

**Industry Canada
Spectrum Management and Telecommunications Policy**

Consultation on a Renewed Spectrum Policy Framework for Canada and Continued Advancements in Spectrum Management)
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) **Notice No. DGTP-001-05**
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Comments of Cisco Systems, Inc.

I. Introduction and Summary

Cisco Systems, Inc. hereby submits its comments on Industry Canada's consultation paper to revise its spectrum policy and spectrum management rules for Canada.¹ Cisco Systems, Inc. is a worldwide leader in networking for the Internet. Cisco Systems Canada Co., a wholly owned subsidiary of Cisco Systems, Inc., has offices across Canada dedicated to customer support, sales and service. In addition, Cisco has a significant research and development centre in Ottawa, Ontario.²

Industry Canada's consultation paper presents a revised set of core objectives and policy guidelines for Canada's Spectrum Management Program. Industry Canada previously identified five policy outcomes for spectrum regulation: (1) sufficient and timely access to spectrum to satisfy Canada's socio-cultural and economic interests; (2) world-class information and telecommunications networks and services; (3) a competitive communications marketplace; (4) an infrastructure secure from cyberattacks and in conformity with international standards and practices; and (5) opportunities for

¹ Notice No. DGTP-001-05 – Consultation on a Renewed Spectrum Policy Framework for Canada and Continued Advancements In Spectrum Management, released May 2005.

² Information about Cisco can be found at <http://www.cisco.com/ca>.

Canadian companies in this sector. The proposed policy revisions that are the subject of the instant Notice are intended to support these identified outcomes.

In its proposal, Industry Canada proposes eight “core objectives” that would guide spectrum policymaking in the future:

- (1) To promote and support the orderly development and efficient operation of radiocommunication systems and services to provide economic, social and cultural benefits for Canadians;
- (2) To promote economically efficient resource allocation and reliance on market forces and economic incentives to assign the spectrum;
- (3) To ensure that radiofrequency spectrum is available to support Canadian sovereignty, security and public safety needs;
- (4) To regulate wisely and only when required;
- (5) To facilitate the implementation of advanced communications technologies and services to benefit all Canadians;
- (6) To facilitate the use of spectrum in rural and remote communities and regions;
- (7) To advance Canadian spectrum interests internationally; and
- (8) To consult widely and on a regular basis on matters affecting the Program.³

Finally, Industry Canada is also proposing a set of revised policy guidelines that it can use that would implement the core objectives identified above. To organize its discussion of the new policy guidelines, Industry Canada has divided its proposals into four groupings: (1) those that facilitate access to spectrum; (2) making spectrum available to meet priority requirements and societal needs; (3) improving the utilization of the spectrum resource; and (4) delivery of the Canadian Spectrum Management Program.

Industry Canada seeks comment on both the new proposed core objectives for spectrum management, as well as proposed policy guidelines.

³ Id. at 6.1.2.

Cisco congratulates Industry Canada on its proposals to revise spectrum management policy in Canada. The wireless industry, and wireless technology, is rapidly evolving. Wireless was once a technology that delivered voice communications, broadcasting, and collected data from satellites or radar. While many of those uses will persist well into the future, wireless is rapidly evolving into a two-way broadband delivery platform for packet data, video, and voice. Flexible and forward-looking spectrum policies are essential if Canada is to keep pace with the leading nations of the world as wireless becomes an increasingly important part of the last-mile connection to the Internet.

Cisco largely supports the policy changes proposed by Industry Canada. Our comments are therefore limited to a few areas where we offer suggestions for improvements or adjustments to the proposals.

II. Discussion

A. Core objectives

The Spectrum Framework Consultation establishes eight core objectives for Industry Canada to achieve in making spectrum decisions. These are intended to streamline and revise existing objectives from the 2002 Framework. Cisco congratulates Industry Canada on its proposed re-write, which is more readable and specific than its predecessor. However, Cisco believes that the proposed core objectives should be modified from the proposal. First, there are four objectives, common to regulators worldwide, that are critical to spectrum policy: (1) use of spectrum to provide economic,

social, and cultural benefits for all citizens; (2) use of spectrum to support national sovereignty, security and public safety; (3) promoting the use of advanced technologies, services and equipment; and (4) ensuring that, to the maximum extent possible, citizens living in rural areas have access to the same benefits, services, technologies and equipment that citizens in urban areas have. Cisco submits that if the core objectives were to include just these four goals, Industry Canada would have a sound basis on which to make all spectrum decisions.

The proposed core objectives, however, encompass other issues that go to how Industry Canada will conduct itself in the course of fulfilling its statutory responsibilities. For example, one objective is to “regulate wisely, and only when required.” Cisco has no objection to a regulatory commitment to minimizing regulatory intervention. As a core objective, however, the language used lacks inherent meaning, since reasonable people may justifiably disagree about what is “wise” and what is “required.” Cisco recommends that, to the extent an objective on this topic is desired, that Industry Canada simply recognize that regulation imposes costs, and that Industry Canada will seek to minimize costs associated with regulation.

In addition, another proposed objective is “to promote economically efficient resource allocation and reliance on market forces and economic incentives to assign the spectrum.” Cisco strongly supports market mechanisms to allocate and assign spectrum. However, Cisco also believes that there needs to be a balance between market mechanisms and non-market mechanisms. For example, Canada’s economy has already

been substantially enhanced from the productivity gains realized through the use of licence-exempt devices in licence-exempt bands, especially Wireless Local Area Networks. Licence-exempt spectrum, by its very nature, is not allocated and is unassigned to any user. In addition, Industry Canada may wish to consider in the future innovative licensing/registration systems that facilitate broadband wireless last mile and backhaul connectivity.⁴ Finally, market mechanisms thus far do not appear to be a good solution to allocating or assigning spectrum to public use, such as public safety use.

Cisco, therefore, urges Industry Canada to embrace a more comprehensive goal for spectrum allocation and assignment that promotes the discipline of a market as an important means of assigning spectrum, while at the same time providing an opportunity for other mechanisms to be utilized. For this reason, Cisco suggests that, to the extent a core objective is desired for spectrum allocation/assignment, the objective be rephrased as follows – to allocate spectrum, and to create assignment mechanisms, in a manner that most efficiently and effectively supports the specific spectrum-based systems, services, and/or technologies that Industry Canada has identified as furthering its core objectives.

⁴ See *Wireless Operations in the 3650-3700 MHz Band*, ET 04-151, *Rules for Wireless Broadband Services*, ET 05-96, *Additional Spectrum for Unlicensed Devices below 900 MHz and in the 3 GHz Band*, ET 02-380, *Amendment of the Commission's Rules with regard to the 3650-3700 MHz Government Transfer Band*, ET 98-237, *Report and Order and Memorandum Opinion and Order*, released March 16, 2005, *reconsideration pending* (hereinafter "3650 Order") (nationwide nonexclusive licensing to operators using equipment that utilizes contention-based protocols); *Allocations and Service Rules for 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands*, WT Docket No. 02-146, 18 FCC Rcd 23318 (2003), *Memorandum Opinion and Order on reconsideration*, released March 3, 2005 (hereinafter "Millimeter Wave Order") (registration system for specific links provides interference protection).

B. Policy Guidelines

1. Facilitate access to spectrum

a. Policy Guideline 1

In its discussion of facilitating access to spectrum, the proposed Framework recognizes the importance of harmonizing spectrum allocations internationally. Cisco agrees and endorses the Framework's proposed Policy Guideline 1, stating that Industry Canada will generally advocate internationally harmonized spectrum allocations. Nowhere is this issue more evident than in spectrum allocations involving mass market end user equipment. Canadian citizens greatly benefit from the economies of scale generated when manufacturers can produce large numbers of devices for sale worldwide. To the extent those devices must be customized in some way, those economies are lost. In some cases, prices for equipment must rise. In other cases, manufacturers might avoid selling their equipment in a particular jurisdiction because they do not want to divert their manufacturing process to meet specialized requirements. Cisco commends Industry Canada for recognizing this important principle of harmonization.

In its discussion of Policy Guideline 1, Industry Canada asks several questions about licence-exempt devices.⁵ The questions go to two issues – expanding the allocations for licence-exempt devices, and ensuring compliance with Industry Canada's rules. Canada has recently joined the world community in implementing the WRC-03 decision adding 255 MHz of spectrum to licence-exempt use in the 5 GHz band. This is

⁵ Consultation at 18-19, questions 3-6.

a significant amount of spectrum that provides an important growth opportunity for wireless local area networks.

In the U.S., the FCC has opened a proceeding to add a licence-exempt use to unused spectrum in the television allocation – the “white spaces” that exist between broadcast television stations. Cisco has not filed in that proceeding, but our observation on the issues presented is that a secondary licence-exempt use for the television bands needs to be accompanied by band-specific protections to ensure that television viewers can continue to receive broadcasters’ signals. This issue would appear to be susceptible to a technical solution, and if a successful technical solution is adopted, would open highly desirable spectrum below 1 GHz for use by wireless Internet Service Providers, especially in rural areas. Signal propagation characteristics of spectrum below 1 GHz makes it far less expensive to deploy a wireless network because fewer towers need to be constructed. We urge Industry Canada to monitor this proceeding closely.

Of equal or even greater concern to wireless Internet service providers is the need for efficient wireless backhaul to the Internet. As a general rule, standards-based technology supported by multiple manufacturers producing competing, but interoperable, devices tends to produce the lowest cost equipment. A single manufacturer of a proprietary technology will tend to have the highest priced equipment. Industry Canada should maximize the opportunity for efficient wireless backhaul by seeking spectrum options where there are likely to be competing manufacturers, and if possible, using standards-based technology that is interoperable.

At present, there are three examples of low cost wireless backhaul: (1) 5.8 GHz unlicensed, where IEEE 802.11 equipment is deployed; (2) the U.S. FCC has recently authorized 3650-3700 MHz for any technology that operates using a contention-based protocol, such as 802.11⁶; and (3) the U.S. FCC's recent decisions on Millimeter Wave technology for the 70, 80, and 90 GHz band that will transmit the equivalent of gigabit Ethernet.⁷ The first example provides backhaul for wireless local area networks today. In the second example, the FCC will issue non-exclusive nationwide licences to any entity who wants one for the use of qualifying technology in the band, subject to the power limitations provided in the rules. In the last example, parties interested in using millimeter wave technology must register for a specific point-to-point link. Once registered, the assignment of the link gives the registrant first-in-time protections against interference. Note that the devices themselves are not registered.

Industry Canada also asks about equipment compliance for licence-exempt devices. In Cisco's view, Industry Canada's equipment certification program, and post-certification audit program ably defend users of the licence-exempt spectrum from non-compliant devices. Cisco believes that the current certification procedures for both licenced and licenced-exempt devices were sufficiently streamlined with the adoption of

⁶ Wireless Operations in the 3650-3700 MHz Band, ET 04-151, Rules for Wireless Broadband Services, ET 05-96, Additional Spectrum for Unlicensed Devices below 900 MHz and in the 3 GHz Band, ET 02-380, Amendment of the Commission's Rules with regard to the 3650-3700 MHz Government Transfer Band, ET 98-237, Report and Order and Memorandum Opinion and Order, released March 16, 2005, *reconsideration pending*.

⁷ Allocations and Service Rules for 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands, WT Docket No. 02-146, 18 FCC Rcd 23318 (2003), Memorandum Opinion and Order on reconsideration, released March 3, 2005

the Conformity Assessment Body (CAB) program. This allows accredited third parties designated by Industry Canada to review and issue registrations of approved radio products. We wish to encourage Industry Canada to continue to expand this program to new technologies.

Industry Canada also asks about enabling longer-range communications for licence-exempt devices in rural areas. Cisco encourages Industry Canada to adopt less restrictive requirements for licence-exempt long range communications in rural areas. Specifically, Industry Canada should adopt the technical requirements as stated in RSS-210 Rev. 5 section 6.2.2 for the adoption of more relaxed requirements for high gain directional antennas. Currently, under RSS-210 the relaxed requirements for point to point systems allow a power reduction of only 1dB for every 3dB that an antenna exceeds 6dBi, instead of the standard 1dB in transmitter power for every 1dB that antenna gain exceeds 6dBi.⁸ This change would contribute to the ability of rural areas to participate in e-commerce, e-health, and e-government applications.

b. Policy Guideline 2

Cisco also commends Industry Canada on Policy Guideline 2, which states that it will provide licencees flexibility to adapt their licenced service offerings to meet changing demands within the practical limits of the allocation and designation of spectrum use. In Cisco's view, a spectrum licencee is best positioned to determine the technology, and the path forward in technology evolution, that will meet its customers'

⁸ Further, Cisco supports allowing the system installer to substitute similar antennas of equal or lesser gain antennas of the same family type.

needs. A policy guideline favoring technology neutrality in such circumstances is important. This is especially true in the area of licenced wireless broadband, where there exist competing technologies to deliver services. In addition to wireless broadband technologies that are evolving in the cellular/PCS space, IEEE 802.16 is a standards-based technology for wireless broadband supported by its own interoperability forum. Pre-standard, proprietary versions of IEEE 802.20 also are available on the market to support fully mobile wireless broadband today.

c. Policy Guideline 3

Policy Guideline 3 states that spectrum will be reallocated to a different use, and will displace existing services, only where “necessary.” Cisco is concerned that the word “necessary” may beg too many questions in future policy debates. Cisco therefore suggests that the Guideline be restated to indicate reallocation will occur only in cases where the reallocation is required to further the core objectives that Industry Canada has identified, e.g., to further economic, social, cultural benefits, or in support of public safety, security, etc.

d. Policy Guideline 4

Proposed Guideline 4 relates to the proposed core objective of using market forces to allocate and assign spectrum. As previously stated, Cisco believes that this is an important mechanism, but not the only mechanism, that is needed in a sound spectrum management policy. As mentioned, there may well be other types of allocation and assignment mechanisms that Industry Canada may wish to use for broadband last mile or backhaul functions. As previously mentioned, the U.S. FCC recently adopted a first-

come registration system for a last-mile and backhaul broadband use of the 70/80/90 GHz bands that is expected to be particularly useful in enterprise deployments. In addition, the FCC also adopted a nationwide, non-exclusive licence structure in the 3650-3700 MHz band, where licences are obtained through a simple filing mechanism. Cisco expects that this band, with the rules as adopted, could become a useful option for wireless backhaul. However, an Industry Canada policy guideline focusing exclusively on market mechanisms would appear to preclude consideration of innovative new allocation or assignment methods that may be important to Canada in the future.

Cisco suggests, therefore, that the Proposed Guideline 4 be prefaced with the same language Cisco suggested for the core objectives - to allocate spectrum, and to create assignment mechanisms, in a manner that most efficiently and effectively supports the specific spectrum-based systems, services, and/or technologies that Industry Canada has identified as furthering its core objectives. The remainder of the proposed guideline can remain intact. Finally, Cisco suggests that the Policy Guideline be revised to indicate that there is some spectrum for which there are no management costs, e.g., licence-exempt spectrum.

e. Policy Guideline 7

With respect to Policy Guideline 7, Cisco endorses Industry Canada's addition of the category of "licence-exempt" spectrum to the guideline. This guideline calls for the prompt release of spectrum to benefit Canadians.

2. Making Spectrum Available for Priority Requirements and Societal Needs

a. Policy Guideline 8

Policy Guideline 8 notes that spectrum is required on a priority basis for law enforcement and national defence. Industry Canada asks whether it should adopt standards that compel interoperability of public safety systems, and whether, as part of the licensing process, it should compel interoperability of public safety systems. Cisco is opposed to the regulatory specification of standards. Standards should be industry-driven, open to the participation of all players, and organic in the sense that they change over time as technology or regulatory requirements evolve. Adoption of standards by a governmental agency removes the standards process from the manufacturers producing the equipment, and from the entities that will be using it. Such a policy will result in a sub-optimal outcome that will hamper public safety, not help it.

Public safety agencies facing the interoperability issue today have several choices. They can purchase air interfaces that interoperate, assuming that they have the budgetary capacity to do so. Alternatively, public safety entities can utilize wired IP networks to intelligently perform the interoperability function for them. Cisco, for example, produces a device that allows “any to any” radio communication, provided that each radio system is connected to an intelligent IP network. Our view is that governmental jurisdictions should be encouraged to migrate to efficient IP networks as soon as practicable, so that air interface interoperability for their public safety users can be leveraged as part of a wired network upgrade.

With respect to public safety use in the VHF and UHF bands, Cisco endorses the view of maximizing harmonization with US allocations to public safety, including border areas.

b. Policy Guideline 9

In Policy Guideline 9, Industry Canada states that it will facilitate access and use of spectrum for communications systems that might not be achieved by market forces alone, such as communications systems in rural and remote areas. Industry Canada is completely accurate in its assessment that wireless technology is the most efficient and effective means of meeting many societal needs in rural areas – including communication, education and health care. Cisco simply wishes to add that it has generally proven true that uniform national allocations, with the same spectrum allocated for a single use, such as cellphone use, best ensures the participation of rural consumers in society. This allows rural customers to leverage economic efficiencies associated with low cost customer end use equipment when that same equipment is sold in urban areas. To the extent that there should be differences in regulatory treatment of rural and urban services, those differences might be focused on power limitations.

3. Improving the Utilization of the Spectrum Resource

a. Policy Guideline 12

In Policy Guideline 12, Industry Canada proposes to consider, as appropriate, the use of spectrum-efficient techniques and frequency sharing among radio services. Cisco believes that, over time, radios are increasingly becoming more reliant on software, and will increasingly be able to react to the RF environment around them. However, we are

also of the view that true commercial “cognitive radios” that sense the RF environment and dynamically react to it, are not going to be built in the near-term. Instead, what we are likely to see is specific cognitive-like functionality designed for a specific band. For example, 5 GHz licence-exempt radios can listen for radars and change frequencies to avoid them. In its television “white spaces” proceeding, the U.S. FCC is considering whether licence-exempt radios can listen for television broadcast signals and move to different frequencies to avoid interference with signals received by television sets. Cisco also believes that when a new shared use is proposed for an existing band, policy makers must ensure that the incumbents and their customers/users do not experience harmful interference. That last point is important because, with today’s cognitive technology, there are uses which could not successfully be “layered.”

4. Delivery of the Canadian Spectrum Management Program

a. Policy Guideline 14

Policy Guideline 14 simply states that Industry Canada will assess new approaches to policy and practice in spectrum management on a continuing basis and will implemented these new approaches as warranted. In the related Policy Guideline 10, Industry Canada states that it will facilitate the adoption of new technologies. Both of these policy goals are worthy and should be part of Industry Canada’s policy guidelines.

With respect to these proposed guidelines, Industry Canada asks a series of questions about which technologies have the greatest likelihood of facilitating the efficient use and management of spectrum, and which are likely to be of greatest value in making more intensive use of the television bands. In the discussion of Policy Guideline

12, above, Cisco has given its view of cognitive radio functionality that it believes will be utilized, on a band-specific basis, to enable more users to utilize a given band. Industry Canada also mentions a pending FCC proceeding on “Interference Temperature.”

Interference temperature would, in theory, allow a device to sense power density of spectrum, and then make opportunistic use of spectrum. However, as evidenced by the record in the U.S. proceeding, enormous practical problems appear to make this theoretically useful idea less appealing as a practical matter. Because RF signals are subject to exponential loss of signal strength, the “signal landscape” produced by the users of a frequency band is highly variable. Small changes in location may result in widely different interference conditions. Simple measures like "interference temperature" take the average of a signal landscape but ignore its variation. Interference temperature may be useful in the context of assessing large scale interference into satellite systems, but using it to assess interference between terrestrial systems is not suitable.

III. Conclusion

Cisco welcomes the opportunity to comment on Canada's proposed revised Spectrum Framework Policy.

Respectfully submitted,

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