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Spectrum Management and Telecommunications

Radio Systems Policy

Policy for the Use of 700 MHz Systems for Public Safety Applications and Other Limited Use of Broadcasting Spectrum

Department of Industry

Radiocommunication Act

Notice No. DGTP-001-06 — Release of the Policy for the Use of 700 MHz Spectrum for Public Safety Applications and Other Limited Use of Broadcasting Spectrum (RP-06)

The purpose of this notice is to announce the release of a spectrum policy that outlines the Department's radio systems policy for the use of designated spectrum in the bands 764-770 MHz and 794-800 MHz (formerly television channels 63 and 68) for public safety applications. This policy establishes the technical and licensing requirements for an orderly and efficient implementation of this valuable spectrum for public safety. In addition, it refines the policy criteria for the limited use of television channels 2 to 59 in support of advanced communications in rural and remote areas. This policy is based on extensive government and industry discussions and previous spectrum policy allocation decisions and proposals, initiated by *Canada Gazette* notice no. DGTP-002-04, regarding the mobile service allocation decision in the band 746-806 MHz (SP-746 MHz).

Obtaining Copies

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

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1. Intent

The purpose of this radio systems policy, announced in *Canada Gazette* notice DGTP-001-06, is to establish the requirements for the use of designated spectrum in the frequency bands 764-770 MHz and 794-800 MHz (formerly television channels 63 and 68) for public safety applications. The Department has established certain policy prerequisites that must be met prior to this spectrum being authorized for public safety use. In addition, it refines the policy criteria for the limited use of television channels 2 to 59, in support of advanced communications in rural and remote areas. These prerequisites will support the orderly and efficient implementation of public safety applications in this valuable spectrum.

The deployment of this spectrum will provide an opportunity for public safety organizations to build radio systems using contiguous spectrum to enable public safety users to interoperate with each other as necessary. This will provide some spectrum relief to meet their priority needs and promote a common modern public safety radiocommunication infrastructure.

2. Background

In October 2004, Industry Canada released Spectrum Utilization Policy 746 MHz, *Mobile Service Allocation Decision and Designation of Spectrum for Public Safety in the Frequency Band 746-806 MHz* (SP-746 MHz)¹, to allocate the mobile service in the bands 746-806 MHz on a co-primary basis with the broadcasting service, and to designate some spectrum for public safety applications in the bands 764-770 MHz and 794-800 MHz. SP-746 MHz also sought comments on the technical and licensing considerations for the efficient implementation of public safety applications in this spectrum.

2.1 Consultation Summary and Conclusions

The public consultation elicited a wide range of responses from public safety agencies, industry associations, manufacturing, government and private sector communities. The following are the questions the Department posed in that consultation and a summary of the public responses:

- (a) *What common/open standard could be encouraged, that would foster interoperable mobile systems for public safety operations? Should this be an APCO sanctioned standard? And if so, should this standard, with all its suites of technical criteria be applied in the bands 764-770 MHz and 794-800 MHz to only interoperability channels or to all public safety channels and if not, why and which technical criteria should be applied?*

Respondents favoured the encouragement of an open standard. To promote interoperability among users, they suggested that the ANSI 102 standard, or P25 Phase 1 Common Air Interface digital protocol, be adopted and further consultation be considered by the Department in this regard. Regarding technical criteria and rules, respondents favoured those that would enable public safety agencies to decide which interoperability methods best suited their operational needs. The spectrum channel

¹ See *Canada Gazette* Notice DGTP-002-04.

efficiency criteria favoured were those adopted by the U.S. Their approach is that there is an initial requirement of the equivalent of one voice path per 12.5 kHz channel of bandwidth and an eventual migration to one voice path per 6.25 kHz channel of bandwidth.

Conclusion:

The Department concludes that the encouragement of an open radio standard that enables interoperability among users and the adoption of spectrum channel efficiency criteria identical to those adopted in the U.S., would support the orderly and efficient development of public safety applications in this valuable spectrum on both a domestic and shared, Canada/U.S. basis.

(b) *Should interoperability on a domestic and Canada/U.S. basis be a prerequisite to licensing and if so, what criteria should be applied?*

Respondents agreed that interoperability should not be mandatory, but rather available and voluntary as public safety agencies know their own needs and can best deal with inter-agency communication issues. In addition, respondents noted that while establishing a plan for voice interoperability was fundamental to public safety operations, establishing a plan for data interoperability was deemed not necessary, as most communications during emergency operations are voice-based in nature. It was observed that requiring public safety agencies to develop an interoperability plan that was too prescriptive could result in bordering, and in some cases smaller agencies, potentially incurring costs when radio interoperability is not absolutely necessary to their operations. To require interoperability on a domestic and Canada/U.S. basis as a prerequisite to licensing, it was observed, could prevent early-adopters from developing new technology in order to satisfy immediate mobile system needs.

Conclusion:

The Department concludes that interoperability should be a licensing prerequisite for the use of mutual aid channels and that the spectrum should be made available for public safety users to implement according to their own particular requirements. In addition, interoperability criteria that would form the basis for band plans for the use of this spectrum should focus on voice interoperability.

(c) *What planning and authorization mechanism should be used to ensure that public safety users are successfully accommodated?*

It was suggested that, in order to plan and finalize the sub-band allocations for the eventual release of assignments, the Department could launch a call for interest and/or a survey with the various agencies in Canada to get a better idea of the projected needs, applications and time frame for the demands in this band. A survey could also include the industry service providers and their plans for the availability of a full suite of system equipment and applications.

It was suggested that a planning process should incorporate an allocation mechanism that sets a high priority on applications that maximize spectral efficiency and interoperability. As a starting point, a plan could also have an established mandate and process. This would be similar in structure to that of the regional planning committees in the U.S. However, in Canada such planning and coordination objectives have not been undertaken by private entities other than to a limited degree for licence-exempt

consumer radio devices. Instead, planning and coordination activities are implemented through prudent management of spectrum by the Department at regional and local levels to directly meet clients' spectrum needs. It was viewed by some respondents that regional planning activities strengthen spectrum management practices and the effectiveness of inter-agency cooperation.

Conclusion:

The Department concludes that an additional consultation on radio interoperability will be of benefit in further determining public safety user requirements for the spectrum and to establish suitable benchmarks which would encourage agencies to consider radio interoperability at the planning stages of their radio systems. To this end, the Department is currently undertaking a further consultation on radio interoperability.

- (d) *Should public safety users have to submit a spectrum and system plan that accommodates public safety users in defined areas in order to justify an authorization? What information and commitments should be required in an overall plan?*

It was suggested that public safety users should be required to submit their plans for interoperability with other groups. Respondents submitted suggestions on the requirements for both national and regional plans. It was suggested that some of the contents of these plans could include operational criteria such as location and agency mandate, radio system parameters, the degree of required interoperability, coordination with other radio users and short and long-term radio system growth plans. It was also noted that interoperability plans should be flexible so as not to disadvantage smaller public safety agencies.

Conclusion:

The Department has concluded that radio interoperability and radio system implementation requirements should be flexible to meet public safety agencies' needs.

- (e) *In order to foster a common communications system to accommodate public safety, should the Department insist on common service plans on a regional or national basis in various regions of Canada before licences are granted anywhere else in Canada to any public safety user?*

It was felt that the Department should refrain from making common service plans a condition of licence.

Conclusion:

The Department concludes that not all radio service plans would be common across the country and that sufficient flexibility must be considered in setting conditions of licence to accommodate for differences among public safety radio systems on a regional basis.

- (f) *What level of harmonization with the U.S. band plan is appropriate, i.e. should the Department define the same specific service applications such as low power, interoperability, wide-area systems etc.?*

Respondents agreed that complete harmonization with the U.S. band plan and its associated narrow-band technical criteria would enable domestic maximization of the spectrum use along the border and to enable Canada/U.S. interoperability when required regardless of whether the radio systems are full power, low power or wide area in nature.

Conclusion:

The Department concludes that harmonization with the U.S. band plan is appropriate from both domestic and international radio interoperability perspectives as well as the radio equipment cost benefits that accrue from a common radio equipment manufacturing market.

(g) *Does the current description of public safety services as previously referenced in footnote 2 cover all critical safety and services for public safety spectrum?*

The current definition of public safety services² was widely supported. However, it was noted that this definition could be slightly modified to permit more flexibility at the regional level, where spectrum permits, to enable some of it to be assigned to third parties supporting public safety activities.

Conclusion:

The Department concludes that the current definition of public safety services is widely supported and that its application should be sufficiently flexible to recognize any regional differences of public safety agencies, and that where appropriate enable third parties access to spectrum to support public safety activities.

2.2 Facilitating Advanced Communications in Remote Rural Communities

In October 2004, the Department stated³ that it was anticipated that in certain remote rural [and northern] communities, a significant amount of spectrum in television channels 2 to 59 would remain unused/unallotted. This was viewed as an opportunity to further advanced communications in these areas. The Department sought input on two questions:

² [Spectrum Utilization Policy 30-896 MHz, Part 1](#), *Spectrum Allocation and Utilization in Certain Bands in the Range 30.01-896 MHz (Part 1)*, May 1990, defines safety services. [Standard Radio System Policy 502, Issue 4](#), *Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 806-821/851-866 MHz and 821-824/866-869 MHz*, further defines a hierarchy of safety service users such as: (a) **Category 1** - police, fire and emergency medical services; (b) **Category 2** - forestry, public works, public transit, dangerous chemical clean-up, customs and other agencies contributing to public safety; and (c) **Category 3** - Other government agencies and certain non-government agencies. See the following Internet addresses respectively: <http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf01051e.html> and <http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf00050e.html>.

³ See SP-746 MHz.

- (1) the potential uses of this spectrum to provide advanced communications including broadband Internet access and wireless broadcast distribution; and
- (2) whether temporary or permanent authorization should be granted and if so, in either case under what conditions.

Respondents generally supported the use of this spectrum to promote advanced radio services in remote and rural communities. Comments from the broadcasting community sought further definition of the term “rural”. In addition, it was felt that as long as the allocation remains exclusive to the broadcasting service, any licensing should be on a non-standard basis.

Conclusion:

The Department concludes that certain unserved and underserved communities, at a sufficient distance from major population centres and broadcasting undertakings, could benefit from this policy.

3. Considerations to Better Accommodate Public Safety Requirements

The situation is that the public safety community has developed a wide number of private radio systems over the years using various equipment standards and bands. Often, these radio systems are limited to local or regional coverage. Public safety agencies at all levels of government have used the common land mobile frequency bands in the 150 MHz, 450 MHz and 800 MHz ranges. In addition, the bands 821-824 MHz and 866-869 MHz were designated exclusively for public safety services in 1990 with a set of mutual aid channels that have been fully used over the ensuing years. This diverse and complex communications infrastructure for the public safety community has often resulted in a lack of contiguous communications, a lack of interoperability and often an inefficient use of limited spectrum.

Over the last five years, the Department has studied the situation across several frequency bands and radio systems with a number of large public safety organizations to understand how to ensure a more coordinated approach to planning the common needs of public safety communications to achieve spectrum efficiency with interoperability and the orderly development of these radio facilities. The Department’s experience with exclusive-use public safety bands (800 MHz) is that licensing guidelines could have been very beneficial in achieving these goals. The Department has devoted significant time and resources in encouraging public safety organizations to design radio systems that provide contiguous communications between adjacent municipalities.

The public safety community has been clear, in industry/government discussions, that a level of interoperability and common technical standards are needed. The Department has been able to release television channels 63 and 68 (6+6 MHz) for public safety applications in the 700 MHz frequency range. It is anticipated that a few years will be needed for the digital transition of television stations to lower channels before another 6+6 MHz can be made available, or for television channels 64 and 69 to become available. Hence, the new 6+6 MHz of spectrum is the first exclusive spectrum released since 1990. It will provide new spectrum for public safety given the congestion in other frequency bands.

The Department has determined that in the public interest, this spectrum should be:

- (1) used efficiently and effectively for public safety applications;
- (2) well planned, so that access by many public safety organizations at local and regional levels can be accommodated; and
- (3) used to meet a minimum level of interoperability with common technical standards.

The Department will establish licensing guidelines to ensure the orderly and efficient development of public safety radiocommunication in this spectrum. The Department notes in the following section, that good progress has been made in developing technical provisions that will support the orderly development of these systems, a harmonized approach with the U.S. and a level of spectrum efficiency, interoperability and common standards.

4. Technical Provisions

Since the mid 1980s, the Department has actively pursued the resolution of policy, technical and operational issues regarding public safety spectrum on several fronts. The key issues to be resolved included: the sharing of this spectrum along the border with the United States; the development of technical standards to enable public safety applications to coexist with broadcasting operations in adjacent frequency bands and to mitigate any potential interference; the development of technical standards that are manufacturer neutral; and the Department's continued efforts to encourage the public safety community to achieve some common goals and plans for this spectrum, particularly with regard to inter-agency and cross-border interoperability where required.

In June 2005, Industry Canada announced the signing of a new frequency sharing and coordination agreement with the United States to set aside a portion of the 700 MHz frequency band for use along both sides of the Canada-United States border to help meet the communications needs of police, ambulance, firefighters and other public safety entities. The Department has worked for several months with the Radio Advisory Board of Canada to achieve a consensus on the technical parameters that could be adopted in new radio equipment standards that will permit interference mitigation between public safety applications and television broadcasting based on the studies that the Department commissioned leading into the public consultation.

These technical standards will be released in tandem with this radio systems policy and will include a technical requirement for radio equipment to meet certification requirements to be able to use some 30 of the "mutual aid" channels. This will permit some interoperability on a small percentage of the overall spectrum available for public safety applications, but encourage a manufacturer-neutral environment. The Department continues to encourage the public safety community to implement common spectrum plans which include interoperability.

Specifically, the Department intends to issue guidelines, following a current public consultation, on spectrum efficient radio interoperability that could be applied to any given frequency band for public

safety use. It is intended that these guidelines, where applied, would contribute to spectrum interoperability among radio users and hence greater spectrum efficiency. In the case at hand, this guideline could promote the more efficient use of limited new spectrum among for public safety users while enabling interoperability among first responders to emergency incidents, as required.

5. Policy for the use of 700 MHz Spectrum for Public Safety Applications

The Department reiterates the importance of this limited spectrum being released to significantly advance public safety communications in Canada. A suitable level of interoperability among public safety organizations is critical. This will ensure that the spectrum is used efficiently and is deployed in an orderly manner, as set out in Section 3.

The Department considers it would be advantageous for public safety agencies, large or small, to use this spectrum with a degree of flexibility. A flexible policy would enable interoperability as required, and take into account shared public safety needs in a given geographic area.

Radio interoperability is considered an essential feature for public safety applications. Together with this radio systems policy, the Department is also undertaking a consultation to establish the entire range of possible radio interoperability levels that could be required for any spectrum designated for public safety applications.

For the above reasons, the Department is establishing this policy to oversee the development of public safety radio systems and will assess applications based on the criteria outlined in Section 5.1.

5.1 Policy Criteria

In general, to promote the orderly and efficient development of public safety radio systems in the bands 764-770 MHz and 794-800 MHz, a public safety agency or its service provider seeking authorization to establish a mobile communication system for the protection of life and property, will have to:

- justify the spectrum requirement in terms of radio traffic and forecasted use;
- report on the discussions with other public safety agencies on the potential for developing and sharing a common radio system to meet their communications needs;
- report on discussions with other public safety agencies regarding the potential for some interoperability among their safety services;
- commit to having radio equipment with standards and frequency selectivity, in order to be able to use the mutual aid channels in accordance with *Standard Radio System Plan 511* (SRSP-511), during regular operation and in times of emergency; and
- be capable of meeting a minimum level of radio interoperability by using mutual aid channels with a shared standard for the band.

6. Policy for the use of Television Channels 2 to 59 for Advanced Communications Services in Remote Rural Communities

In SP-746 MHz, the Department stated that it would consider licence applications for advanced communications services for unserved and underserved remote rural [and northern] communities in unused/unallotted broadcasting spectrum in television channels 2 to 59 (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-746 MHz). Since that time, the Department has received several applications for broadband Internet access and other services.

6.1 Policy Criteria

The Department establishes herein, a further refinement to the policy established in accordance with SP-746 MHz.

In the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-746 MHz (television channels 2 to 59), licence applications will be considered, on a case-by-case basis, for advanced communications in remote rural communities. Licence applications will be authorized to providers in television channels that are unallotted and unassigned to broadcasting services;

- at sufficient distance from major population centres, broadcasting facilities and their service contours so as not to cause them interference; and
- on the condition that they do not constrain the provision of existing and new broadcasting services.

Note: The words *and northern* have been removed from the phrase *rural remote and northern communities*, as stated in SP-746 MHz, as there are certain unserved and underserved communities that are rural remote but not northern, but are at a sufficient distance from major population centres and broadcasting undertakings to be served by this policy.

These policy criteria will be applied to applications for licence, until such time as any further allocation changes are considered in these frequency bands.

7. Implementation

Available spectrum will be prudently managed by each regional office in a manner that seeks to accommodate all national, provincial and municipal public safety entities involved in the protection of life and property.

Parties interested in the implementation of this radio systems policy should contact a spectrum manager at their local Industry Canada office.

Issued under the authority
of the Radiocommunication Act

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