except aeronautical mobile), Radiolocation	Mobile for trunked and conventional mobile systems, carrying voice or data (paired) and some flexibility of certain mobile and fixed applications where justified
935-941		
932-932.5 and 941-941.5	FIXED, MOBILE (except aeronautical mobile), Radiolocation	Multipoint Communications Systems (paired)
932.5-935 and 941.5-942	FIXED, Mobile (except aeronautical mobile), Radiolocation	Fixed Links (paired)
944-952	MOBILE, FIXED	Wireless Access Applications

Annex 5 - Bands Under Review for Medical Telemetry Devices

The following is a summary of some of the current domestic allocations and uses of the bands currently under review for medical telemetry devices.

Frequency Band MHz	Current Allocation	Current Use	Spectrum Sharing Issues
608-614	Allocated to the radio astronomy service on a primary basis and the mobile-satellite service (Earth-to-space) on a secondary basis.	<p>According to the Industry Canada Assignment and Licensing System (ALS) database, there are no licensed operations in this band. Radio astronomy observatories operate on a licence-exempt basis.</p> <p>This frequency band is currently underutilized. It should be noted that medical telemetry devices are already permitted in this frequency band on a secondary non-protected basis. (See Spectrum Utilization Policy SP 30-896 MHz, Part I.)</p>	None
1395-1400	Allocated to the fixed, mobile and radiolocation services on a primary basis. Allocated to the space research (passive) and Earth-exploration satellite (passive) services on a secondary basis.	<p>This frequency band represents part of the upper portion of the frequency range 1350-1400 MHz. It is designated for exclusive use by the Government of Canada for fixed and mobile services.</p> <p>Radio astronomy observations and the current and potential use of high-power radar systems are protected. Canadian footnote C27 states that “in the band 1 370-1 400 MHz, high-power stations of the radiolocation service have priority over the fixed and mobile services”.</p> <p>The lower portion of this frequency band is currently underutilized.</p>	Medial facilities that are located in the vicinity of high-power radar installations will need to coordinate their use with these installations to avoid interference.
1427-1429.5	The bands 1427-1429 MHz and 1429-1452 MHz are allocated respectively, on a co-primary basis, to the fixed and space operation services and to the fixed and mobile services.	Currently in frequency band 1427-1429 MHz, automated meter reading (AMR) devices are premitted (i.e. non-medical telemetry, paired with an additional 3 MHz of spectrum in the band 1493.5-1496.5 MHz in urban areas). In the frequency band 1427-1452 MHz and paired with the band 1492-1517 MHz, Multipoint Communication Systems (Subscriber Radio Systems (SRS)) are premitted.	Medical telemetry will need to share spectrum with non-medical telemetry applications like automatic meter reading (AMR) and with the subscriber radio service (SRS).

Annex 6 - Plan for Medical Telemetry at 1.4 GHz

Current Canadian Use (in MHz)

1427	1429.5	1430	1430.5	1432	1434	1492	1493.5	1496.5	1497
Narrow Band MCS (Urban)								Narrow Band MCS (Urban)	
	Reserved Pending Medical Telemetry Use	Automated Meter Reading							
Subscriber Radio Service (Rural - Channel S1)			Subscriber Radio Service (Rural - Channel S2)				Subscriber Radio Service (Rural - Channel S1 ¹)		

Current U.S. Plan (in MHz)

1427	1429.5	1432	1497
WMTS (PRIMARY) (licensed by rule)	TELEMETRY (PRIMARY) Site-by-Site Licence		
Telemetry (secondary) (site-by-site licensing)	Grand fathered Incumbent Telemetry (secondary)		
		Mobile-Satellite Service (MSS) Feeder Downlinks*	

Proposed Canadian Designation (in MHz)

1427	1429.5	1430	1430.5	1432	1434	1492	1493.5	1496.5	1497
Narrow Band MCS (Urban)								Narrow Band MCS (Urban)	
Medical Telemetry Applications	Telemetry Applications (e.g. AMR)	Subscriber Radio Service (Urban/Rural - Channel S2)				Subscriber Radio Service (Rural - Channel S1 ¹)			
Subscriber Radio Service (Rural - Channel S1)									

Annex 7 - Proposed Allocation Modifications for the Frequency Range 1370-1400 MHz

<u>1 370 - 1 390</u> FIXED C5 MOBILE C5 RADIOLOCATION 5.149 5.339 5.339A MOD C27 C27A
<u>1 390 - 1 400</u> FIXED C5 MOBILE C5 RADIOLOCATION 5.149 5.339 5.339A C27 C27A <u>C27B</u>

- MOD C27 In the band 1 370-~~1 400~~ 1390 MHz, high-power stations of the radiolocation service have priority over the fixed and mobile services.
- C27A (CAN-04) In the bands 1 390-1 392 MHz and 1 430-1 432 MHz the fixed-satellite service, in accordance with **5.339A, (WRC-03)** is withheld in Canada.
- ADD C27B In the bands 1 390-1 400 MHz radiolocation operations licensed prior to October 1, 2005 will continue to operate on a co-primary basis with other services in the band.
- 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.
- 5.339A *Additional allocation:* the band 1 390-1 392 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a secondary basis and the band 1 430-1 432 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis. These allocations are limited to use for feeder links for non-geostationary-satellite networks in the mobile-satellite service with service links below 1 GHz, and Resolution **745 (WRC-03)** applies. **(WRC-03)**
- 5.340 All emissions are prohibited in the following bands:
- | | |
|-------------------|---|
| 1 400-1 427 MHz, | except those provided for by No. 5.422,
except those provided for by No. 5.483,
except those provided for by No. 5.511, |
| 2 690-2 700 MHz, | |
| 10.68-10.7 GHz, | |
| 15.35-15.4 GHz, | |
| 23.6-24 GHz, etc. | |

5.341 In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

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 spaceborne 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)