Industry Canada Industrie Canada

SP-5150 MHz
October 1999

Spectrum Management and Telecommunications Policy

Spectrum Utilization Policy

Spectrum Utilization Policy for Licence Exempt Wireless Local Area Networks in the 5 GHz Range

Canada

Aussi disponible en français - PS-5150 MHz

INDUSTRY CANADA

RADIOCOMMUNICATION ACT

NOTICE NO. DGTP-007-99

SPECTRUM UTILIZATION POLICY FOR LICENCE EXEMPT WIRELESS LOCAL AREA NETWORKS IN THE 5 GHz RANGE

Introduction

The purpose of this Notice is to announce the release of the spectrum utilization policy for the licence exempt wireless local area networks in the frequency bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz. It addresses the principal issues governing the use of these bands.

In June 1998, Industry Canada released a consultation paper entitled *Proposed Spectrum Policy for Licence Exempt Wireless Local Area Networks in the 5 GHz Range* under Canada Gazette Notice DGTP-010-98, which sought comments on proposals to designate 300 MHz for wireless devices for local area networks.

In general there was support to designate 300 MHz of spectrum for license exempt wireless networks and devices. These systems could support neighbourhood point-to-point and point-to-multipoint high-speed wireless services in a cost-effective manner. In particular, as the processing power of computers continues to increase, there will be a growing demand for broadband high-speed digital distribution facilities. Some respondents commented on provisions to ensure that feeder links to mobile satellite networks are not adversely affected in the 5150-5250 MHz band and the operation of earth exploration satellites at 5250-5350 MHz are not compromised by these wireless networks. Industry Canada has taken these comments into consideration in formulating this spectrum policy.

The policy paper entitled *Spectrum Utilization Policy for Licence Exempt Wireless Local Area Networks in the 5 GHz Range* is available electronically via the Internet at:

World Wide Web (WWW)
http://strategis.ic.gc.ca/spectrum

or in hard copy, for a fee from:

Tyrell Press Ltd.
2714 Fenton Road
Gloucester, Ontario
K1T 3T7
Canada toll-free no. : 1-800-267-4862
U.S. toll-free no. : 1-800-574-0137
Worldwide tel. no. : 613-822-0740
Fax number : 613-822-1089

Canada Communication Group
45 Sacré-Coeur Blvd.
Hull, Quebec
K1A 0S9
Toll-free no. : 1-888-562-5561
Fax number : 819-779-2833
Worldwide tel. no. : 819-779-4335

October 1, 1999

Michael Helm
Director General
Telecommunications Policy Branch

1.0 Introduction

This spectrum policy addresses the introduction of Licence Exempt Wireless Local Area Networks (LE-LANs) devices in the bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz.

Licence exempt devices are radio apparatus which are exempt under the *Radiocommunication Act* from the requirement to operate under a radio licence in specified radio frequency bands and which conform to appropriate Industry Canada spectrum policies, regulations and technical standards. Licence exempt devices or systems cannot claim protection from other radio systems and cannot cause harmful interference into licensed radio services. Wireless LE-LAN systems can be characterized as local transmission devices available to provide a wide range of applications for high-speed broadband digital distribution applications comprising voice, video and data. These systems promise to provide high speed connectivity for computers and multimedia neighbourhoods.

A key objective of this policy is to provide sufficient spectrum for new LE-LAN devices which will provide greater choice of access and distribution technologies to users, and advance the competitiveness of the telecommunications industry. To that end, the Department recognizes the importance of harmonising the spectrum policy and technical requirements with regional and global activities and developments in order to ensure that maximum benefits are derived from the economies of scale. As well, it is important to encourage the development of innovative applications which further the government's connectedness agenda without causing an increase in harmful interference to other services co-existing in the same spectrum. LE-LAN devices will therefore be required to operate in accordance with parameters selected to permit compatible co-existence between LE-LAN users in the same frequency band and with other services using these bands.

The spectrum utilization policy provisions outlined in the following sections for the operation of LE-LAN devices in these bands have taken into consideration the public comments, studies and deliberations by the industry on co-existence between services. Technical specifications will be found in the Radio Standards Specification (RSS) 210 (section that is being developed).

This policy paper was announced in the Canada Gazette Notice DGTP-007-99.

2.0 Background

In June 1998 through the release of Gazette Notice DGTP-010-98 entitled *Proposed Spectrum Policy for Licence Exempt Wireless Local Area Networks in the 5 GHz Range*, Industry Canada invited comments on proposal to designate the bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz for Licence Exempt Wireless Local Area Networks (LE-LANs).

The discussion document requested comments on a range of spectrum issues for LE-LANs including:

- designation and use of bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz;

- partitioning of the spectrum;

- any limitations to ensure compatibility with other services and among LE-LAN devices;

- types of LE-LAN devices.

3.0 Policy Provisions for Licence Exempt Wireless Local Area Networks

3.1 General Discussion and Policy Provisions

Industry Canada has examined the bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz, as well as the immediately adjacent bands, in terms of the suitability of the spectrum for LE-LANs. The Department has concluded that these bands are suitable for LE-LAN devices. The majority of the respondents supported these designations and believe that it would be a significant component of connecting a wide range of systems and devices for an information society. Accordingly, the Department is designating the bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 for LE-LANs.

Respondents to the consultation paper suggested that the types of LE-LAN devices for these bands would consist mainly of point-to-point and point-to-multipoint high-speed digital wireless services. Industry Canada believes that these services will enhance Canada's information infrastructure by facilitating wireless access and distribution, the creation of new wireless local area networks and a broad range of new devices and service offerings. To ensure that Canadians are provided with the most advanced communications facilities and devices, the Department will allow such services in these bands, with emphasis on applications for high speed broadband multimedia applications comprising voice, video, and data requiring channel bandwidths of up to 20 MHz or more, each.

The comments received concerning the use of the spectrum requested that LE-LAN users be required to operate in accordance with parameters to permit compatible co-existence among LE-LAN users in the same frequency band as well as other services allocated to these bands. The Department agrees with this position and makes the following provision: ***The use of the spectrum in the bands 5150-5250 MHz, 5250-5350 MHz and 5725-5825 MHz for LE-LAN devices is on the basis that such devices cannot claim protection from other radio systems and cannot cause harmful interference into other radio services in these bands.***

Many respondents to the consultation paper believe that the 300 MHz of spectrum is sufficient at this time. However, they recommend extending the band 5725-5825 MHz by an extra 25 MHz to 5725-5850 MHz so that it matches the existing spread spectrum band for future traffic needs. At this time, Industry Canada believes that the spectrum designated for LE-LAN service should be sufficient and does not see any advantage in extending the band to match the spread spectrum designation for 5725-5850 MHz. Moreover, the amateur-satellite service will continue to have access to the band 5830-5850 MHz on a secondary basis.

The Department requested comments on necessary limitations to ensure compatibility among LE-LAN systems. The majority of respondents did not feel at this time that there is a need for a channelling plan, nor is a spectrum etiquette desirable for these bands in view of the limitations these might place on innovation and development. Industry Canada will await the establishment of international standards in these areas and will revisit the issue as appropriate.

Respondents noted the benefits of harmonization with the activities in the United States Unlicensed-National Information Infrastructure (U-NII) devices, and that the economies of scale which can be achieved are important factors in the deployment of licence exempt devices.

Industry Canada is aware of operational and power limits imposed by the FCC and CEPT (Europe), and the importance of adopting technical parameters and standards which do not preclude the operation of similar devices in Canada. Concurrent to the development of this policy, the Radio Advisory Board of Canada has studied the issues of co-existence in these bands, and concluded that similar operational constraints to those imposed in the U.S. could be adopted in Canada. Industry Canada agrees with these deliberations from the industry and will therefore adopt standards which align to the extent possible with the FCC U-NII specifications and which facilitate the use of these devices in Canada. As well, since broadband applications may not as yet be fully developed, the department shares the FCC view that adopting a power spectral density limit across the band will facilitate the spectrum sharing of devices operating within various bandwidths. Further instruction on the application of these constraints, emission limits, measurement and requirements for certification will be contained in the Radio Standards Specifications (RSS-210).

Recognizing that each of the three bands has a different sharing environment, the department will monitor events and activities which will permit the orderly development of wireless LE-LAN devices and other services. Of particular interest will be the experience gained with the actual roll-out and deployment of these devices. As well, the department will monitor the regulatory provisions of other administrations, as well as the developments in technologies which affect co-existence between systems and services. The department encourages the development of innovative broadband wireless applications and devices which will further the government's connectedness agenda. Any variation from the standards adopted in this document will be developed by Industry Canada in consultation with the interested parties.

3.2 Discussion and Policy Provisions for the 5150-5250 MHz Band

The band 5150-5250 MHz is currently allocated to aeronautical radionavigation service on a primary basis. The band 5091-5250 MHz was allocated to fixed-satellite service (FSS) for non-geostationary, mobile satellite feeder links, (Earth-to-space direction) on a primary basis at the 1995 World Radiocommunication Conference (WRC-95). Industry Canada has since amended the *Canadian Table of Frequency Allocations* to include this allocation. Furthermore, Canada has licensed two gateway earth stations for non-GSO service operating in this band at Smiths Falls, Ontario and High River, Alberta. One of the elements has been to assess the co-existence of the operation of radionavigation and mobile satellite feeder links (FSS) with LE-LAN devices.

An industry group formed under the auspices of the Radio Advisory Board of Canada (RABC) investigated the technical issues regarding the co-existence between mobile satellite feeder links and LE-LAN systems. The conclusion of their investigation was that LE-LAN systems having the same technical specifications[1] and anticipated deployment densities as the U-NII systems in the United States, would not cause harmful interference to the mobile satellite feeder links operation.

Industry Canada has given these conclusions full consideration and is satisfied that the RABC with all interested parties have explored the issues of co-existence. Industry Canada will adopt technical parameters as recommended by the RABC for this band including a EIRP limit of maximum 200 mW (further limited to 10 mW in any 1 MHz band) and limiting applications in this band to indoor use.

[1] See Report and Order, ET Docket No. 96-102, released January 9, 1997 and Memorandum Opinion and Order, ET Docket No. 96-102, FCC 98-121, released June 24, 1998.

3.3 Discussion and Policy Provisions for the 5250-5350 MHz Band

The band 5250-5350 MHz is currently allocated to both the radiolocation service and to the Earth Exploration Satellite (EES) and space research services on a primary basis. The Canadian Space Agency (CSA) operates an advanced earth exploration satellite system, known commercially as Radarsat I, in the 5250-5350 MHz frequency band. Radarsat I is equipped with a synthetic aperture radar capable of taking imagery from all parts of the globe, independent of the weather conditions. Typical applications include ice reconnaissance, hydrological measurements, the monitoring of crop and forest growth and terrain mapping.

Studies conducted by the CSA have concluded that co-existence between EESs, such as Radarsat I, and LE-LAN devices is feasible. The Department had proposed an additional allocation to the EES service in the band 5350-5460 MHz at the 1997 World Radiocommunication Conference to address any potential future sharing problems and provide additional bandwidth for Radarsat. This proposed allocation was adopted by the Conference. As a consequence, future Canadian Radarsat satellites will be able to use the additional band 5350-5460 MHz band for synthetic aperture radar operations.

Based on the technical studies carried out to date, Industry Canada believes that the technical specifications as recommended by the RABC in this band are appropriate to ensure the efficient operation of EES services. Industry Canada will therefore adopt these technical parameters which include: a limit of 250 mW transmitter power; a power spectral density of 11 dBm in any 1 MHz band; and a maximum EIRP of 1 watt.

3.4 Discussion and Policy Provisions for the Band 5725-5825 MHz

The band 5725-5825 MHz is currently allocated to radiolocation services on a primary basis and to the amateur service on a secondary basis. Studies have established that LE-LAN devices can be implemented where there is limited use by radiolocation services.

The band 5725-5875 MHz, which overlaps the proposed 100 MHz for LE-LANs, is designated internationally for industrial, scientific and medical (ISM) applications. Thus, radiocommunication services operating within this band must accept harmful interference which may be caused by ISM devices. In addition to the ISM applications, low powered licence exempt devices using spread spectrum techniques are permitted in the 5725-5850 MHz band.

The RABC has recommended technical limits similar to those adopted by the FCC[2] in this

[2] See Report and Order, ET Docket No. 96-102, released January 9, 1997 and Memorandum Opinion and Order, ET Docket No. 96-102, FCC 98-121, released June 24, 1998.

band. These limits will prevent harmful interference to radiolocation services and mitigate interference into other low powered licence exempt devices using spread spectrum techniques. Industry Canada will therefore adopt technical parameters which include: a limit of 1 W transmitter output power; a power spectral density of 17 dBm in any 1 MHz band; a maximum 4 W EIRP; and fixed, point-to-point LE-LAN devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter output power or power spectral density limits.

4.0 Implementation

The department is of the view that the technical specifications adopted in this document will provide sufficient flexibility for the implementation of LE-LANs and permit the orderly operation of other services. Further details on these constraints and their application will be incorporated into RSS-210.

The Department also recognizes the importance of encouraging the development of innovative LE-LAN applications which further the government's connectedness agenda without causing an increase in harmful interference to other services co-existing in the same spectrum. One such wireless multimedia system currently under development, and under consideration within the RABC, is designed for broad public use, achieving a high capacity through a series of unique antenna and co-channel interference control innovations which allow substantial frequency reuse. It is anticipated that as work on this system progresses, the relevant technical characteristics to facilitate its operation could be accommodated.

Any variation from the technical limits adopted in this document will be developed by Industry Canada in consultation with the interested parties and incorporated into the document RSS-210.

Issued under the authority
of the *Radiocommunication Act*

Michael Helm
Director General
Telecommunications Policy Branch

R.W. McCaughern
Director General
Spectrum Engineering Branch