Industry Canada Industrie Canada

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Spectrum Management and Telecommunications

Policy and Technical Framework

Mobile Broadband Services (MBS) — 700 MHz Band

Broadband Radio Service (BRS) — 2500 MHz Band

Aussi disponible en français

Canada

Contents

Intent

1. Through the release of this paper, Industry Canada hereby announces the decisions resulting from the consultation processes undertaken in *Canada Gazette* notice SMSE-018-10 — *Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum*, and *Canada Gazette* notice SMSE-005-11 — *Decisions on a Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band 2500-2690 MHz*.

2. All comments and reply comments received in response to these two consultation documents are available on Industry Canada's departmental website at http://www.ic.gc.ca/spectrum.

3. The following document sets out Industry Canada's decisions in four parts. Part A outlines the general policy decisions on both the band 698-806 MHz (known as the 700 MHz band) and band 2500-2690 MHz (known as the 2500 MHz). Parts B and C set out specific decisions regarding the 700 MHz and 2500 MHz bands. Part D outlines Industry Canada's determination with respect to auction timing for both of the bands.

PART A — Competition Environment in the Canadian Wireless Industry

A1. Policy Objectives

4. The Government of Canada is committed, through Canada's Digital Economy Strategy, to ensuring that consumers, businesses and public institutions benefit from the availability of advanced, competitively priced telecommunications services in all regions of the country. Having a world-class digital infrastructure is a key pillar of the Strategy. A strong telecommunications sector supports the use of digital technologies across the Canadian economy, which is essential to maintaining our global competitiveness and economic prosperity.

5. The Minister of Industry, through the *Department of Industry Act*, the *Radiocommunication Act* and the *Radiocommunication Regulations*, with due regard to the objectives of the *Telecommunications Act*, is responsible for spectrum management in Canada. This responsibility includes developing national policies and goals for spectrum utilization, and ensuring effective management of the radio frequency spectrum resource.

6. Industry Canada has been guided by both the policy objectives of the *Telecommunications Act* and the policy objective of the *Spectrum Policy Framework for Canada*, which is to maximize the economic and social benefits that Canadians derive from the use of the spectrum. Consequently, Industry Canada's main objectives for the decisions outlined in this paper are as follows:

- sustained competition in the wireless telecommunications services market so that consumers and businesses benefit from competitive pricing and choice in service offerings;
- robust investment and innovation by wireless telecommunications carriers so that Canadians benefit from world-class networks and the latest technologies; and,
- availability of these benefits to Canadians across the country, including those in rural areas, in a timely fashion.

In support of these objectives, Industry Canada is releasing spectrum in the 700 MHz and 2500 MHz bands and has made the decisions outlined in this paper, with the intent that this spectrum be deployed by telecommunications service providers in a timely manner for the benefit of Canadians.

A2. Guiding Policy Principle

7. In pursuing these objectives, Industry Canada's guiding principle for telecommunications policy, including spectrum management, is to rely on market forces to the maximum extent feasible, but to take minimally intrusive measures when necessary to achieve objectives. Furthermore, Industry Canada's policies should be developed in an open, transparent and reasoned manner. To this end, Industry Canada carefully considered input from the public consultations on the spectrum in the 700 MHz and 2500 MHz bands in formulating its policy measures, as reflected in this document.

A3. Background and Considerations

8. *The Canadian wireless telecommunications market.* The wireless sector plays an increasingly important role in Canadian telecommunications, now constituting 43% of telecommunications revenue,

up from 28% in 2004. In 2010, Canada added 1.7 million wireless subscriptions and wireless telecommunications revenue grew at a rate of 6.6% compared with a decline of 1.6% in wireline telecommunications revenue.[1]

9. This growth reflects the real benefits accruing to Canadian consumers and businesses. Today, 99% of Canadians have access to wireless services, and more than 98% have access to high-speed wireless networks.[2] Providing newer, innovative services to more people would not have been possible without significant investments in infrastructure by the private sector. The continual need for significant investments in infrastructure is a key characteristic of the telecommunications sector.

10. *Developments since 2008.* The growth in the use of smart phones, tablets and other data-intensive devices is putting unprecedented demands on mobile networks, increasing the need for greater network capacity, and the spectrum that enables it. More than eight million Canadians now use a smart phone, a number that has more than doubled in less than two years. Global mobile data use has tripled each year since 2008, and is expected to experience a compound annual growth rate of more than 90% to 2015.[3] As the demand for these new wireless devices and services grows, so must the capacity and the speed of the networks that enable them.

11. The competitive landscape in the Canadian mobile services sector has changed significantly since 2008. This is a function of factors such as strong private sector investment, as well as the Government of Canada's actions in the last spectrum auction in 2008. To open the doors to new competition in the wireless market, in the 2008 Advanced Wireless Services (AWS) auction, the government set aside spectrum for companies having less than 10% of the national wireless market based on revenue; and mandated tower sharing and roaming. These measures enabled additional companies to enter the Canadian wireless services market and quickly start providing wireless services. These additional companies are hereinafter referred to as AWS entrants.

12. AWS entrants have since launched services and made inroads in the market, investing over three billion dollars and attracting more than one million customers.[4] During the same time, incumbents (Bell, MTS Allstream, Rogers, TELUS, SaskTel) have made large investments to roll out new technologies.

13. Offerings from AWS entrants and incumbent providers since 2008 have resulted in lower prices and more options in wireless packages for consumers and businesses. Average Canadian mobile wireless prices have fallen by more than 10% since 2008.[5] As of 2011, AWS entrant data and voice packages were priced 30% lower than comparable service packages by incumbents. AWS entrants'

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1 See Canadian Radio-television and Telecommunications Commission (CRTC) Communications Monitoring Report, July 2011.

2 CRTC Communications Monitoring Report, July 2011 and company reports.

3 Refer to Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2010-2015.

4 Data sourced from company reports.

5 Price comparison study conducted for the CRTC in April 2011 by Wall Communications Inc. based on an average of three monthly usage baskets in Halifax, Montréal, Toronto, Regina and Vancouver. See Appendix 4 in the 2011 CRTC Communications Monitoring Report for a full description of the baskets.

mobile Internet service rates were, on average, priced 27% lower than the incumbents' and allow for higher "unlimited" data usage levels.[6]

14. The mobile services market is still dominated by Rogers Communications Inc. (Rogers), Bell Mobility Inc. (Bell) and TELUS Communications Company (TELUS), which have a total of more than 23 million wireless subscribers[7] and a combined national subscriber market share of 93%. The two main regional providers, SaskTel and MTS Allstream, hold market shares of 78% and 57% in their respective territories.[8] The AWS entrants have a combined national subscriber market share of 3%.[9]

15. In its consultations, Industry Canada sought views on the current state of competition and its expected evolution in the wireless marketplace. Consultation respondents generally felt that the state of wireless competition in Canada had strengthened since 2008, and that the level of competition is now more comparable to that found in international jurisdictions. Respondents generally either attributed the gains to increased competition between Rogers, Bell and TELUS, or to the recent competitive pressures (on price, consumer options and services) introduced by AWS entrants.

16. Other countries have adopted measures in spectrum auctions to support competition and service availability, including auction rules that ensure that multiple companies acquire spectrum, primarily through the use of caps that limit the amount of spectrum licences that any one company can acquire. Through the use of spectrum caps, the responsible agencies in other countries aim to address the risk of one or more dominant providers obtaining all of the spectrum licences available for auction, resulting in a reduction of competition in the marketplace. Countries that have recently applied spectrum caps in some of their auctions include the United Kingdom, Italy, France and Germany.

17. Additional measures taken by foreign governments to promote competition in the wireless market include roaming requirements. To promote rural deployment, many countries also require the winners of spectrum to deploy to rural areas within a specified period of time.

Industry Canada has concluded that:

- competition in the wireless sector has increased significantly since the government set aside spectrum for new entrants in the 2008 auction;
- this increase in competition has been driven by both the entry of new service providers and intensified competition by incumbents; and
- competition from AWS entrants is emerging.

18. *The need for spectrum.* Industry Canada consulted with stakeholders on their expectations of current and future demands for spectrum. Respondents overwhelmingly identified the rapid increase in mobile broadband usage among end users as a key driver of increased spectrum requirements in the near term. Although some noted that efficiencies may arise through spectrum management, most

6 See CRTC 2011 Communications Monitoring Report — based on prices in Halifax, Montréal, Toronto, Regina and Vancouver.

7 As of the second quarter of 2011, based on company reports.

8 As of 2010, CRTC 2011 Communications Monitoring Report.

9 CRTC 2011 Communications Monitoring Report and company reports.

respondents indicated the need for more spectrum to be reallocated to commercial wireless usage going forward.

19. AWS entrants also cited difficulty in sustaining competition if they were unable to obtain new spectrum licences. These companies cited challenges resulting from having access to spectrum in only one band in terms of their ability to access equipment and devices for their customers. Bell, Rogers and TELUS noted that, although they have access to more spectrum (85% of all wireless spectrum commercially available across a variety of bands),[10] they also serve the majority of the wireless customers.

20. The spectrum to be licensed in the 700 MHz and 2500 MHz bands possesses unique characteristics. Respondents highlighted the benefits of 700 MHz spectrum: excellent propagation and in-building penetration, making it highly applicable for both urban and rural deployment at a lower cost than higher frequency spectrum. Many respondents also noted the importance of the 700 MHz band in meeting the needs of rural users. Furthermore, the band was cited as important to all wireless service providers to meet increasing demand and ease growing network congestion in urban areas.

21. Respondents also noted the scarcity of spectrum below 1 GHz. The only similar spectrum to the 700 MHz band that is currently licensed for commercial mobile use is in the Cellular band (800 MHz), of which 99% is held by Rogers, Bell, TELUS, SaskTel and MTS Allstream. Only two service providers hold licences for this spectrum in most licensing regions.[11] AWS entrants highlighted their lack of access to spectrum below 1 GHz as one important disadvantage in their ability to compete with incumbents.

22. Respondents also indicated the importance of the economies of scale provided by U.S. equipment ecosystems in the 700 MHz band, which are expected to include several high demand handsets, tablets and other broadband devices.

23. In response to the 700 MHz consultation, the public safety community also indicated a need for spectrum. Public safety agencies use spectrum in their wireless communication on a day-to-day basis, in emergency situations and for disaster relief. Stakeholders providing views on the need for public safety broadband spectrum pointed to a growing need for reliable, secure mobile broadband applications that can improve the safety of first responders and enable faster response to emergencies. In particular, the public safety community highlighted how spectrum in the 700 MHz band could meet its unique requirements for reliability and coverage deep into buildings.

24. Spectrum in the 2500 MHz band is also expected to be in high demand to help service providers address future capacity constraints. Although the propagation properties of the spectrum are not ideal for mobile systems covering large rural and remote areas, the spectrum is expected to be highly useful in expanding the wireless capacity of mobile systems in urban areas and may also be deployed for fixed wireless systems in rural areas.

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[10] Commercial spectrum holdings are weighted by population. See *Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum*, available at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09947.html.

[11] Ibid.

25. Industry Canada recognizes the value of the 700 MHz and 2500 MHz bands for all wireless service providers to help to meet capacity demands, to offer the latest technologies, to improve coverage and service quality, and to effectively compete in the market. Industry Canada also recognizes the need for spectrum to support public safety and security.

26. *Whether measures are required by Industry Canada to support competition, investment and benefits for all Canadians, including those in rural areas.* Industry Canada consulted stakeholders on the need for measures in the 700 MHz and 2500 MHz auctions to promote competition in the wireless market and deployment to rural areas. Stakeholders were also asked to comment on what sort of measures would be appropriate (if action was warranted), and for their views on the actions taken in the 2008 AWS auction.

27. Respondents were polarized in their assessment of the impact of the measures taken in the 2008 AWS auction to increase competition. Some respondents, including AWS entrants, felt that the measures in the AWS auction were necessary to allow new entrants into the marketplace and improve competition. Incumbent service providers generally felt that the interventions distorted the market, inflated the price of non-set-aside spectrum, and that the current number of competitors in the market was unsustainable.

28. Views also differed on whether measures to promote competition should be taken in the 700 MHz and 2500 MHz spectrum licence auctions to support competition in the current Canadian marketplace. Some incumbents indicated that Industry Canada should take no measures in the auctions and allow the spectrum to be secured by the highest bidders. The respondents opposing measures argued that there is currently a high level of competition in the marketplace, and that open auctions are efficient in allocating scarce resources, while interventions are ineffective and distorting.

29. Other respondents, including AWS entrants, called for some or all spectrum to be reserved for AWS entrants and future new entrants through the use of set-asides or caps in the spectrum auction. These stakeholders stated that without further support, the marketplace was likely to revert to a lower level of competition. Many argued that large service providers would purchase all available spectrum if not prevented from doing so, resulting in lower competition. With regard to the 2500 MHz spectrum, most respondents, including TELUS and MTS Allstream, noted that Bell and Rogers already control a large amount of spectrum in this band, and called for measures to limit or prevent them from acquiring additional spectrum in this band.

30. Some AWS entrants also called for other measures to meet their infrastructure needs and support their ability to provide effective competition. These measures include improvements to the tower sharing and roaming policies introduced following the AWS auction. Some AWS entrants suggested significant changes, including the regulation of wholesale roaming rates and tower sharing fees to replace the current company-to-company negotiated agreement process. Incumbents generally saw no need to change existing tower sharing and roaming policies.

31. With respect to requirements for rural deployment, some incumbents specified that they would deploy 700 MHz spectrum and bring next-generation wireless services to rural areas in the short term; and that onerous conditions were not required. Some respondents suggested direct subsidies to promote rural deployment, whereas others suggested auctioning spectrum licences for urban and rural areas separately to support rural deployment.

32. Using their existing spectrum holdings, including spectrum below 1 GHz, Bell, Rogers and TELUS have deployed high-speed mobile services to areas covering 97% of Canadians. The upcoming auction of 700 MHz spectrum will be only the second time that such spectrum below 1 GHz has been made available for commercial mobile services in Canada, and represents an important opportunity to deepen network capacity in rural Canada.

Industry Canada recognizes that:

- access to spectrum represents a critical barrier to entry in this industry and that without rules preventing excessive concentration of spectrum holdings, competition could suffer; and,
- spectrum in the 700 MHz band presents an opportunity to further improve mobile services in rural Canada.

A4. Targeted Measures to Promote Competition, Investment and Benefits to Rural Canadians

33. In view of the above considerations, Industry Canada has concluded that targeted measures related to the 700 MHz and 2500 MHz auctions are required to support the objectives of sustained competition, robust investment, and improve mobile services in rural areas, as well as provide public safety and security benefits. In keeping with the guiding principle outlined in Section A2, Industry Canada has designed these measures to be minimally intrusive.

34. *Spectrum caps in the 700 MHz and 2500 MHz auctions.* To support the objectives of sustained competition and robust investment in a minimally intrusive manner, Industry Canada is applying spectrum caps in the 700 MHz and 2500 MHz auctions to limit the amount of spectrum that each company can obtain.

35. These spectrum caps will give four or more service providers in most regions, including AWS entrants or future new entrants, the opportunity to access prime spectrum in both the 700 MHz and 2500 MHz bands. The caps will also support competition by preventing a further concentration of holdings in the 2500 MHz band, allowing many service providers to improve their networks and the experiences of their customers.

36. Spectrum caps are more appropriate than set-asides for the auctioning of 700 MHz and 2500 MHz spectrum because of the limited quantity of 700 MHz spectrum available; the different values that providers may place on the specific blocks of 700 MHz; and the fact that certain companies already hold licences for large amounts of 2500 MHz spectrum. The use of caps will not require Industry Canada to identify specific blocks of spectrum for a set-aside, but will allow companies to choose blocks based on equipment ecosystem preferences and business plans. For these reasons, the use of caps will support the objective of sustained competition in a less intrusive manner than the use of a set-aside. Further details on the measures to support competition through spectrum caps in the 700 MHz and 2500 MHz auction can be found in sections B3 and C2 respectively.

37. *700 MHz rural development requirement.* The Government of Canada, in support of Canada's Digital Economy Strategy, is committed to facilitating access by Canadians in all regions of the country to advanced, competitively priced telecommunications services. Given the rare opportunity to improve rural services by making more spectrum available below 1 GHz, and that the timely deployment of next-generation services in rural areas is not guaranteed through market forces alone, Industry Canada is requiring rural rollout conditions for auctioned licences in the 700 MHz band. In each licence area, companies that have access to two or more blocks of 700 MHz spectrum, through licences obtained in the auction or through spectrum sharing, will be required to deploy services to 90% of their existing broadband mobile coverage area within five years, and 97% within seven years of licensing. In order to facilitate access to multiple blocks of spectrum, Industry Canada will consult on the rules related to associated entities to consider changes that would permit certain business arrangements between competitors, as outlined in section B3. Details on how Industry Canada's spectrum policies on the 700 MHz and 2500 MHz auctions will benefit rural Canadians can be found in sections B4 and C3 of this document.

38. *Extending and improving tower sharing and roaming policies.* In order to further support competition in a minimally intrusive manner, Industry Canada intends to extend and improve the existing tower sharing and roaming policies instituted in 2008. These policies promote competition by requiring wireless service providers to provide other companies with access to roaming and towers on commercial terms. The proposed changes include an extension of in-territory roaming for all service providers indefinitely, accelerated timelines for both triggering arbitration and the arbitration process, and improved transparency with respect to the tower information necessary to facilitate sharing. Industry Canada will seek stakeholder views on these changes in a separate process.

A5. Targeted Measures in Support of Public Safety

39. *Allocating 700 MHz spectrum for public safety broadband.* In order to support the safety and security of Canadians, Industry Canada is immediately designating spectrum (5+5 MHz) in the 700 MHz band for public safety broadband use. This will allow the public safety community to develop an interoperable network to address the growing mobile broadband needs of public safety first responders, enhancing the safety and security of Canadians. Industry Canada also consulted on the possible use of another paired block for public safety broadband use, referred to as the "D block" in the Upper 700 MHz band. The U.S. recently decided to designate the D block in the Upper 700 MHz band for public safety broadband use. Industry Canada will further consult on the use of this additional 10 MHz of spectrum in light of this decision. Further details on public safety designations can be found in Section B2 of this document.

A6. Auction Timing

40. Industry Canada consulted on the advantages and disadvantages of proceeding with a combined auction for the 700 MHz and 2500 MHz bands, or holding the auctions separately and, if so, which band should be auctioned first. Industry Canada will proceed with the 700 MHz auction in the first half of 2013, followed by the 2500 MHz auction in early 2014. Further details on this decision can be found in Part D of this document.

PART B — Decisions on a Policy and Technical Framework for Commercial Mobile Broadband Spectrum in the 700 MHz Band

Background

41. In November 2010, Industry Canada released SMSE-018-10 — *Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum*, (herein referred to as the "700 MHz consultation"). In this document, Industry Canada sought comments on general policy considerations related to commercial mobile broadband spectrum use, competition issues and the potential use of the 700 MHz band.

42. Key topics included whether measures to support competition are needed in the auction process and, if so, what specific measure(s) would be most appropriate; whether there is a need for measures to support rural and remote mobile broadband rollout; how to address public safety mobile broadband spectrum needs and whether the auction of the 700 MHz and 2500 MHz bands should be held separately or jointly.

43. In addition, the 700 MHz consultation document sought comments on the proposed band plan options; the transition policy for the licensees remaining in the band subsequent to the transition to digital television; whether open access requirements should be imposed; and the necessary updates to the *Canadian Table of Frequency Allocations*.

Comments and reply comments were received from various entities (see Annex 1).

B1. Band Plan Architecture for Commercial Mobile Systems

44. In order to deploy commercial mobile services in the 700 MHz band, an appropriate band plan must be adopted which takes into account current national needs, global uses and equipment availability.

45. Recent technological evolution and market trends enabling multimedia applications over broadband access systems have resulted in a significant increase in spectrum demand for mobile broadband wireless applications. In order to support such growth in spectrum demand, the selection of a 700 MHz band plan should consider the following factors:

- availability of equipment and associated economies of scale;
- reduced cross-border interference and facilitation of cross-border frequency agreements;
- international interoperability and roaming; and
- continuation of public safety operations (in their designated frequencies).

46. In the past, when implementing new radio services, Canada has often adopted harmonized spectrum allocations, band plans and radio equipment specifications with the United States. Such harmonization typically presented the following advantages over other alternatives:

- a wide selection of low-cost equipment due to the size of the U.S. market;
- facilitation of cross-border roaming as a result of interoperable equipment; and
- simplified cross-border frequency coordination procedures due to harmonized frequency arrangements.

B1.1 Band Plan and Block Sizes

47. In the 700 MHz consultation, Industry Canada proposed four band plan options for consideration:

- **Option 1:** Harmonization with the U.S. band plan;
- **Option 2a:** Modified U.S. band plan with slight adjustments — 8 and 10 MHz channel blocks in the Lower 700 MHz band;
- **Option 2b:** Modified U.S. band plan with slight adjustments — mix of 3 and 5 MHz channel blocks in the Lower 700 MHz band; and
- **Option 3:** Harmonization with the Asia-Pacific Telecommunity (APT) band plan.

These band plan options are illustrated in Annex 2.

48. In the U.S. band plan (Option 1), the Lower and Upper portions of the 700 MHz band are treated as two separate bands by the U.S. Federal Communications Commission (FCC). In the Upper 700 MHz band, the FCC allocated a paired block of 11+11 MHz (Upper C block) with open access requirements, 12+12 MHz for narrowband and broadband public safety operations, and a paired block of 5+5 MHz (D block), which was intended for a private-public partnership between commercial service providers and public safety entities in the adjacent block. However, the D block was not successfully auctioned and discussions about whether to designate this spectrum for public safety use have recently concluded in the United States (see Section B2 of this document for further details). In the Lower 700 MHz band, the FCC auctioned three 6+6 MHz paired blocks and two 6 MHz unpaired blocks of spectrum.

49. Options 2a and 2b represent slight variations of the U.S. band plan; the first option would enable the use of multiple 10+10 MHz channels, whereas the second would include 5+5 MHz and 3+3 MHz blocks in the paired spectrum, thus allowing at least five paired blocks to be auctioned.

50. Option 3, the APT band plan, consists of a 45+45 MHz FDD[12] configuration over the entire 700 MHz band.

Summary of comments

51. Of the comments received regarding which band plan to adopt in Canada, the majority of respondents supported the adoption of Option 1, harmonization with the U.S. band plan.

52. Mobilicity preferred the adoption of the Option 2b band plan, as it provides bidders with the greatest flexibility for acquiring and packaging spectrum blocks and does not prevent AWS entrants "from bidding on smaller spectrum blocks that might meet their capacity needs."

53. The Canadian Media Guild, Niagara Networks and Mr. Brendan Howley (an individual respondent) supported the adoption of Option 3, harmonization with the APT band plan. In their view, Option 3 was the most spectrally efficient and would allow for the greatest number of licensees to gain access to this spectrum. Furthermore, these respondents considered that this band plan may eventually have greater equipment availability at lower costs, as that band plan will be used in heavily populated Asian markets.

[12] Frequency division duplex — allows bidirectional communication, where the transmit and receive links are deployed over different frequency bands.

54. Although some respondents initially considered options 2a, 2b or 3 to be more desirable, most supported Option 1 after analyzing the potential equipment availability for options 2a and 2b, and the lack of public safety designated spectrum in the Option 3 band plan.

55. Barrett Xplore Inc. and Barrett Broadband Networks Inc. (Xplornet), Quebecor Media Inc. (QMI), Rogers and TELUS proposed subdividing the Upper C block into two separate blocks. This proposal was generally supported by others in the reply comment phase. Respondents maintained that subdividing the Upper C block into two separate blocks would maximize the amount of useable spectrum and increase the number of blocks which would be available for all bidders while maintaining full alignment with the U.S. band plan.

Discussion

56. *The 700 MHz band plan.* Harmonization with the U.S. band plan, as proposed in Option 1, would promote economies of scale by allowing the Canadian market access to a wide selection of low-cost equipment. This option would also enable cross-border roaming and allow simpler cross-border frequency arrangements and coordination procedures for both public safety and commercial mobile services.

57. Adoption of the Option 1 band plan, however, could affect Canadian deployments due to potential interference issues which have been experienced in the United States. These include:

- interference from digital TV operations in TV channel 51; and
- interference from operations in the unpaired blocks (blocks D and E).

As such, the use of guardbands may be necessary to minimize these potential impacts.

58. Although options 2a and 2b would increase the spectral efficiency by matching the proposed block sizes to the radio channel size of modern technologies, these options were not supported by the majority of respondents due to equipment availability concerns.

59. Option 3, the APT band plan adopted by administrations in Asia, does not include provisions for public safety services in the 700 MHz band. The adoption of this band plan would thus require the displacement of Canadian public safety operations from current frequencies. Moreover, significant issues related to cross-border interoperability, interference, frequency coordination and equipment availability would arise and affect both public safety and future commercial mobile systems.

60. Taking into consideration the constraints related to potential cross-border interference, the necessity to support public safety systems and equipment ecosystem availability, Industry Canada has concluded that Option 1 (harmonization with the U.S. band plan) should be adopted.

61. The U.S. band plan provides for the following block structure for auction:

- 3 paired blocks (6+6 MHz each): blocks A, B, C (Lower 700 MHz band);
- 2 unpaired blocks (6 MHz each): blocks D, E (Lower 700 MHz band);
- 1 paired block (11+11 MHz): block C (Upper 700 MHz band); and

- 4 guardbands (1 MHz each):[13] Upper 700 MHz band.

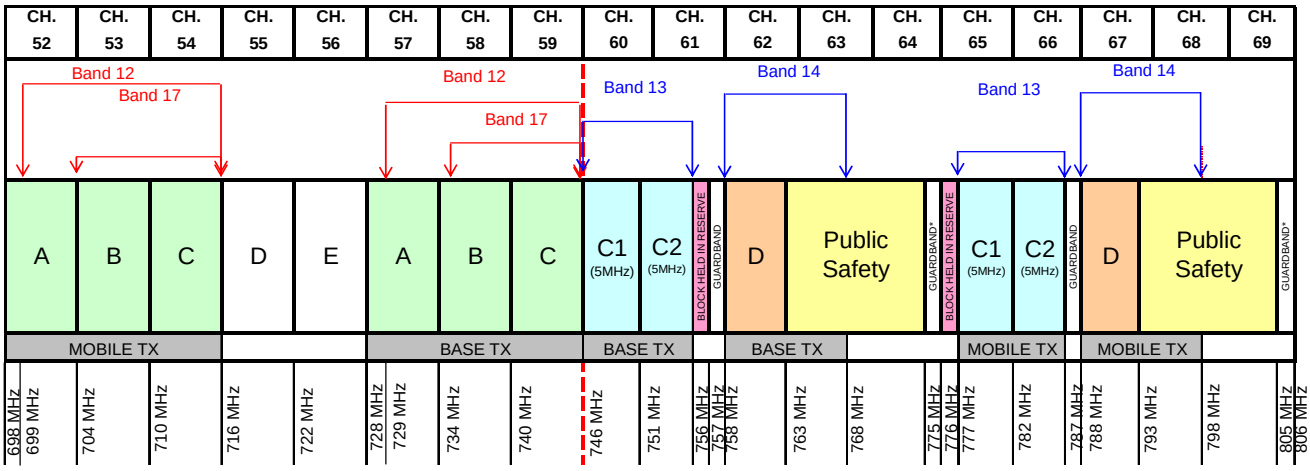
62. *Block C in Upper 700 MHz band.* As previously mentioned, Industry Canada received comments proposing that the Upper C block be subdivided into two blocks. As most service providers supported this proposal and given that there are no technical reasons against it, Industry Canada has determined that the Upper C block will be subdivided and auctioned as two separate blocks. These blocks will be referred to as blocks C1 and C2 and will result in the following blocks being available in the Upper 700 MHz band:

- 2 paired blocks (5+5 MHz each): blocks C1, C2; and
- 2 blocks (1 MHz each).

63. As the current technical equipment specifications[14] established by the 3rd Generation Partnership Project (3GPP[15]) support a paired block of 10+10 MHz in the bands 746-756 MHz and 777-787 MHz (also known as Band 13), block C will be evenly divided as two paired blocks of 5+5 MHz each, namely blocks C1 and C2. Block C1 will be 746-751 MHz, paired with 777-782 MHz; block C2 will be 751-756 MHz, paired with 782-787 MHz. This subdivision is illustrated in Figure B1 below.

64. As a result, two blocks of 1 MHz (756-757 MHz and 776-777 MHz) will be "orphaned" with a frequency separation of 20 MHz. At this time, there are no known uses for these blocks, in either a paired or unpaired configuration. Therefore, these blocks will be held in reserve by Industry Canada.

Figure B1 — 3GPP technical specifications for equipment operating in the 700 MHz band with Block C subdivided into two separate blocks



*In Canada, the bands 775-776 MHz and 805-806 MHz are designated for public safety.

13 In Canada, SP-768 MHz (issued in 2009) designated the frequency ranges within two of these four guardbands (775-776 MHz and 805-806 MHz) for public safety use, as shown in yellow in Figure B2. The technical rules for these frequency ranges will ensure compatibility with commercial services in the adjacent frequency blocks.

14 See 3GPP TS 36.104 v9.9.0 (2011-09): 3GPP Technical Specification Group Radio Access Network; Evolved Universal.

15 Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (Release 9). See http://www.3gpp.org/About-3GPP.

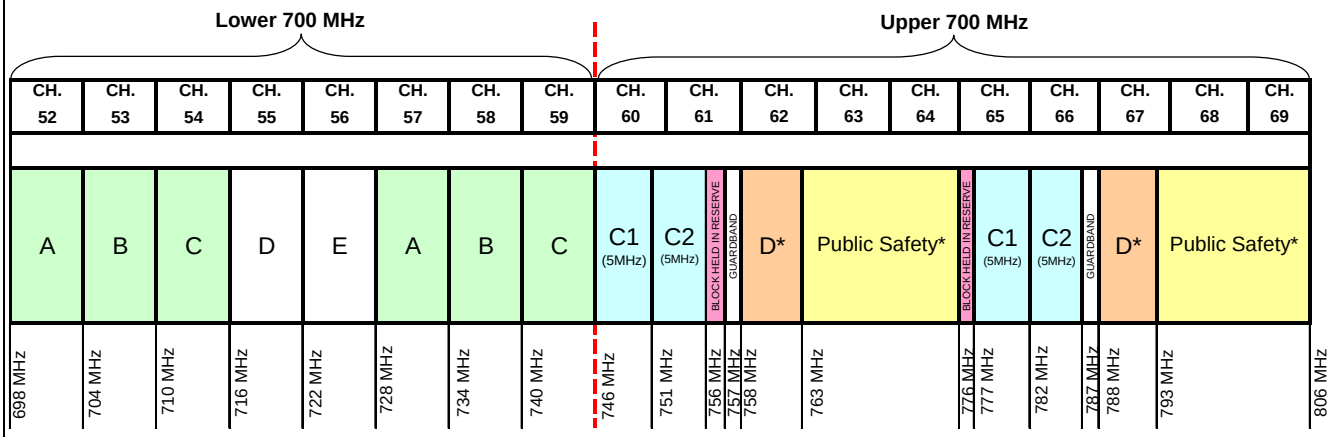
65. *Interference from TV channel 51.* The potential for interference between TV broadcasting systems operating on channel 51 and mobile broadband systems in block A may be addressed by retuning the TV stations (i.e. changing the operational broadcasting channel) operating on channel 51 to other available TV channels. Such changes need only be implemented when and where required, and only after technical determination has concluded that continued operation of the TV station would impede the deployment of new licensed systems in block A in the Lower 700 MHz band. In such cases, licensees in block A are encouraged to enter into arrangements with the relevant broadcasters for a mutually acceptable solution. Furthermore, to avoid the addition of new broadcasting stations that may need to be altered later in order to prevent interference into mobile operations, Industry Canada will no longer accept applications for broadcasting certificates for TV stations on channel 51. The list of full power TV stations currently operating on TV channel 51, or for which applications were received for channel 51, is available in Annex 3.

66. Issues related to the D block in the Upper 700 MHz band and the spectrum designated for public safety are discussed in Section B2.

Decisions related to the band plan and block sizes

B1-1: The band plan shown in Figure B2 below will be adopted for the 700 MHz auction, with the Upper C block subdivided into two separate blocks, namely C1 and C2. The following figure shows the band plan architecture for commercial mobile spectrum use.

Figure B2 — Canadian band plan for the bands 698-756 MHz and 777-787 MHz



* Decisions regarding D block (in the Upper 700 MHz band) and frequency ranges designated for public safety are discussed in Section B2.

The following frequency blocks will be available for the 700 MHz auction:

Block	Frequency	Pairing	MHz
A	698 – 704 MHz/ 728 – 734 MHz	paired	6+6 MHz
B	704 – 710 MHz/ 734 – 740 MHz	paired	6+6 MHz
C	710 – 716 MHz/ 740 – 746 MHz	paired	6+6 MHz
D	716 – 722 MHz	unpaired	6 MHz
E	722 – 728 MHz	unpaired	6 MHz
C1	777 – 782 MHz/ 746 – 751 MHz	paired	5+5 MHz
C2	782 – 787 MHz/ 751 – 756 MHz	paired	5+5 MHz

A Standard Radio Systems Plan (SRSP) and a Radio Standards Specification (RSS) will be released before the auction to establish the technical rules for systems operating in the commercial mobile spectrum in the 700 MHz band.

B1-2: The two 1 MHz blocks (the frequency bands 756-757 MHz and 776-777 MHz resulting from subdividing the Upper C block into blocks C1 and C2) will be held in reserve, and will thus not be part of the upcoming auction.

B1-3: As per the letter addressed to the CRTC, no new applications for broadcasting certificates will be accepted for TV stations operating on channel 51 (692-698 MHz). Block A licensees, in areas where mobile deployments are affected by TV broadcasting on channel 51, are encouraged to enter into mutually acceptable arrangements with the relevant broadcasters.

B1.2 Guardbands

67. In conjunction with questions posed about the band plan, comments were sought on how to treat the two 1 MHz guardbands (757-758 MHz and 787-788 MHz) between the public safety and commercial mobile blocks (see Figure B2).

68. Comments were also sought on whether the guardbands between adjacent services within the 700 MHz band should be auctioned or whether they should be held in reserve for future use. In the United States, the FCC auctioned the guardband licences to Band Managers,[16] who could lease their spectrum to service providers or directly to end-users through secondary market trading.

Summary of comments

69. Most respondents considered that the guardbands should not be licensed. Some were of the view that these blocks should be held in reserve until a use can be identified which is technically compatible with services in the adjacent bands. Other respondents maintained that guardbands should remain unused indefinitely.

[16] For further details regarding the FCC's guardband licensee requirements, refer to the FCC's website at http://wireless.fcc.gov/services/index.htm?job=service_home&id=700_guard.

70. Many respondents suggested waiting for the FCC's decision on the use of the D block in the Upper 700 MHz band before taking any steps to auction the guardbands, as this would facilitate continued cross-border harmonization. If Industry Canada decides to license the guardbands at a later date, a few respondents suggested that the spectrum be licensed on a no-interference, no-protection basis.

71. On the other hand, other respondents, which were predominantly large service providers, insisted that the use of the guardbands for any purpose other than to prevent harmful interference to licensed commercial mobile systems would be counterproductive to the objective of licensing the 700 MHz band. As a result, they recommended that the guardbands remain unused indefinitely.

72. SSi Micro Ltd. (SSi) was the only respondent to suggest auctioning the guardbands given that in its view, "auctioning the guardbands would give licensees flexibility to maximize use of the spectrum."

73. As noted above, there are no known uses for the guardbands at this time, nor did respondents to the consultation request specific uses for them. Given the significant potential for interference and the unknown availability of equipment for this spectrum, Industry Canada has determined that these frequencies will be held in reserve until further notice.

Decision related to guardbands between adjacent services

B1-4: The two guardbands (i.e. the frequency bands 757-758 MHz and 787-788 MHz) between adjacent services in the Upper 700 MHz band will be held in reserve until further notice.

B1.3 Tier Sizes

74. Industry Canada has established standard service areas that are used in a spectrum auction to set licence boundaries. These areas, called tiers, are based on Statistics Canada's Census Divisions and Subdivisions. Four tier sizes, as outlined in the document *Service Areas for Competitive Licensing*,[17] have been established to accommodate various wireless services, applications and frequency bands.

- Tier 1 is a single national service area;
- Tier 2 consists of 14 large service areas;
- Tier 3 consists of 59 smaller regional service areas; and
- Tier 4 comprises 172 localized service areas.

75. These tier areas are illustrated in Annex 4. In general, Tier 1 and Tier 2 licences have traditionally been used for mobile services, whereas Tier 3 and 4 have been used for licensing fixed services.

76. In the 700 MHz consultation, comments were sought on whether the auction for the 700 MHz commercial spectrum should be based on uniform tier sizes or a mixture of tier sizes across all spectrum blocks, and on which tier size(s) should be adopted.

[17] For further information, refer to Service Areas for Competitive Licensing at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01627.html.

Summary of comments

77. *Uniform tier size.* The British Columbia Broadband Association (BCBA), the Peace Region Internet Society (PRIS) and SSi proposed using uniform Tier 4 service areas. Mobilicity and Rogers proposed Tier 3 service areas, whereas Bell, QMI, Shaw Communications Inc. (Shaw) and Drs. Gregory Taylor and Catherine Middleton (from Ryerson University) proposed uniform Tier 2 service areas. Bragg Communications Inc. (EastLink) originally proposed the adoption of Tier 4 service areas, but later revised its proposal for the use of a larger tier, either a Tier 2 or Tier 3, across the entire band.

78. *Mixture of tier sizes.* Many respondents proposed a mixture of tier sizes. Xplornet and the Government of British Columbia proposed a mixture of tiers 2, 3 and 4, with the latter suggesting a mixture of tiers 3 and 4 for small urban areas. In its reply comments, Xplornet further suggested that two paired blocks and two unpaired blocks be reserved for rural deployment and be licensed on a modified Tier 4 level with "rural unbundling."[18]

79. Niagara Networks also proposed a mixture of Tier 1, 2 and 3 service areas. Others, including Globalive Wireless Management Corp. (WIND), MTS Allstream and Public Mobile, suggested a mixture of Tier 2 and Tier 3 service areas. The Canadian Association of Community Television Users and Stations (CACTUS) also suggested a mixture of two tiers, with Tier 3 and Tier 4 as the most appropriate for the 700 MHz commercial spectrum.

80. TELUS suggested auctioning the 700 MHz commercial spectrum in Tier 1 and/or Tier 2 service areas, with the exception of one block (or at most three blocks), which could be auctioned using a Tier 3 service area. In TELUS' view, this would "facilitate potential entry by smaller regional/rural operators" and would allow for "urban-focused providers that may be pursuing more targeted business plans."

81. Some respondents, including WIND and Mobilicity, opposed the adoption of a Tier 1 service area given that it would effectively preclude at least the regional service providers, if not all small service providers, from participating effectively in the auction.

Discussion

82. Mobile services typically use low frequency bands where radio waves propagate farther and users are mobile and roam over wide areas. As a result, the antennas used in mobile applications transmit in all directions to cover these wide areas and, consequently, mobile service areas are generally large. This is especially true for high mobility applications, such as for services onboard trains and vehicles travelling on highways.

83. The 700 MHz band will be the lowest frequency band allocated so far for commercial mobile services. In this band, radio waves will carry the desired signals, as well as the interference, at significantly higher distances compared with higher frequency bands such as AWS and PCS.

[18] Xplornet defines rural unbundling as the separation of "the rural population in the Tier 4 urban licences with populations above 100,000, so that the rural population can be properly served with broadband."

84. Previously, other commercial mobile bands were licensed using national Tier 1 (e.g. Cellular and PCS), provincial Tier 2 (e.g. Cellular, PCS and AWS) and regional Tier 3 (e.g. portions of the AWS spectrum) areas. In the 700 MHz band, a national licence area (i.e. Tier 1) would allow a single service provider access to the same block of 700 MHz spectrum across the entire country. A Tier 1 licence would, however, exceed the scope and interest of small or regional service providers.

85. While both Tier 1 and Tier 2 service areas enable the provision of high mobility services, Tier 2 service areas would provide licensees with province-wide coverage.[19] As many service providers operate on a regional basis, use of Tier 2 allows these bidders to acquire spectrum where they operate today. Aggregation of multiple Tier 2 licences up to the national level is also possible.

86. Licensing based on smaller tier sizes, such as Tier 3 or a Tier 4, provides flexibility for licensees whose business plans are concentrated in specific geographic markets, or who choose to aggregate smaller service areas into larger regions corresponding to their business needs. Smaller tier sizes may result in lower costs for bidders interested only in smaller markets. However, in many areas, dividing the service areas into smaller sizes (i.e. Tier 3, 4), or a modified Tier 4 as proposed by Xplornet, could result in deployment challenges such as increased interference coordination with neighbouring service providers at the edge of their licence areas. This could also create uncertainty, delays and additional costs to service providers. The fewer borders there are between licence areas, the more efficiently service providers can use their spectrum.

87. Moreover, Industry Canada is of the view that the use of homogenous tier sizes for both paired and unpaired spectrum will facilitate the auction process by reducing complexity for the bidders who may need to devise strategies for bidding across multiple frequency blocks over multiple geographic areas.

Decision related to Tier Sizes

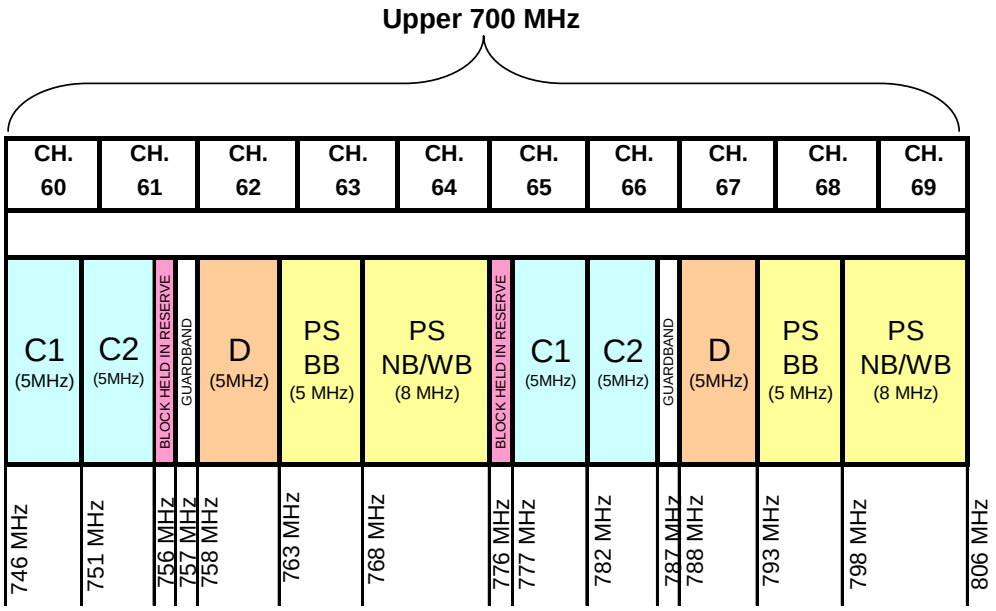
B1-5: Tier 2 service areas will be used to license all frequency blocks for the auction of 700 MHz spectrum licences.

B2. D Block in the Upper 700 MHz and Public Safety Spectrum

88. The 700 MHz consultation considered the issue of how much spectrum, if any, should be designated for public safety broadband use. In the Upper 700 MHz band, there are two paired 5+5 MHz blocks which could be used for this purpose. As shown in Figure B3 below, the public safety broadband (PSBB) block consists of 763-768 MHz and 793-798 MHz, whereas the D block (not to be confused with the unpaired block D in Lower 700 MHz) consists of 758-763 MHz and 788-793 MHz.

[19] Ontario and Quebec each have three Tier 2 service areas.

Figure B3 — Canadian band plan for the Upper 700 MHz band



89. The following three options were considered for public safety systems in Canada:

- **Option 1:** Designate 5+5 MHz (PSBB block) to public safety systems and auction 5+5 MHz (D block) for commercial systems;
- **Option 2:** Designate the entire 10+10 MHz of spectrum for commercial systems, with possible provisions for priority access for public safety systems; or
- **Option 3:** Designate the entire 10+10 MHz of spectrum for public safety systems.

90. Comments were also sought on whether Industry Canada's decision regarding spectrum for public safety broadband should be delayed until the United States has made a decision on the use of the D block.

Summary of comments

91. Not all respondents commented on public safety issues. Of those who did, most supported the immediate designation of 5+5 MHz (PSBB block) for public safety broadband use.

92. Comments were varied, however, with respect to the use of the other 5+5 MHz block (D block in the Upper 700 MHz band). Public safety organizations and provincial respondents unanimously recommended that the D block be designated for public safety purposes. This was also supported by the Federation of Canadian Municipalities, la Ville de Québec, the City of Calgary, the Canadian Advanced Technology Alliance, the Utilities Telecom Council of Canada, Motorola Canada Limited and Harris Canada Systems Inc. The comments from commercial service providers were varied. Most smaller service providers were of the view that the D block should be auctioned for commercial mobile services without any obligation to serve public safety. Of the major national and regional service providers, only SaskTel supported a public safety designation. Bell, TELUS, Rogers, MTS Allstream

and many other respondents recommended that Industry Canada initiate a further consultation on whether to designate the D block for public safety broadband use once the intended use of the D block in the United States has been determined. Xplornet further proposed that Industry Canada make the D block available to rural Internet service providers (ISPs) to deploy commercial fixed and mobile services while awaiting a U.S. decision, recognizing that, if this was allowed, rural ISPs operations would later have to move to other spectrum or operate in cooperation with public safety systems depending on the final D block decision.

93. The public safety community and other respondents listed above who supported the designation of a block of 10+10 MHz of the 700 MHz spectrum for public safety argued that it would be required in order to deploy a robust public safety broadband network across Canada and meet the growing demand for mobile data communications. They pointed to the unique requirements of public safety communications in terms of high reliability and coverage deep into buildings and underground as compared with commercial systems. Possible applications would include database access, imaging (e.g. building blueprints and mug shots**)**, tracking (e.g. oxygen tank monitors on firefighters and licence plate recognition), Internet access and video streaming.

Discussion

94. A public safety broadband network in the 700 MHz band could facilitate a coordinated response among various Canadian public safety agencies when responding to emergency situations. In addition, harmonizing the use of the PSBB block with the United States would enable economies of scale for equipment and allow for cross-border interoperability between public safety agencies in the United States and Canada. Furthermore, the majority of the Canadian stakeholders supported designating the PSBB block for public safety broadband use. Therefore, Industry Canada has decided to designate the bands 763-768 MHz and 793-798 MHz (PSBB block) for public safety broadband use.

95. Comments varied greatly with respect to whether to designate the D block for public safety or to auction it for commercial use. Most respondents stressed the importance of harmonization with the United States; however, there was no consensus on its use since most public safety entities supported designating it to public safety while many commercial entities supported waiting for the U.S. decision. Some commercial entities proposed that Industry Canada consult further on the D block once the U.S. had made a decision. On February 22, 2012, the United States enacted Bill H.R. 3630,[20] which designates the D block for public safety broadband use.

96. From a technical point of view, interoperability with the United States will not be affected if there is a difference in the amount of spectrum designated to public safety on each side of the border, as the equipment available will support both 5+5 MHz and 10+10 MHz bandwidths through software configuration. Since the D block is now designated for public safety broadband use in the United States, it is unclear whether consumer devices such as tablets and smart phones would be available for commercial use in the D block in Canada.

97. Consequently, Industry Canada has decided to launch a further consultation to establish a policy framework for the use of the spectrum in the 758-763 MHz and 788-793 MHz bands (D block) in light of the U.S. decision.

[20] Bill H.R. 3630 — Middle Class Tax Relief and Job Creation Act of 2012. For further details, see http://www.gpo.gov/fdsys/pkg/BILLS-112hr3630enr/pdf/BILLS-112hr3630enr.pdf.

98. Regardless of the final amount of spectrum that will ultimately be designated for public safety broadband use, a further round of consultation will be required. This future consultation will focus on the technical, operational and licensing issues related to the 700 MHz spectrum designated for public safety broadband use. Such issues will include whether a specific technology should be mandated, the identification of categories of users, the determination of licence fees, the possible role of a co-ordinating body in licensing of the spectrum, licence conditions (e.g. interoperability, as stipulated in Section 7 of RP-25[21]) and the use of public safety broadband spectrum in rural areas.

Decisions related to the public safety spectrum

B2-1: The bands 763-768 MHz and 793-798 MHz (PSBB block) are designated for public safety broadband use. Consequently, these bands will not be part of the 700 MHz auction.

B2-2: A decision on the use of the bands 758-763 MHz and 788-793 MHz (the D block in the Upper 700 MHz band) will be made following a separate consultation.

99. Industry Canada will initiate a further consultation on the technical, operational and licensing issues related to the spectrum designated for public safety broadband use in the 700 MHz band.

B3. Measures to Promote Competition

100. In the 700 MHz consultation, comments were sought as to the appropriate auction mechanism(s) which should be adopted in the event that Industry Canada decided that specific measures to promote competition were desirable. Comments were sought on**:**

- whether a spectrum cap or set-aside should be implemented;
- whether a potential spectrum cap should apply only to the 700 MHz band or whether it should be broader (e.g. to all mobile spectrum);
- the attributes of a potential set-aside, including the amount of set-aside spectrum, which block(s), and the eligibility requirements for bidders in the set-aside block(s);
- whether restrictions should be put in place to ensure that policy objectives are met (e.g. whether transfer of set-aside spectrum licences should be restricted or whether a spectrum cap should be put in place for a specific time period); and
- whether specific bidding rules should apply to bidders and their affiliates or associates.

Summary of comments

101. The submissions of parties on these issues were widely diverging. Most large wireless service providers, including Bell, Rogers, SaskTel and TELUS, argued that there is no need for specific measures to promote competition and that any government intervention would harm the Canadian wireless industry. Bell stated that, due to the scarcity of the 700 MHz spectrum, the imposition of a

[21] See RP-25 — *Policy Principles for Public Safety Radio Interoperability*, at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09554.html.

spectrum set-aside or spectrum cap would have a great impact on the auction's ability to efficiently determine who is best able to use the spectrum, and would also permanently disadvantage at least one of the three national wireless service providers.

102. Rogers also maintained that the amount of 700 MHz spectrum available for auction is insufficient to allow for a set-aside. Rogers stated that, in the event that Industry Canada decides to adopt a set-aside mechanism, entitled bidders should be restricted to bidding on the set-aside blocks only. Rogers added that, should Industry Canada decide to adopt a spectrum aggregation limit, it should adopt an "auction cap" for 700 MHz spectrum only, and not a general "spectrum cap" applicable to other spectrum holdings. Rogers further added that, if a cap were to be imposed, it should be shared by affiliates and associated entities cooperating in building their network or marketing their services.

103. TELUS was also of the view that no set-aside or spectrum cap should be implemented in the 700 MHz auction. However, TELUS added that if Industry Canada were to decide that some mechanism was appropriate, a reasonably designed spectrum cap would be preferable to a set-aside. TELUS' support for such a spectrum cap would be contingent on TELUS being allowed to bid on at least two paired blocks of spectrum in the 700 MHz band. TELUS submitted that bidders and their legal affiliates should be required to share a spectrum cap if such a cap were imposed. However, TELUS stressed that bidders which have roaming and other network access arrangements with other bidders should not be treated as associated entities for the purpose of 700 MHz auction. Furthermore, TELUS argued that cable companies and regional ILECs[22] should not qualify to bid on any set-aside spectrum.

104. SaskTel pointed out that market forces work differently in rural and urban areas, as there is significant facilities-based competition in urban areas. In rural areas, however, competition is generally limited to competition for services. For example, in areas where population densities do not support the economics of more than one network infrastructure, other companies use SaskTel's infrastructure to provide services. In SaskTel's view, access to spectrum by the facilities-based provider is crucial in order that all cellular service providers be able to serve their customers.

105. MTS Allstream proposed that block C in the Upper 700 MHz band be set aside for new entrants and that the new entrant definition used in the AWS auction continue to be used for the 700 MHz auction.[23]

106. Cogeco Cable Inc. (Cogeco) and EastLink both proposed a similar amount of spectrum for a set-aside. Cogeco proposed that an unspecified block of at least 30 MHz be set aside for AWS entrants (excluding MTS Allstream in Manitoba and SaskTel in Saskatchewan) and future new entrants. EastLink proposed that all of the spectrum in the lower portion of the 700 MHz band (36 MHz paired and 12 MHz unpaired) be set aside for service providers with less than 3% of the Cellular (800 MHz) spectrum holdings (weighted by population).

107. Mobilicity, Public Mobile and WIND proposed that the entire 700 MHz band be set aside for eligible AWS entrants (excluding MTS Allstream in Manitoba and SaskTel in Saskatchewan) and service providers with no Cellular spectrum holdings in their respective home market. In the reply

[22] Incumbent Local Exchange Carriers — for example, MTS Allstream and SaskTel.

[23] The definition of a "new entrant" in the AWS auction is available at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08833.html.

comments, WIND submitted the view that enhanced competition in the sector following the AWS auction has resulted in Canadians enjoying "substantially more affordable wireless service as well as new and innovative product offerings and terms of service," and restated that AWS entrants and future new entrants should be given access to all, or substantially all, of the newly available spectrum. Should a complete 700 MHz set-aside not be implemented, WIND submitted the view that a spectrum cap of 105 MHz should be imposed on the total spectrum holdings[24] of wireless service providers. In addition, WIND proposed a further cap of 25 MHz of spectrum below 1 GHz in any licensed territory; a limit of two 700 MHz paired blocks for any bidder; and a single paired block for incumbents, in any given area. Mobilicity suggested that, in the event a complete set-aside is not adopted, a spectrum cap should be implemented in which affiliated and/or associated parties are treated as one entity based on their holdings in the frequencies below 1 GHz. Mobilicity reiterated that such a cap should remain in place indefinitely, subject to review from time to time. Public Mobile proposed a complete set-aside of 700 MHz spectrum for service providers which do not currently hold spectrum below 1 GHz in the same region. As well, Public Mobile argued that service providers with more than 20 MHz of unused spectrum in any band should not be allowed to participate in the auction. In addition, Public Mobile proposed an "in auction" cap which would prevent any auction participant from holding more than 25 MHz of spectrum below 1 GHz in any licensed territory. Public Mobile also suggested that bidders and their associates share the spectrum cap.

108. Shaw and QMI both favoured the imposition of spectrum caps. Both proposed that, in any licence area, no participant in the 700 MHz auction be able to acquire more than two paired blocks of 700 MHz spectrum, and that any participant already holding spectrum below 1 GHz be able to acquire only one paired block of 700 MHz spectrum. This two-fold proposal was also supported by SSi in its reply comments. In addition, Shaw requested that Bell and TELUS be considered as one bidder for the 700 MHz auction.

109. Service providers with a focus on rural areas, including Axia NetMedia (Axia), Xplornet, the Canadian Cable Systems Alliance (CCSA), Ontario Telecommunications Association (OTA) and Tbaytel, advocated for some form of set-aside. Axia proposed that, in rural areas, up to 100% of the available spectrum be set aside for bidders that commit to reach the highest portion of rural users. CCSA recommended a set-aside of 50% of the 700 MHz spectrum for AWS entrants and future new entrants, whereas Tbaytel and the OTA recommended a set-aside of an unspecified amount for small ILECs. Axia and Xplornet proposed that bidders, affiliates and associates share the spectrum caps.

110. In addition, Xplornet suggested a specific "rural set-aside" which would be based on licensing the spectrum using Tier 4 areas; the borders of Tier 4 areas would be redefined such that rural areas in proximity of urban areas would be "unbundled" and attached to the surrounding rural Tier 4 licence areas. In Xplornet's proposal, entities with spectrum holdings of 50 MHz or more would be excluded from bidding on the rural portions of the unbundled Tier 4 blocks. In its reply comments, Xplornet further proposed that the above provisions be applied to the unpaired blocks D and E, which are "well suited to deliver fixed wireless services based on TDD," and to the D block in the Upper 700 MHz band (see Section B2) on an interim basis until the spectrum utilization for this block is determined.

111. The Province of British Columbia and the Yukon Government proposed a set-aside of modestly priced licensed spectrum which would cover small geographic areas (excluding urban and metropolitan areas). On the other hand, a significant number of municipal and regional governments from rural and

[24] Including holdings in the 2500 MHz (BRS) and 806-824/ 851-869 MHz (iDEN/ESMR) bands.

remote areas have submitted views supporting an open auction with no preferential treatment for any service provider.

112. Niagara Networks argued for a set-aside of 80% of the 700 MHz spectrum and that, if a spectrum cap is imposed, it should be shared by bidders and their associates. MobilExchange was of the view that 20 MHz should be set aside for a "Secure Wireless Health Network." The Public Interest Advocacy Centre (PIAC) stated that a minimum of 25% of the available 700 MHz spectrum should be set aside for AWS new entrants and smaller service providers. PIAC also proposed that a minimum of 25 MHz be set aside for non-emergency public uses (e.g. libraries), with a further 10 MHz set aside for innovation and research and development purposes. The British Columbia Broadband Association (BCBA) proposed a set-aside for rural service providers in the 165 least populated Tier 4 service areas. CACTUS and the Canadian Media Guild (CMG) also advocated a set-aside mechanism. Two individual respondents, Messrs. Brendan Howley and Steven May, proposed that 25% of the spectrum to be auctioned be the set-aside for smaller service providers and new entrants in 5 MHz blocks. Drs. Gregory Taylor and Catherine Middleton of Ryerson University argued for the need for both a set-aside and spectrum caps.

113. With respect to any timing restrictions for secondary market trading, Rogers suggested that if any cap is imposed, it should remain in effect for as short a time as possible so that there are no long-term consequences to this fast-changing industry. TELUS also was of the view that if Industry Canada decides to implement measures to support competition, a short licence transfer lockout period of two years at the most should be implemented in order for the market to function freely through an active secondary market.

114. Cogeco and Niagara Networks proposed that any restrictions on the resale of set-aside spectrum be limited to five years, similar to that in the AWS spectrum auction. MTS Allstream proposed to restrict the secondary market transfer of any set-aside spectrum for a period of 10 years. EastLink also suggested that a 10-year period apply to any spectrum cap. Shaw proposed that the spectrum caps remain in effect for an initial period of five years and that, prior to the expiry of such a cap, another consultation be carried out to determine whether the restriction period should be extended. QMI proposed that any spectrum cap remain in place as long as predetermined by Industry Canada.

115. Respondents other than wireless service providers stated that secondary market trading restrictions should be permanent. Axia proposed that a spectrum cap remain in effect for the duration of the licence. PIAC, CACTUS and CMG also suggested that restrictions be imposed so that successful bidders on the set-aside spectrum would not be allowed to lease, transfer, exchange or share this spectrum with an incumbent service provider during the term of its licences.

Discussion

116. *Spectrum supply for the 700 MHz auction.* Based on a consensus view from the industry, the U.S. band plan will be adopted for the 700 MHz band. Excluding the frequency blocks under consultation for public safety, the following spectrum blocks will be available for auction in each service area:

- Paired blocks (6+6 MHz each): A, B and C;
- Paired blocks (5+5 MHz each): C1 and C2;
- Unpaired blocks (6 MHz each): D[25] and E.

117. Currently available equipment for the 700 MHz band, such as Long-Term Evolution (LTE) equipment, operates on 5 and 10 MHz channel bandwidths.[26]

118. *Equipment constraints and spectrum quality.* Wireless equipment, especially consumer terminal equipment, is highly complex and is manufactured in mass quantities. New products require long development cycles and large investments. As a result, manufacturers tend to develop new products based on the demand of the service providers which can place the largest orders. As the Canadian wireless industry is not comparatively large, the Canadian service providers typically rely on the availability of equipment developed for their larger U.S. counterparts.[27] As mentioned in Section B1, one reason for the selection of the U.S. band plan for the 700 MHz band is to take advantage of the scale of the U.S. wireless industry in order to gain access to a wide range of equipment at competitive prices.

119. Two non-interoperable equipment ecosystems have emerged in the United States, which correspond to the specific 700 MHz spectrum holdings of AT&T (blocks B and C) and Verizon (blocks C1 and C2). In the short to medium term, it is expected that most[28] of the available equipment will operate either on blocks B and C and be compatible with AT&T equipment ecosystem, or on blocks C1, C2 and be compatible with the Verizon equipment ecosystem.

120. There are no current deployments in block A in the United States due to poor availability of equipment and the potential of interference from TV channel 51. The equipment ecosystem for block A will likely improve over time, as the interference from TV is eliminated and as interest by smaller U.S. licensees develops.

121. There is no available information on current deployments in the United States in the unpaired spectrum blocks D and E. According to published plans, research and development are currently under way regarding unidirectional wireless systems, which will make use of this spectrum in conjunction with spectrum in the AWS band (also known as “carrier aggregation technology”). The associated equipment may not be available by the time of the auction. Wireless bidirectional technology (which is time division duplexing based) is less likely to be developed for this unpaired spectrum, as there is strong potential for interference between adjacent service areas and/or adjacent frequency blocks.

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[25] This is the unpaired block D in the Lower 700 MHz band. Not to be confused with the paired D block in the Upper 700 MHz band, which is subject to the discussions related to public safety.

[26] The LTE specifications also include provisions for 1.4 MHz and 3 MHz channel bandwidths; however, equipment using these narrower channels is less spectrally and operationally efficient, and has not been developed for the 700 MHz band.

[27] The customer base of the largest wireless service provider in the United States is more than three times the size of the population of Canada.

[28] Equipment operating in blocks A, B and C (3GPP band 12) is also expected to become available before the 700 MHz auction.

122. As a result, the value of the various 700 MHz spectrum blocks to Canadian service providers will vary depending on which of the two equipment ecosystems each service provider will use. Furthermore, it is likely that the utility of block A will be lower than the other paired frequency blocks (B, C, C1 and C2) in the short to medium term. Consequently, it is reasonable to refer to the paired blocks B, C, C1 and C2 as "prime" 700 MHz spectrum. The quality of the spectrum block(s) acquired by bidders at the 700 MHz auction will play a significant role in their capability to deploy advanced services and compete effectively in the marketplace.

123. *Spectrum demand.* Due to its propagation characteristics, the 700 MHz spectrum is very well suited for providing service to wide coverage areas in suburban and rural markets, as well as high capacity applications in high density urban areas, especially for broadband deployments based on 10+10 MHz channels. All consultation submissions indicate a very strong interest in the 700 MHz spectrum. All service providers expressed the need for 700 MHz spectrum stating that, without access to it, their future ability to offer advanced wireless services and compete effectively would be negatively affected. In addition, many respondents pointed out that providing state-of-the-art services, especially to rural areas, would require two contiguous or adjacent paired blocks, i.e. 10+10 MHz of spectrum. In light of the submissions received, it is apparent that the total amount of spectrum available in the 700 MHz band is far from sufficient to satisfy all stakeholders' needs.

124. *Objectives*. As stated in Part A, one of the specific objectives is to foster sufficient competition in the wireless telecommunications services market so that consumers and businesses benefit from competitive pricing and choice in service offerings. Taking into account that competition offered by AWS entrants is still emerging, at least one service provider in each licence area, other than the large national service providers, should have the opportunity to obtain 700 MHz spectrum. The government is seeking to achieve this through measures that will introduce the least amount of market distortion. Access to the 700 MHz spectrum by service providers other than the large national service providers would help to support competition, offering consumers additional choices for competitive MBS in both the metropolitan and smaller markets.

125. In many areas of Canada, consumers have access to extensive wireless coverage based on services provided by two or three large service providers. In order to allow these large national and regional service providers to offer new advanced mobile services to their customer base, they should also have the opportunity to obtain 700 MHz spectrum, which is not a substitute for Cellular spectrum. In the short to medium term, there are differences in the equipment ecosystems for the 700 MHz and the Cellular bands. In the longer term, the 700 MHz band will be needed in addition to the Cellular band for capacity reasons. The rapid growth in mobile data use is expected to increase the capacity requirements for the existing mobile infrastructure in all areas of the country. Due to its favourable propagation characteristics, the spectrum in the 700 MHz band will be needed in addition to the Cellular spectrum to address these capacity requirements. The large national and regional service providers provide the majority of Canadian users, including in many rural and remote areas, with advanced state-of-the-art wireless services and are responsible for the largest proportion of investment and innovation taking place in the Canadian wireless industry. It is important that these service providers continue to increase the capacity of their networks and deploy the most advanced wireless services at both national and regional levels.

126. Many of the respondents who advocated specific mechanisms to sustain and promote competition maintained that, in general, the large service providers have the means and the incentive to bid for spectrum at price levels that could ensure the preservation of their market share. Even if not necessarily

subscribing to the above view, a prudent assumption for the auction design is that large service providers would likely win the bidding for most of the spectrum in an open auction. Therefore, an appropriately dimensioned set-aside or cap could ensure that other companies have an opportunity to acquire spectrum licences.

127. *Types of interventions.* Among the many comments received, possible measures suggested for implementation in the 700 MHz auction are discussed below.

128. *Large set-aside.* Setting aside a large amount of spectrum could negatively affect the ability of the large national and regional service providers to provide advanced services to their customer base. Deployments of the most advanced services to smaller markets, including rural and remote areas, may be delayed, counter to Industry Canada's objective that spectrum benefits be made available on a timely basis to these Canadians.

129. *Overall spectrum cap.* Placing a cap on total spectrum holdings (or for spectrum holdings under 1 GHz) could completely eliminate one or more regional or large national service providers from the 700 MHz auction, hindering their ability to continue providing advanced services. The fast-paced growth in mobile broadband use by consumers will lead to an unprecedented increase in the overall traffic demand. The large service providers have the largest subscriber bases (more than 23 million subscribers). The 700 MHz band will be needed to address this significant increase in required capacity for their wireless networks. Furthermore, an overall cap would unfairly disadvantage service providers holding spectrum in higher frequency bands, as the spectrum in these bands is available and used in larger bandwidths. Given the rapid growth in the demand for data services, an overall spectrum cap would be a continued barrier to service providers' ability to acquire the spectrum necessary to expand their operations and deploy the latest technology in a timely fashion.

130. Based on the above considerations, the possible solutions for the auction design are either a set-aside of one or two 5+5 MHz paired frequency blocks, or a cap that prevents one or more large service providers from obtaining all of the 700 MHz spectrum licences.

131. *Set-aside of one or two paired spectrum blocks for small service providers.* In the context of the 700 MHz auction, the choice of a set-aside has limitations related to the non-homogenous properties of the 700 MHz spectrum blocks, as described earlier. This solution would represent a set-aside of between 20% and 40% of available paired spectrum. However, given that the band is not homogenous, it could consist of a much larger proportion of the spectrum for a particular equipment ecosystem. A set-aside of a specific block or blocks could potentially lock eligible service providers into an undesired equipment ecosystem or out of a desired one. This would affect their ability to deploy new systems that are compatible with their existing infrastructure and to implement domestic and international roaming. The choice of the set-aside frequency block is difficult given the dynamic pace of wireless technology and market evolution. Furthermore, based on available information, there is no single 700 MHz block which would fit the current technology and equipment ecosystems for all service providers. Due to the non-homogenous characteristics of the 700 MHz band, any specific block choice by government may disadvantage one or more service providers relative to others.

132. *700 MHz spectrum cap of two paired spectrum blocks.* A spectrum cap for the 700 MHz band is a more flexible option, enabling service providers to bid for the block(s) they want, but limiting the total amount of spectrum that a single service provider/bidder may acquire. This would provide additional

bidders with the opportunity to obtain spectrum. A cap of two paired blocks in the 700 MHz band would also respond to comments that indicated that 10+10 MHz (which can be achieved by aggregating two contiguous paired blocks) of spectrum is needed for the deployment of more advanced MBS. Moreover, several AWS entrants proposed a cap of two paired spectrum blocks and some of the large service providers were also open to such a provision. A cap of two paired blocks applicable to all bidders may lead to auction outcomes where, in each area, most or all of the spectrum licences would be won by only three companies, most likely the large service providers. To address this issue, an additional auction condition, applicable only to large service providers, is required.

133. *Spectrum cap of one prime paired block for large service providers*. Limiting bids from each of the large service providers to one of the prime paired spectrum blocks (block B, C, C1 or C2) ensures that one or more smaller service providers can obtain prime spectrum.

134. A "dual cap" combining the spectrum cap of two paired blocks in the 700 MHz band and the spectrum cap for prime blocks described above can considerably strengthen AWS or future new entrant(s) in most markets by enabling them to acquire at least one of the prime 700 MHz spectrum blocks (block B, C, C1, or C2). The large service providers (as described in the following paragraph) would be able to bid on one prime paired block of spectrum in each licence area, including MTS Allstream and SaskTel in their respective provinces. If more than one block of spectrum is desired, any large service provider may bid on the paired block A or the unpaired blocks D and E. As well, service providers may explore possibilities of joint network builds. Deployment of advanced services requiring at least two contiguous paired blocks would be dependent on the service providers' ability either to acquire two blocks (A+B blocks for large service providers or any blocks for other companies) or to create network arrangements with other service providers. Refer to paragraph 138, *Affiliated and associated entities rules*.

135. *Definition of large wireless service providers.* The dual cap solution requires that the term "large service providers" be defined. The definition of "new entrant" in the 2008 AWS auction[29] was based on the national wireless market share of revenues. Firms which had less than 10% of the national wireless market share of revenues could bid on the set-aside spectrum. Regional ILEC operators MTS Allstream and SaskTel, which combined had less than 6% of national wireless revenues in 2008, were eligible to bid for the set-aside spectrum in the AWS auction. However, these companies have the largest share in their home markets, with 57% and 78% wireless subscriber market share in Manitoba and Saskatchewan respectively in 2010.

136. Some of the comments received suggested linking the eligibility to bid in the 700 MHz auction with a bidder's existing commercial mobile spectrum holdings. One view was that entities holding Cellular spectrum could be limited to bidding on a maximum of one paired block in the auction. However, such a linkage would overlook the key factors of market share and market size, which are important when considering competition. For example, a large service provider may lack Cellular spectrum in a certain region, but it may have significant market share in that region. Conversely, a smaller service provider may hold Cellular spectrum in a certain region, but it may not have significant market share in that region. Therefore, linking eligibility to bid in the 700 MHz auction with a bidder's existing commercial mobile spectrum holdings may not be appropriate.

[29] The new-entrants definition for the AWS auction is available at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08833.html.

137. A definition of a large service provider should take into account the regional nature of the wireless services market. This can be achieved by linking the definition to both the national and provincial wireless market share. The national market share threshold of 10% could be adopted. The threshold for the provincial market share should be higher, however, to reflect a situation in which an entity could have a large provincial market share (thus the entity should be considered as a large service provider in that province) but have a small national market share. Based on the above considerations, the definition for large wireless service providers will be based on a subscriber market share of 10% at the national level or 20% at the provincial level. The reference data for the evaluations will rely on the 2012 *CRTC Communications Monitoring Report*.

138. *Affiliated and associated entities rules.* Past auctions have featured rules that associated and affiliated entities[30] were required to bid as one entity to ensure the integrity and transparency of the auction. There were also limits on the ability to communicate with other bidders starting from the date of application to participate in the auction up to the final payment deadline for licences provisionally won in the auction process. In addition, rules restricting post-auction licence transfers also included transfers to affiliated or associated entities so as not to defeat the purpose of those restrictions. There will be similar auction rules and conditions regarding transfer of licence in effect as part of the licensing framework in the 700 MHz auction. That being said, Industry Canada recognizes that changes to the rules should be considered due to the scarcity of spectrum in the 700 MHz band, the high demand for capacity by customers (driven by the use of smart phones and tablets), the high cost of network deployment, particularly in rural areas, and the spectrum and network efficiencies that can be realized through the use of more than one block of spectrum through spectrum sharing.

139. A number of Canadian service providers have entered into different forms of network and spectrum sharing arrangements, driven by the investment and spectrum efficiencies such arrangements can bring. As consumer demand for wireless data grows rapidly, interest in these arrangements among carriers in Canada and other countries is expected to increase. Changes to the rules surrounding spectrum sharing are being considered in order to encourage more rapid deployment of next generation services to rural Canadians. These changes may also support investment and service innovation as next generation technologies require large amounts of spectrum. We will be seeking input from stakeholders on this issue in the next consultation process.

140. For example, if licensees are competitors and intend to remain so, and have an existing or enter into a new joint network or spectrum sharing agreement such that they are associated, they may still be eligible to participate in the auction as separate entities and continue to be treated as separate entities for the purposes of the spectrum cap if certain conditions are met. On the other hand, if two or more entities are affiliated through ownership structure or if they enter into agreements which have the effect of undermining the integrity of the auction or defeating the purpose of the spectrum cap(s), those entities would be required to bid as one and the cap would be applied to them jointly. Standard roaming agreements would not result in the companies being deemed associated. Entities would be able to request a ruling as to whether an agreement would have the effect of making them associated or affiliated for the purposes of the auction. Changes to the specific auction rules and the conditions of licence relating to associates will be discussed in the upcoming consultation on the licensing and auction framework.

[30] Affiliated and associated entity definition for the AWS auction is available at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08833.html.

141. *Unpaired blocks D and E.* As described earlier, the technology planned for blocks D and E in the Lower 700 MHz is not currently available and, hence, untested in the marketplace. Furthermore, the planned use of these blocks would likely involve joint use with other spectrum bands. Open bidding will allow the bidders who value this spectrum the most to acquire these blocks.

142. *Rollout obligation.* In several past licensing processes, Industry Canada has made use of general rollout obligations intended to encourage licensees to put the spectrum to use and to deter acquisition of spectrum licences by speculators and those whose intent is to preclude access to the spectrum by their competitors. Several respondents noted the importance of this requirement, particularly given the high demand for the 700 MHz band in comparison to its availability. A condition of licence similar to those previously used will apply to all licences issued subsequent to the 700 MHz auction. This condition of licence will be in addition to any applicable rural rollout conditions. Comments will be sought on the details of the general deployment requirement that will apply to the 700 MHz licences (e.g. population coverage required and time frame) in the upcoming consultation on the licensing and auction framework.

Decisions on mechanisms to promote competition in the 700 MHz auction

143. Given the above considerations, the following measures will be adopted for the 700 MHz auction:

B3-1: A spectrum cap of two paired frequency blocks in the 700 MHz band (blocks A, B, C, C1 and C2) is applicable to all licensees.

B3-2: A spectrum cap of one paired spectrum block from within blocks B, C, C1 and C2 is applicable to all large wireless service providers. Large wireless service providers are defined as companies with 10% or more of national wireless subscriber market share, or 20% or more wireless subscriber market share in the province of the relevant licence area.[31, 32]

B3-3: Unpaired blocks D and E in the Lower 700 MHz band are not subject to a spectrum cap.

B3-4: Industry Canada will consult with a view to revising the rules on associated entities.

B3-5: A general rollout obligation will apply to all 700 MHz commercial licences. Industry Canada will consult on the details of the general deployment requirements (e.g. population coverage and time frame).

144. *Limiting transfers to maintain spectrum cap*. In the past, Industry Canada has implemented competitive measures, such as spectrum caps and set-asides, and maintained them post-auction in order to ensure that the measure is effective. In the 2008 AWS auction, licences acquired in the spectrum set aside specifically for them could not be transferred or leased to companies that did not, at the time of the auction, meet the criteria of a new entrant (which included MTS Allstream and SaskTel), for a period of five years from the date of issuance of the licence. Spectrum caps have also been employed in

[31] The subscriber market share for Ontario will apply for the licence area 2-06, Eastern Ontario and Outaouais.

[32] For the Tier 2-14 licence area (Yukon, Northwest Territories and Nunavut), only the national market share criteria will apply.

previous auctions, such as in the auctions of the 2.3 GHz and 3.5 GHz bands and remained in effect for various time frames following the close of the auctions to deter speculation.

145. As a "dual" spectrum cap will be implemented in the 700 MHz band, restrictions on secondary market transactions, including transferability of licences, should be imposed for specific time frames post-auction in order to limit the opportunities for a company to purchase another company's licence in order to circumvent the cap.

146. Retaining the spectrum caps for five years from the date of issuance of the licence would reduce the attractiveness of the licences to speculators yet would permit market adjustments within a reasonable period of time.

Decision regarding limitations on licence transfers in the 700 MHz band

147. The following decision has been made with respect to the 700 MHz auction:

B3-6: The spectrum caps put in place for the 700 MHz auction will continue to be in place for five years following licence issuance. Therefore, no transfer of licences or issuance of new licences will be authorized if it allows a licensee to exceed the spectrum cap during this period.

B4. Promoting Service Deployment in Rural Areas

148. Through the consultation, Industry Canada sought stakeholder feedback on challenges and specific problems affecting the deployment of MBS to rural and remote areas; changes to existing rules or policy measures needed to facilitate deployments in rural and remote areas; and specific measures to be adopted within the 700 MHz spectrum auction process to ensure deployment of advanced mobile services in rural and remote areas.

149. *Rural Deployment Challenges.* The majority of respondents felt that it is difficult to support the significant investments required to deploy in areas where there is not a strong business case. Respondents generally commented that given the small populations in such areas, there is also a lower potential return associated with any investments.

150. To address this challenge, Public Mobile recommended government subsidies to support deployment in non-commercially viable areas. SSi recommended that, where possible, incentives be provided to service providers to expand into unserved or underserved rural areas. Such incentives could take the form of a spectrum set-aside, financial subsidies, reduced auction fees, smaller tier sizes and measures to prevent the hoarding of spectrum.

151. Apart from the lack of a strong business case, many respondents cited the operational challenges which exist, such as the requirement to negotiate roaming agreements with large service providers, delays and difficulties in accessing sites, and the limited availability of equipment tailored to the characteristics of remote/rural areas. The Government of Alberta pointed to situations where current spectrum licensees are often reluctant to sub-license their unused spectrum to rural providers.

152. Canadian mobile high-speed packet access (HSPA) broadband coverage is excellent by international standards. Canadian service providers have achieved HSPA wireless coverage to 97% of the population,[33] similar to coverage in the United States, and ahead of coverage in much smaller and densely populated countries such as France, England and Spain. However, given the geography, demographics and other factors, existing infrastructure varies from region to region and between different service providers. The remoteness of some regions creates far greater complexity and cost than is the case with urban build-outs. As noted by respondents, there is, at best, a marginal business case to support the significant investment and higher operational costs required to deploy in some of these rural or remote areas. In the most rural and remote areas, deployment may not be commercially viable without government subsidy. Programs such as Broadband Canada: Connecting Rural Canadians and various provincial programs have provided incentives in the past.

153. Nonetheless, there are general measures and others specific to 700 MHz that can be taken to promote service deployment in rural areas.

B4.1 General Regulatory Measures for Rural Deployments

Summary of comments

154. Comments were received from respondents on the need for further regulatory measures or changes to the existing RP-019, *Policy for the Provision of Cellular Services by New Parties*,[34] to facilitate service deployment in rural and remote areas that remain unserved and/or underserved. RP-019 facilitates the provision of cellular services to unserved and underserved areas by enabling entities to apply for access to cellular spectrum in these areas. Some respondents advocated retaining RP-019, others suggested expanding RP-019 to include other frequencies, whereas some suggested removing RP-019 altogether and allowing market forces to prevail. The Ontario Telecommunications Association and Xplornet recommended revising RP-019 to broaden the scope of frequencies covered and to establish another process whereby companies could apply to Industry Canada to reclaim licensed spectrum, on a Tier 4 basis, that is unused within a specified period of time. SSi suggested retaining RP-019 in its present form.

Discussion

155. There are currently various mechanisms for obtaining spectrum in rural areas that include secondary market transfers (including subordinate licensing), the first-come, first-served PCS licensing process (there are some licences currently available in rural areas), and RP-019. Recognizing that RP-019 only applies to the Cellular spectrum, consideration should be given to reviewing the policy to assess possible changes to improve the process and whether the policy should apply to other spectrum bands. However, a review will not result in immediate changes to newly licensed mobile bands, including the AWS, 700 MHz and 2500 MHz bands, as licensees should be able to count on a substantial period of time to deploy systems extensively before such spectrum is subject to RP-019.

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33 *CRTC Communications Monitoring Report*, July 2011.

34 See RP-019, *Policy for the Provision of Cellular Services by New Parties*, at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01593.html.

Decision related to general regulatory measures for rural deployments

B4-1: RP-019, *Policy for the Provision of Cellular Services by New Parties*, will be reviewed to assess possible changes to improve the process and determine whether the policy should be expanded to apply to other bands.

B4.2 Specific Measures to be Adopted with 700 MHz Spectrum Auction Process

Summary of comments

156. The majority of respondents recommended specific measures to be adopted within the 700 MHz auction process in support of rural deployment. MTS Allstream, Rogers, SaskTel, Shaw, QMI and TELUS advocated for clearly defined rollout conditions, similar to those set out for AWS licences, to be met within a specified time frame (e.g. five or 10 years).

157. To support rural deployment, EastLink, Government of British Columbia, OTA, Public Mobile, Xplornet, Peace Region Internet Society, British Columbia Broadband Association, Canadian Cable Systems Alliance and Tbaytel recommended a rural set-aside.

158. Rogers commented on the need for a sufficient quantity of spectrum for extensive rural deployment and for it to be economically viable.

Discussion

159. The 700 MHz spectrum is ideally suited for mobile broadband rural deployment given its propagation characteristics. Many respondents suggested that a rural set-aside be implemented, with various forms being proposed. However, one of the major challenges being faced in this auction is the high value of the spectrum for both urban and rural areas, coupled with the very high level of demand for mobile services in the limited spectrum available. Setting aside spectrum for rural providers would require Industry Canada to establish a fairly limited definition of eligible rural providers. This could result in the exclusion of some providers who either have a proven track record in serving extensive rural subscribers or other providers who could have plans to serve rural Canadians.

160. In response to submissions made, Industry Canada has taken into consideration the high level of support for rollout conditions and the operational challenges affecting deployment. It is noted that the cost to deploy will be particularly high for those without existing infrastructure. It is also noted that deployment is more cost-effective (with more capacity per megahertz) when service providers have access to two or more paired blocks of spectrum. Thus, consideration was given to the amount of spectrum required to be cost-effective and minimize operational challenges, the appropriate level of population coverage and the reasonable amount of time for deployment.

161. The 700 MHz spectrum is a key enabler for provision of the latest wireless services to Canadians and a condition of licence is required to ensure that services are delivered to a high percentage of rural areas and that they are not unduly delayed. A condition of licence similar to those applied in previous licensing processes (e.g. 50% of the population within a specified time period) will likely result in significant deployment to urban areas; however, deployment to rural communities would not be assured.

162. To ensure that rural communities are served, deployment must at a minimum reach 90% of the population of the licensee's existing mobile broadband (HSPA) footprint. Based on national HSPA coverage of 97%, 87% of Canadians would have access to next-generation services on 700 MHz. Raising deployment to 97% of the footprint would mean that 94% of the Canadian population would have access to new services via 700 MHz. It is recognized that requiring licensees in a particular band to expand beyond 97% of their footprint may not be practical, as the existing coverage would probably be sufficient and it is also likely that satellite would be the better solution for many of these areas. Furthermore, in the most rural and remote areas, deployment may not be commercially viable without government subsidy.

163. Various time frames to support rural population coverage for 90% and 97% were considered. A longer time period (e.g. seven years for 90% and 10 years for 97%) for deployment would not be a meaningful condition of licence because the timelines are too distant given the pace of change of technology. A shorter time period (e.g. three years for 90% and five years for 97%) could be overly onerous and may compel licensees to prematurely deploy in areas where HSPA services have been recently deployed and demand does not warrant an immediate overlay. Also, some licensees would likely not have sufficient time to plan and deploy the new network.

164. To facilitate rural communities receiving next-generation mobile services within a reasonable time frame, licensees will be required to deploy the 700 MHz spectrum to 90% of the population of their existing mobile broadband (HSPA) network footprint[35] within five years and 97% of their HSPA network footprint within seven years. This time frame of five and seven years will ensure timely deployment of mobile broadband to rural Canadians while permitting some flexibility for companies to put in place business plans.

165. It is recognized that two blocks of paired spectrum provide for increased network efficiencies making it more cost effective to deploy in rural areas. Therefore, the rural deployment requirement will only be applied to entities that have access to two or more blocks of paired spectrum through licences obtained in the auction and/or spectrum sharing arrangements. As noted in Decision B3-4, Industry Canada will consult on the rules related to associated entities to consider changes that would permit certain business arrangements between competitors while still having the caps apply individually.

166. These requirements will be set out in conditions of licence which will be based on the licensees' existing HSPA network footprints. For licensees that build a joint network in the future, their HSPA network footprint coverage requirement will be based on existing HSPA network footprint(s). Taking this approach, the ability to meet this condition of licence would be greatly facilitated by the extensive tower infrastructure already in place that covers a significant portion of the population (97% of Canadians at this time). In addition to leveraging existing infrastructure, service providers will also benefit from the efficiencies resulting from access to at least two paired blocks of spectrum. It is believed that leveraging the existing HSPA network footprint through existing infrastructure would ensure that the costs to provide services are not overly onerous. In all instances, the existing HSPA network footprint coverage is the coverage in effect as of the release date of this paper. Standard roaming agreements would not result in the companies being deemed associated.

[35] The HSPA network footprint is defined as the total area where a licensee provides mobile HSPA service by way of its own network facilities, in any commercial mobile band.

167. It is recognized that some companies will not have any requirements to deploy to rural areas if their acquisition of spectrum does not include two paired blocks or if their current HSPA footprint is predominantly urban.

168. In addition to the general deployment requirements noted in Section B3, the following condition of licence will also apply.

Decision related to specific measures to be adopted with the 700 MHz spectrum auction process

B4-2: A condition of licence will apply to 700 MHz licensees which requires the following:

(1) In each licence area where a licensee holds two or more paired blocks of spectrum in the 700 MHz band, or has access to two or more paired blocks of spectrum in the 700 MHz band through association, that licensee must deploy its 700 MHz spectrum:

(a) to cover 90% of the population of its existing HSPA network footprint within five years from the date of the issuance of the 700 MHz licence; and

(b) to cover 97% of the population of its existing HSPA network footprint within seven years from the date of the issuance of the 700 MHz licence.

(2) Coverage provided only through a roaming agreement is not considered to be part of the licensee's HSPA network footprint.

(3) Existing HSPA network footprint coverage is the coverage in effect as of the release date of this paper.

B5. Open Access

169. When the 700 MHz band was auctioned in the United States, requirements for "open platforms for devices and applications" were included in the FCC rules applicable to Block C (746-757/776-787 MHz) in the Upper 700 MHz band. The term *open platforms for devices* refers to the ability of device manufacturers to develop, and of users to procure, the devices of their choosing, as long as the wireless network is not negatively impacted. *Open platforms for applications* refers to the ability of application developers to create, and of users to download, install and use, the applications of their choice, while complying with certain technical conditions related to the management of the wireless network.

170. In the 700 MHz consultation, comments were sought on whether there was a need for government intervention to promote open access by increasing user access to handsets and/or applications and, if so, what specific measures should be implemented.

Summary of comments

171. The majority of the wireless service providers that provided comments on this topic stated that government intervention is not required to stimulate open access. Bell indicated that the market and technology environment has evolved considerably since 2007 when the FCC decided to implement the open access requirement for 700 MHz Upper C block. Since then, the market has seen the introduction and the widespread adoption of smart phone devices and associated "application stores" which are not under the control of the wireless licensees. SaskTel suggested that government intervention is not necessary, as "there are sufficient competitive forces in the market place already driving vendors and service providers towards open access for platforms and devices." TELUS pointed out that the "market is already delivering open platforms" aside from the Apple closed platform which is, in fact, extremely popular with consumers. TELUS also considered that, as a possible unintended consequence, a strict interpretation of the open platform provision may block devices based on closed application platforms (like the iPhone) from deployment. Public Mobile proposed that if open access requirements are implemented, they should apply to all service providers and across all spectrum. Mobilicity indicated that if open access is mandated for applications, it should apply only to blocks C1 and C2. Axia supported mandated open access requirements across all future commercial mobile bands. Axia is of the view that since spectrum is a public resource, and while organizations may compete for the right to use it, they should not be able to use that right to stifle or prevent innovation and fair and open competition.

172. Media and content development organizations supported government intervention to promote open access. CACTUS endorsed the principle of open access on all platforms, as spectrum is a scarce public resource and relatively few companies will be able to win any spectrum in this auction.

173. Drs. G. Taylor and C. Middleton from Ryerson University supported "Open Platform Standards" given that "restrictions that restrict user and developer access to wireless networks with the devices and/or applications of their choice limit innovation and constrain consumer choice."

Discussion

174. The latest generation of wireless services and devices are based on broadband IP connectivity. Advanced user devices recently available on the market are able to connect to the Internet through multiple media types (wired, licensed 3G/4G wireless, or unlicensed types such as WiFi). Users of these advanced services have an expectation of being able to use their mobile broadband devices with the same degree of flexibility and access as using any personal computer connected to the Internet. Based on continued advances in technology and dynamic changes in the marketplace, consumers and businesses are gaining access to a rapidly growing range of wireless devices and applications. Recent evolutions in the market have resulted in the developers of mobile operating systems and consumers having more control over the development, the distribution and the use of mobile applications. Widely available platforms, such as Android, iOS, Windows 7 and Blackberry OS, enable users to access very large collections of applications and content.

175. With respect to hardware and device platforms, most wireless service providers in Canada have adopted the 3GPP family of technologies, i.e. HSPA from the GSM family of standards, for their service delivery. The great majority of Canadian wireless users acquire their devices at subsidized

prices directly from the wireless service providers. As mentioned in the 700 MHz consultation paper, Canadian consumers also have the ability to acquire their choice of handset from third party retailers and then purchase wireless only services from service providers with compatible networks. The current practice in the market is that service providers support and welcome such customers with "third party handsets," as long as these devices are technically compatible and do not harm the wireless network. Moreover, other types of devices based on completely different service models (some of them not "open") have recently entered and are successful in the market, for example, machine-to-machine communications, e-book readers, etc.

176. Industry Canada concludes that government intervention to promote open access, as described above, is not required.

Decision related to open access

B5-1: No measures to ensure open access provisions, for devices and/or applications, are to be implemented at this time.

B6. Treatment of Existing Spectrum Users

177. Until recently, the 700 MHz band has been used by the broadcasting and broadcasting auxiliary services, as well as low-power licensed devices such as wireless microphones. With recent advances in digital transmission technology, television broadcasting can now be delivered more efficiently (using less spectrum), thereby freeing up spectrum that can be repurposed for other services and applications.

178. *Low-power television stations.* In preparation for the digital TV (DTV) transition, the CRTC confirmed in 2010 its decision to clear the 700 MHz band of all full-power analog broadcasting transmitters by August 31, 2011. This transition took place as scheduled. In its broadcasting regulatory policy,[36] the CRTC noted that broadcasters currently operating outside of the mandatory markets which have chosen not to convert to digital are required to either move their service(s) out of TV channels 52-69 (698-806 MHz) or cease operation of their analog transmitter(s). The CRTC, however, did not make any provisions to transition low-power television (LPTV) operations. Industry Canada stopped issuing LPTV broadcasting certificates for the band 746-806 MHz in 2000.[37] In the 700 MHz consultation, Industry Canada announced its decision to cease the issuance of new broadcasting certificates for LPTV stations in the 698-746 MHz range. It also sought comments regarding the use of a transition policy for the displacement of LPTV stations operating in the bands 698-768 MHz and 776-798 MHz.[38] Specifically, Industry Canada proposed that the displacement of the LPTV stations operating in these bands be subject to a notification period of one year for LPTV stations located in urban areas; and a period of two years for LPTV stations in all other areas.

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[36] For further information regarding the CRTC decision, refer to the *Broadcasting Regulatory Policy CRTC 2010-167*.

[37] Refer to Industry Canada's letter to the CRTC in response to Public Notice CRTC 2000-127 — *Call for comments on a licensing framework for low-power community television undertakings in urban areas, and in other markets not covered by existing policy* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08086.html).

[38] LPTV operations in the bands 768-776 MHz and 798-806 MHz are addressed in SP-768 MHz.

179. Those respondents who commented on this issue supported Industry Canada's proposal.

180. During the DTV transition, approximately 140 analog stations were converted to DTV transmission and their analog TV facilities were switched off. Among the 35 full-power analog stations that were operating in the 700 MHz band prior to the DTV transition deadline, 17 of these were converted to DTV using their post-transition channels below 700 MHz band and nine were converted to LPTV in order to remain in the 700 MHz band on a secondary basis. The remaining full-power analog stations either relocated below 700 MHz (and continued to operate as analog stations) or shut down their operations. Only 51 LPTV stations remain in the 700 MHz band.

181. *Low-power licensed devices, including wireless microphones.* Comments were sought on the proposal to permit these devices to operate in the bands 698-764 MHz and 776-794 MHz[39] only until March 31, 2012. All comments received supported Industry Canada's proposal with regard to low-power licensed devices, including wireless microphones.

Decisions related to existing users of the 700 MHz band

182. Taking into consideration that no respondents objected to the proposal presented in SMSE-018-10 regarding LPTV and low-power licensed devices, including wireless microphones, these proposals, as presented in the consultation SMSE-018-10, will be adopted.

183. Proposals addressing the operation of wireless microphones below 698 MHz are addressed in Notice No. SMSE-012-11 — *Consultation on a Policy and Technical Framework for the Use of Non-Broadcasting Applications in the Television Broadcasting Bands Below 698 MHz*.

B6-1: LPTV stations are permitted to continue to operate, but are subject to displacement. Industry Canada may issue a displacement notice on the following basis:

(a) Where a licensee planning to deploy services in the bands 698-768 MHz and 776-798 MHz identifies a specific LPTV station that may prevent its deployment, the licensee can approach Industry Canada with an identification of the areas, the spectrum required and planned time frames for its deployment. Industry Canada will examine the submission and, if it is determined that the continued operation of the LPTV station will interfere with these new services, will issue a displacement notice providing for termination of the broadcast certificate and requiring the LPTV operator to cease or migrate its operations.

(b) The following minimum notification periods between the displacement notice and termination of the broadcast will apply: (i) LPTV stations located in the proximity of urban areas (as detailed in Annex 5) will be afforded a minimum of a one-year notification period; and (ii) LPTV stations located in all other areas (also listed in Annex 5) will be afforded a minimum of a two-year notification period.

(c) Voluntary agreements between the LPTV station operators and 700 MHz licensees may provide for earlier displacement or for the continued operation of the LPTV stations.

[39] In the bands 764-776 MHz and 794-806 MHz, which are designated for public safety systems, operation of wireless microphones is already prohibited as per SAB-001-10.

B6-2: The nine full power stations which converted to LPTV in order to remain in the 700 MHz band on a secondary basis after August 31, 2011, will only be permitted to operate up to the date of the 700 MHz auction. These stations are also listed in Annex 5.

B6-3: Low-power licensed devices, including wireless microphones, will only be allowed to operate in the bands 698-764 MHz and 776-794 MHz until March 31, 2013.

B7. Spectrum Utilization Policy

184. In SMSE-018-10, comments were sought on the adoption of a spectrum utilization policy for the 700 MHz band. It was proposed that commercial services in the band be referred to as Mobile Broadband Services (MBS). MBS systems would be compliant with the Radio Policy RP-014 definition for Cellular Mobile Radio Service (CMRS), and no restrictions would be placed on the types of services offered by licensees under MBS (other than technical compatibility considerations).

185. All comments received on this topic supported the proposed spectrum utilization policy.

Decision related to the 700 MHz spectrum utilization policy

B7-1: Systems for MBS shall comply with the Radio Policy RP-014 definition for CMRS, and no restrictions will be placed on the types of services offered by licensees (other than technical compatibility considerations).

186. A spectrum utilization policy document for MBS systems operating in the 700 MHz band will be published and RP-014 will be updated thereafter.

B8. Changes to the Canadian Table of Frequency Allocations

187. In SMSE-018-10, Industry Canada proposed to update the *Canadian Table of Frequency Allocations* (herein referred to as "the Canadian Table") to reflect the global identification for International Mobile Telecommunication (IMT) in the band 698-862 MHz.

188. In 2007, the International Telecommunication Union (ITU) identified additional spectrum for use by IMT systems within the 698-862 MHz band. In particular, the following bands were identified for IMT use in each of the three ITU regions:[40]

- Region 1: 790-960 MHz
- Region 2: 698-960 MHz
- Region 3: 790-960 MHz[41]

[40] ITU Region Map: http://www4.plala.or.jp/nomrax/ITU_Reg.htm.

[41] Although the band 790-960 MHz was identified for IMT in Region 3, Bangladesh, China, Korea (Rep. of), India, New Zealand, Papua New Guinea, Philippines and Singapore also identified the band 698-790 MHz to align with Region 2. The frequency arrangements for the respective regions are found in the document ITU-R M.1036-2.

189. Currently, the Canadian Table allows for Broadcasting and Mobile services in certain portions of the band 614-806 MHz. Industry Canada is proposing to allocate the band 698-806 MHz on a co-primary basis to Broadcasting, Mobile and Fixed services, whereas the remaining band 614-698 MHz would remain unchanged. The Canadian footnotes are updated to reflect the new IMT identification as well.

190. Of the 88 comments received in response to SMSE-018-10, no objection to this proposal was noted.

191. Since the consultation paper was published, the international footnote 5.297 (which identifies the band 512-608 MHz for co-primary fixed and mobile allocations) was added to the Canadian Table for the frequency range 470-608 MHz. As a result, this international footnote also needs to be addressed in Canadian footnote C24, which currently applies only to the bands 470-512 MHz and 614-806 MHz.

Decision on changes to the Canadian Table of Frequency Allocations

B8-1: The *Canadian Table of Frequency Allocations* will be updated to include the following:

MHz
470 – 608 BROADCASTING 5.293 5.297 C24
…
614 – 698 BROADCASTING 5.293 C24
698 - 806 BROADCASTING FIXED MOBILE 5.317A C7 5.293

C24 **(CAN-11)** In the bands 470-608 MHz and 614-806 MHz, international footnotes **5.293** and **5.297** have raised the fixed and mobile services to a co-primary status with the broadcasting service. In Canada the fixed and mobile services have primary allocations only in the 698-806 MHz range. Industry Canada will carry out public consultation in the future in order to

consider adopting the other service allocation provisions of international footnotes **5.293** and **5.297** in the frequency bands 470-608 MHz and 614-698 MHz.

C7 **(CAN-11)** International Footnote **5.317A** provides administrations with the flexibility to implement International Mobile Telecommunications (IMT) in the parts of the band 698-960 MHz that are allocated to the mobile service on a primary basis. The application of **5.317A** is limited to the bands designated for cellular mobile radio systems, cellular mobile telephony and trunked mobile systems. The bands 698-758 MHz and 776-788 MHz, 824-849 MHz and 869-894 MHz are designated for cellular mobile radio systems, cellular telephony services and the bands 806-821 MHz, 851-866 MHz, 896-902 MHz and 935-941 MHz are designated for trunked mobile services and, as such, can evolve to accommodate IMT service capabilities.

PART C — Decisions on Spectrum Packaging and the Licensing of Broadband Radio Service (BRS) in the 2500 MHz Band

Background

192. In February 2011, Industry Canada announced its decisions from the consultation initiated by DGSO-001-10[42] in *Canada Gazette* SMSE-005-11 — *Decisions on a Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band 2500-2690 MHz*. In SMSE-005-11, Industry Canada announced its decisions related to the adoption of a new band plan, as well as the mapping of Multipoint Communication Systems (MCS) and Multipoint Distribution Service (MDS) licensees into the new BRS band plan.

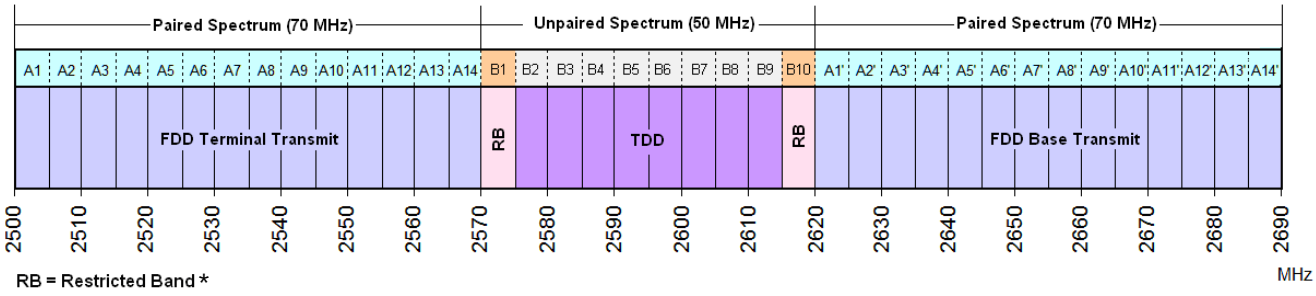
193. In SMSE-005-11, the Department also initiated the consultation on a policy and technical framework to further license spectrum in the 2500 MHz band. Comments and reply comments were received from various entities (see Annex 6).

C1. Spectrum Packaging for Licensing

C1.1 Spectrum Available for Licensing

194. As per SMSE-005-11, the following general band plan was adopted for BRS in the 2500 MHz band (see Figure C1). Also shown in the figure is the associated reference to specific channels within the band.

Figure C1 — General band plan for BRS in the band 2500-2690 MHz

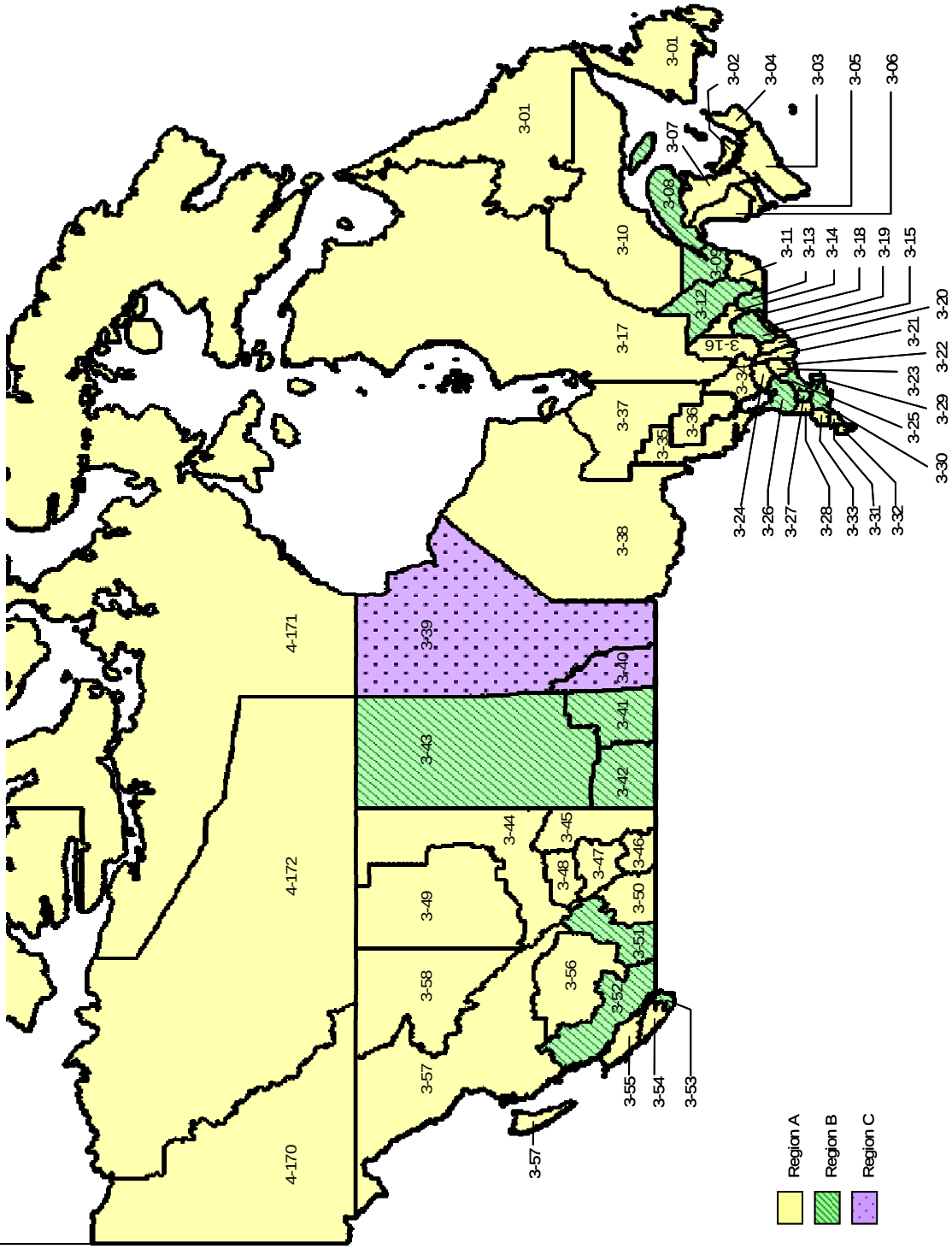


* Operation in the restricted bands (2570-2575 MHz and 2615-2620 MHz) is specified in SMSE-005-11.

[42] See DGSO-001-10: *Decisions on the Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz and Consultation on Changes Related to the Band Plan*.

195. As noted in SMSE-005-11, figures C2 to C5 show the amount of spectrum available in the three Regions[43] in Canada:

Figure C2 — Map of Regions



[43] Refer to Appendix A in SMSE-005-11, *Decisions on a Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band 2500-2690 MHz* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09992.html); Region A — areas where the MDS spectrum has not been licensed; Region B — areas where both the MCS and MDS spectrum have been licensed; Region C — Manitoba.

Figure C3 — Spectrum available for licensing in Region A

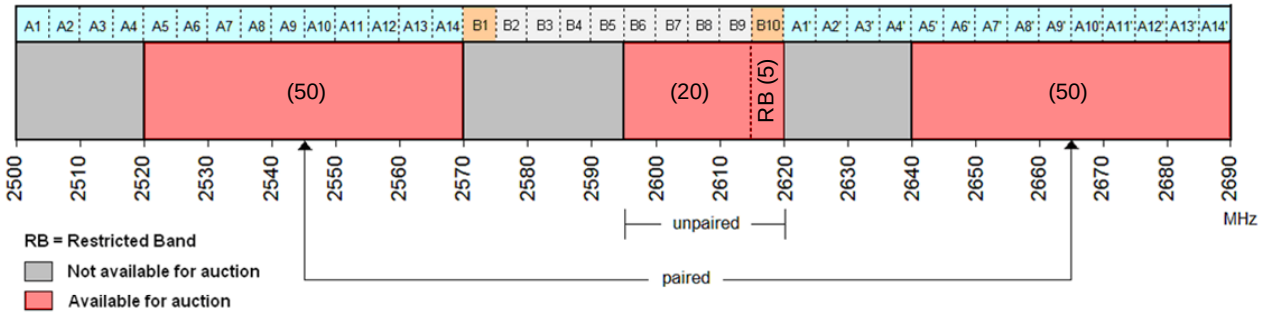


Figure C4 — Spectrum available for licensing in Region B

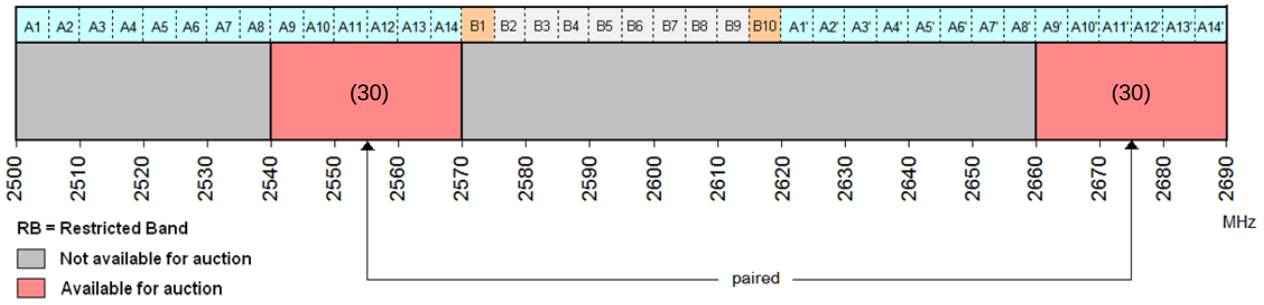
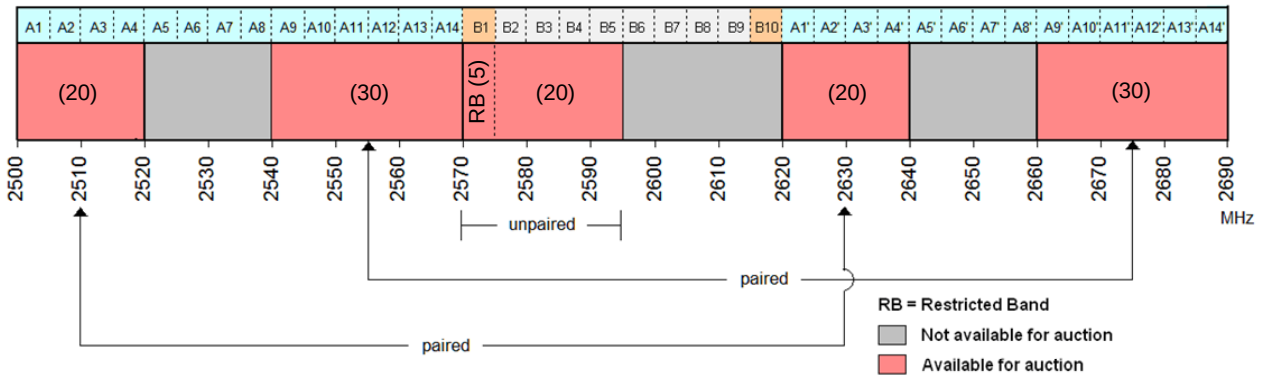


Figure C5 — Spectrum available for licensing in Region C



196. As shown in figures C3 to C5, a minimum of 30+30 MHz and a maximum of 50+50 MHz of paired spectrum are available for licensing throughout Canada. As well, up to 25 MHz of unpaired spectrum (including the respective 5 MHz restricted band) is available for licensing in most areas across the nation.

C1.2 Block Sizes

197. Industry Canada consulted on the optimal block sizes to be used in the licensing of the 2500 MHz band. Comments were sought with respect to both the paired and unpaired spectrum blocks.

Summary of comments

198. *Block sizes in the paired spectrum.* With respect to the paired spectrum (2500-2570 MHz and 2620-2690 MHz), all respondents agreed that, given the amount of spectrum in the 2500 MHz band and the globally harmonized band plan, the 2500 MHz band has promising potential to facilitate the offering of high capacity broadband services to Canadians. Although respondents agreed that wide frequency blocks will be required to deliver such services, they differed in terms of what the minimum block sizes for licensing should be. Bell, Huawei, Niagara Networks, PIAC, the RABC, Rogers, SaskTel, SSi and TELUS were of the view that uniform block sizes of 5+5 MHz across all Regions would allow for more service providers to acquire spectrum while allowing bidders the flexibility to aggregate blocks into larger blocks of contiguous spectrum according to their business plans. Rogers further commented that "this approach would place a greater reliance on market forces in determining the appropriate spectrum block sizes."

199. Bell, Huawei, the RABC, SaskTel and TELUS also recommended that Industry Canada permit post-auction voluntary spectrum swapping to facilitate spectrum aggregation for efficiency, as well as to enhance the business case and service offering. Bell went one step further and proposed that Industry Canada allow voluntary swapping of spectrum prior to the final assignment of the spectrum licences.

200. EastLink, Electro-Federation Canada (EFC),[44] MTS Allstream, Shaw, QMI and Xplornet recommended that uniform block sizes of 10+10 MHz be implemented in all Regions. These parties were of the view that such block sizes represent a balance between spectral efficiency and flexibility for businesses to acquire spectrum best suited to their needs. These parties stated that block sizes of 5+5 MHz are too small and that new BRS licensees may be left with insufficient channel widths to provide competitive services.

201. Public Mobile supported a mix of 10+10 MHz and 15+15 MHz block sizes stating that this block size proposal, along with its spectrum cap proposal, would enable the entry of a minimum of two new BRS licensees and ensure that each new licensee has sufficient spectrum to launch effective LTE offerings. However, Public Mobile stated that if Industry Canada decides to implement uniform block sizes, it would support block sizes of 10+10 MHz.

202. RIM suggested that at least one block of a significant size be made available in order to "offer a class-leading high speed and high capacity network." RIM recommended that block sizes of 30+30 MHz and 20+20 MHz be implemented in Regions A and C. Alternatively, RIM suggested combinations of 20+20 MHz and 10+10 MHz blocks.

203. Table C1 summarizes the comments received with respect to block sizes in the paired spectrum.

[44] Electro-Federation Canada (EFC) submitted its comment through the RABC.

Table C1 — Summary of comments received related to block sizes in the paired spectrum (bands 2500-2570 MHz and 2620-2690 MHz)

Number of blocks for auction and corresponding block sizes		Respondents supporting
Region A and Region C (50+50 MHz)	**Region B (30+30 MHz)**	
10 x (5+5 MHz)	6 x (5+5 MHz)	Bell, Huawei, Niagara Networks, PIAC, the RABC, Rogers, SaskTel, SSi and TELUS
5 x (10+10 MHz)	3 x (10+10 MHz)	EastLink, EFC, MTS Allstream, Public Mobile,[45] Shaw, QMI and Xplornet
2 x (10+10 MHz) 2 x (15+15 MHz)	2 x (15+15 MHz)	Public Mobile[46]
1 x (20+20 MHz) 1 x (30+30 MHz)	1 x (30+30 MHz)	RIM[47]
1 x (10+10 MHz) 2 x (20+20 MHz)	1 x (30+30 MHz)	RIM[48]

204. *Block sizes in the unpaired spectrum.* With respect to the unpaired spectrum (2570-2620 MHz), Niagara Networks, Rogers, and SaskTel recommended that uniform blocks of 5 MHz be used. These parties cited the benefit of flexibility for service providers to aggregate blocks to form wider blocks as desired.

205. However, Bell, Huawei, MTS Allstream, QMI, the RABC, SSi, TELUS and Xplornet supported uniform blocks of 10 MHz in all Regions. Bell recommended that 5 MHz blocks not be used given that guardbands may be required to reduce problems of interference between networks. Specifically, Bell stated that "if there are small block sizes and multiple operators, the need for guardbands will compromise the efficient use of the TDD-based spectrum." EastLink also addressed the issue of guardbands stating that the unpaired spectrum is "subject to substantial interference such that carriers would require guardbands of at least 2 MHz to provide quality service." EastLink stated that this not only wastes spectrum, but also limits the capacity of both blocks. As a result, EastLink supported an unpaired block size of 20 MHz. In addition to EastLink, EFC, Public Mobile and Shaw were also in support of an unpaired block size of 20 MHz.

206. Respondents generally agreed that the restricted bands, 2570-2575 MHz (block B1) and 2615-2620 MHz (block B10), should be added to the adjacent assigned unpaired blocks regardless of the block size that may be determined. For example, if the block sizes are determined to be 20 MHz, then the licensee assigned to blocks B2 to B5 will also be assigned block B1. Similarly, the licensee assigned to blocks B6 to B9 will also be assigned block B10.

207. Table C2 summarizes the comments received with respect to block sizes in the unpaired spectrum.

[45] Public Mobile's alternate proposal

[46] Public Mobile's primary proposal

[47] RIM's primary proposal

[48] RIM's alternate proposal

Table C2 — Summary of comments received related to block size(s) in the unpaired spectrum

Number of blocks[49] for auction and corresponding block sizes		Respondents supporting
Region A and Region C (20 MHz)*	**Region B (0 MHz)**	
4 x 5 MHz	Not applicable	Niagara Networks, Rogers and SaskTel
2 x 10 MHz	Not applicable	Bell, Huawei, MTS Allstream, QMI, the RABC, SSi, TELUS and Xplornet
1 x 20 MHz	Not applicable	EastLink, EFC, Public Mobile and Shaw

*This does not include the restricted bands.

Discussion

208. It is recognized that the 2500 MHz band offers a substantial amount of spectrum and that it will be beneficial in meeting the rapidly rising demand for capacity to deliver broadband services.

209. As discussed in SMSE-005-11, different bidders will have different spectrum requirements.

210. *Block sizes in the paired spectrum*. One of the advantages of licensing the paired spectrum based on small block sizes (i.e. 5+5 MHz) is that service providers would have the flexibility to aggregate blocks into larger blocks of contiguous spectrum according to their business plans. However, with small block sizes, there is a possibility that some licensees may end up with only a single paired block of frequencies despite their attempt to secure multiple blocks during the 2500 MHz spectrum auction. In order to promote the delivery of efficient broadband services, the block sizes should not be so small so as to hinder a service provider's capacity to provide broadband services in the 2500 MHz band. At the same time, it is important that service providers be provided with sufficient flexibility to aggregate multiple blocks in a manner which best suits their specific business needs. It is also recognized that block sizes that are too large (e.g. 15+15 MHz or 20+20 MHz) may limit the number of service providers in the 2500 MHz band and stifle competition.

211. With respect to whether different block sizes should be used in different geographic regions, it is noted that uniform block sizes across all licence areas would enable service providers to acquire multiple blocks across multiple licence areas. The imposition of different block sizes in different regions may unnecessarily complicate the bidding process and make it difficult for bidders to aggregate spectrum.

212. In light of the above, block sizes of 10+10 MHz will be used in the paired spectrum in all licence areas to best balance such requirements. Licensees may aggregate multiple blocks up to the permissible spectrum aggregation limit set out later in this document (see Section C2).

213. *Block sizes in the unpaired spectrum*. As with paired spectrum, the implementation of small block sizes in the unpaired spectrum has the advantage of providing bidders the flexibility to form larger blocks in the unpaired spectrum. However, as discussed in SMSE-005-11, a guardband between unsynchronized networks in the unpaired spectrum is typically necessary to mitigate interference between networks of different service providers. The use of guardbands will, in turn, diminish the amount of spectrum used to carry actual traffic, thus limiting the ability of a service provider to provide

[49] The restricted bands (2570-2575 MHz and 2615-2620 MHz) are not included.

broadband services. One possible solution to ensure the effective use of the unpaired spectrum, while avoiding the use of frequency guardbands, would be to synchronize the affected networks; however, this could result in several technical limitations as outlined in DGSO-001-10.

214. In order to promote the efficient use of the spectrum and the delivery of broadband services to Canadians, Industry Canada has decided that the unpaired spectrum should be licensed in large blocks of 20 MHz. Therefore, taking into account the restricted bands (5 MHz each) between the paired and unpaired spectrum, the unpaired spectrum would be licensed based on 25 MHz blocks (i.e. 2570-2595 MHz and 2595-2620 MHz).

215. With respect to the issue of spectrum transferability of auctioned licences, it will be addressed in the upcoming 2500 MHz consultation on licensing issues.

Decisions related to block sizes in the 2500 MHz band

C1-1: In the bands 2500-2570 MHz and 2620-2690 MHz ("the paired spectrum"), the spectrum is to be licensed in blocks of 10+10 MHz in all licence areas.

C1-2: In the band 2570-2620 MHz ("the unpaired spectrum"), the spectrum is to be licensed in blocks of 25 MHz (which includes the respective 5 MHz restricted band[50]) in all licence areas.

C1.3 Tier Sizes

216. The *Service Areas for Competitive Licensing*[51] document outlines the general service areas that have been used in the past for auctions and other licensing processes. The defined geographic areas have been categorized under "service area tiers" that are based on Statistics Canada's Census Divisions and Subdivisions. The definition of the service areas within these tiers and accompanying maps and data tables are available on Industry Canada's website.

217. As different wireless services and applications are best suited to different service areas, four tiers of service areas have been established (see Annex 4).

218. In DGSO-001-10, Industry Canada announced that Tier 3 service areas would be used for the conversion of eligible MCS and MDS authorizations to BRS spectrum licences, except where two MCS licensees (Inukshuk and SSi) hold spectrum licences with geographic service areas in northern Canada that are equivalent to Tier 4 service areas.

219. In SMSE-005-11, Industry Canada sought comments on which tier size or combination of tier sizes should be used for licensing spectrum in the 2500 MHz band.

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[50] Operation in the restricted bands (2570-2575 MHz and 2615-2620 MHz) is specified in SMSE-005-11: *Decisions on a Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band 2500-2690 MHz.*

[51] Refer to Service Areas for Competitive Licensing at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01627.html.

Summary of comments

220. There was no support from any respondent to license the 2500 MHz band using Tier 1 service areas.

221. MTS Allstream, Public Mobile, QMI, Shaw and TELUS recommended that, where possible, Tier 2 should be used to license the 2500 MHz band. Most of these parties recognized that it may not be practical to license all areas using Tier 2 areas given that existing BRS licences were generally issued on a Tier 3 basis (Tier 4 in Yukon, Northwest Territories and Nunavut). They therefore supported Tier 2 areas where possible and Tier 3 areas otherwise. Specifically, MTS Allstream and QMI submitted that Tier 2 licensing would provide more flexibility for bidders and greater efficiencies because of the larger service coverage areas. In addition, they stated that Tier 2 licensing would result in fewer coordination issues between neighbouring licensees. QMI further commented that Tier 2 licensing would reduce the number of roaming agreements required between neighbours. As a fall back position, TELUS also indicated support for licensing the 2500 MHz band using only Tier 3 areas.

222. Bell, EastLink, the RABC, Rogers and SaskTel opposed the use of Tier 2 areas and supported licensing using Tier 3 areas. They acknowledged that larger areas (such as Tier 2) would result in fewer coordination issues; however, they stated that, given the propagation properties of the 2500 MHz band, coordination issues are more manageable than with lower frequency bands. They submitted that the 2500 MHz band is not envisioned to be used for wide area coverage of sparsely populated areas. As well, they commented that larger licence areas could result in licensees acquiring larger areas than they intended to deploy, thus denying such spectrum to other bidders.

223. SSi stated that Tier 4 areas would allow for a greater number of licensees to acquire spectrum. Xplornet proposed that Industry Canada adopt Tier 4 service areas and unbundle rural service areas from urban areas ("rural unbundling"). This would involve the remapping of certain Tier 4 areas so that the area boundaries are in line with census subdivisions. Xplornet submitted that this would require that 47 of the existing Tier 4 areas be redefined. Bell, however, argued that the implementation of Tier 4 areas could unnecessarily increase the complexity of the licensing process and cost to both Industry Canada and the industry. In addition, SaskTel considered that Tier 4 areas could result in fractured service areas and discontinuous coverage. QMI commented that this also could result in inefficient service deployment. MTS Allstream submitted that Tier 4 areas and the unbundling of rural areas would result in gaps with unissued licences.

224. Niagara Networks proposed that Tier 2 licensing be implemented in the "returned spectrum" (blocks A9-A14 and A9'-A14'). For other frequency blocks, Niagara Networks proposed that Tier 3 licensing be used in areas with large to moderate population densities, together with Tier 4 in the remaining areas. Public Mobile supported a mixture of Tier 2 and Tier 3 areas. In Public Mobile's opinion, Tier 2 licence areas would be overly large and overwhelmingly rural, a situation which is not ideal for service providers that are planning to launch service in urban areas. On the other hand, the adoption of only Tier 3 areas would create a situation where it could be difficult to establish contiguous service areas. Therefore, Public Mobile submitted that "a mixed-tier spectrum plan would allow bidders to manage their business plans for specific geographic regions, and facilitate the planning and deployment of networks with a greater degree of flexibility…leading to a reasonable distribution across carriers and licensed areas…." Public Interest Advocacy Centre (PIAC) also supported the use of a mixture of tier sizes in order to take into account "regional differences" such that they do not "preclude competitors from entering the market or maintaining a competitive presence in any region."

225. Although not related to the issue of tier size, SaskTel stated that changes to the tier area boundaries around Lloydminster, Saskatchewan, are worthy of further consideration by Industry Canada.

226. Table C3 summarizes the comments received related to tier sizes:

Table C3 — Summary of comments received related to tier size(s) in all Regions

Tier size(s)	Respondent supporting
Tier 1	None
Mixture of Tier 2 and Tier 3	MTS Allstream, Public Mobile, QMI, Shaw, and TELUS
Tier 3	Bell, EastLink, the RABC, Rogers and SaskTel
Tier 4	SSi
Redefined Tier 4	Xplornet
Mixture of different tiers	Niagara Networks, PIAC

Discussion

227. The 2500 MHz band, which is the only globally harmonized mobile service band, is envisioned to be used in both urban and rural areas where there is a desire to increase network capacity.

228. Due to the diversity of use in the 2500 MHz band, Tier 1 and 2 licence areas are likely overly large and could potentially result in licensees acquiring larger areas than they intend to deploy, thus denying such spectrum to other bidders. With respect to small licence areas, such as Tier 4, they have the benefit of enabling rural service providers to acquire spectrum only in the specific areas of interest to them. However, Tier 4 licence areas are likely too small for the purposes of providing mobile service and could result in fragmented mobile service offerings. As well, Tier 4 licence areas could cause deployment challenges in many boundary areas. It could result in higher build-out costs and a reduced consumer experience. Furthermore, frequency coordination with neighbouring service providers at the edge of the licence area (to avoid interference) could create uncertainty, delays and additional costs for service providers and may lead to unserved geographic areas.

229. In comparison with Tier 2, Tier 3 service areas provide an opportunity for more service providers to focus on key areas of interest to acquire spectrum, while providing service providers with the ability to aggregate smaller service areas into larger areas. In addition, the use of Tier 3 service areas will provide more opportunities for rural service providers to acquire rural licence areas without having to compete with larger service providers for areas in the urban core of Tier 2 service areas. At the same time, the use of Tier 3 licence areas will result in fewer coordination issues than would the use of Tier 4 service areas.

230. In light of the above and in the interest of balancing the requirement to provide services in both urban and rural areas, all spectrum blocks (paired and unpaired) available for auction shall be licensed on a Tier 3 basis, with the exception of the Northwest Territories, Yukon and Nunavut, where Tier 4 licence areas will be used. The Tier 4 areas in the three Territories are sufficiently large such that they would not lead to the coordination issues as discussed above. This decision is aligned with the 2010 decision (see DGSO-001-10) to generally migrate MCS and MDS licensees into Tier 3 areas, with the exception of Tier 4 in the three Territories.

231. The suggestion to redefine the Tier 4 licence areas is not being undertaken for this licensing process (see discussion in Section C3).

232. With respect to the tier area boundaries around Lloydminster, Saskatchewan, this will be addressed in the upcoming 700 and 2500 MHz consultations on licensing issues.

Decisions related to Tier sizes

C1-3: In the Yukon, Northwest Territories and Nunavut, the licensing of 2500 MHz spectrum shall be based on Tier 4 service areas.

C1-4: In all other areas, the licensing of 2500 MHz spectrum shall be based on Tier 3 service areas.

233. Table C4 summarizes the spectrum blocks, tiers and the number of licences available for the 2500 MHz auction. Annex 7 provides a more detailed table of the spectrum availability for all licence areas.

Table C4 — Summary of spectrum blocks, tiers and number of licences available for the 2500 MHz auction in all Regions

	Block	Frequency	Pairing	MHz	Tier	Licences
Region A - excluding the Territories	A5 to A6/ A5' to A6'	2520-2530 MHz / 2640-2650 MHz	paired	10+10 MHz	3	40
	A7 to A8/ A7' to A8'	2530-2540 MHz / 2650-2660 MHz	paired	10+10 MHz	3	40
	A9 to A10/ A9' to A10'	2540-2550 MHz / 2660-2670 MHz	paired	10+10 MHz	3	40
	A11 to A12/ A11' to A12'	2550-2560 MHz / 2670-2680 MHz	paired	10+10 MHz	3	40
	A13 to A14/ A13' to A14'	2560-2570 MHz / 2680-2690 MHz	paired	10+10 MHz	3	40
	B6 to B10	2595-2620 MHz*	unpaired	25 MHz*	3	40
Region A - Yukon, Northwest Territories & Nunavut	A5 to A6 A5' to A6'	2520-2530 MHz / 2640-2650 MHz	paired	10+10 MHz	4	3
	A7 to A8/ A7' to A8'	2530-2540 MHz / 2650-2660 MHz	paired	10+10 MHz	4	3
	A9 to A10/ A9' to A10'	2540-2550 MHz / 2660-2670 MHz	paired	10+10 MHz	4	3
	A11 to A12/ A11' to A12'	2550-2560 MHz / 2670-2680 MHz	paired	10+10 MHz	4	3
	A13 to A14/ A13' to A14'	2560-2570 MHz / 2680-2690 MHz	paired	10+10 MHz	4	3
	B6 to B10	2595-2620 MHz*	unpaired	25 MHz*	4	3
Region B	A9 to A10/ A9' to A10'	2540-2550 MHz / 2660-2670 MHz	paired	10+10 MHz	3	16
	A11 to A12/ A11' to A12'	2550-2560 MHz / 2670-2680 MHz	paired	10+10 MHz	3	16
	A13 to A14/ A13' to A14'	2560-2570 MHz / 2680-2690 MHz	paired	10+10 MHz	3	16
Region C	A1 to A2/ A1' to A2'	2500-2510 MHz / 2620-2630 MHz	paired	10+10 MHz	3	2
	A3 to A4/ A3' to A4'	2510-2520 MHz / 2630-2640 MHz	paired	10+10 MHz	3	2
	A9 to A10/ A9' to A10'	2540-2550 MHz / 2660-2670 MHz	paired	10+10 MHz	3	2
	A11 to A12/ A11' to A12'	2550-2560 MHz / 2670-2680 MHz	paired	10+10 MHz	3	2
	A13 to A14/ A13' to A14'	2560-2570 MHz / 2680-2690 MHz	paired	10+10 MHz	3	2
	B1 to B5	2570-2595 MHz*	unpaired	25 MHz*	3	2

* Includes 5 MHz restricted band.

C2. Measures to Promote Competition

234. As indicated in SMSE-005-11, general policy-related issues were addressed in the 700 MHz consultation document.[52] These issues included the drivers for spectrum demand, the possible need to promote competition in the Canadian wireless services market and specific mechanisms applicable to both the 700 MHz and 2500 MHz auctions. Through SMSE-005-11, Industry Canada sought views on the mechanisms specifically related to the 2500 MHz band. In particular, Industry Canada consulted on whether it should use mechanisms such as spectrum aggregation limits (spectrum caps) and/or spectrum set-asides to promote competition in the wireless services market.

Summary of comments

235. *Measures to promote competition — General*. Bell, Rogers, SaskTel and SSi were all of the view that there is no need for any such measures. These companies generally submitted that there is already sufficient competition in the wireless services market and that market forces will ensure that the spectrum is put to its best use.

236. On the other hand, other respondents believed that Industry Canada should intervene in the 2500 MHz auction in order to promote competition in the wireless market. EastLink, MTS Allstream, Niagara Networks, PIAC, Public Mobile, QMI, Shaw, TELUS, WIND and Xplornet each proposed various measures to promote competition, including in rural areas. These parties all cited the large amount of spectrum currently held in the 2500 MHz band by the Inukshuk partnership of Bell and Rogers and most argued that Bell, Rogers and Inukshuk should not be allowed to participate in the 2500 MHz auction. In addition, Public Mobile argued that SaskTel should also be barred from bidding in Saskatchewan where it is already a licensee in the 2500 MHz band. Public Mobile, supported by PIAC, further suggested that any service provider with more than 20 MHz of unused spectrum in any commercial mobile band should also not be allowed to participate in the 2500 MHz auction.

237. In addition to the possible implementation of spectrum caps or set-asides, Industry Canada sought comments on whether there are other mechanisms that should be considered and applied in the 2500 MHz band in order to promote competition.

238. In this regard, MTS Allstream recommended that Industry Canada maintain mandatory antenna tower and site sharing and roaming obligations as a condition of licence on all commercial mobile wireless licences. Similarly, Shaw suggested that Industry Canada extend mandated roaming and tower and site sharing for holders of spectrum in the 2500 MHz band. Shaw was also of the opinion that the current rules related to mandated roaming and tower and site sharing require reform.

239. RIM recommended that the auction be structured in a manner to avoid the fragmentation of the 2500 MHz band. RIM stated that this can be achieved with auction procedures which lock out non-contiguous bids or through post-auction assignment of individual channels to ensure that they are contiguous.

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[52] See SMSE-018-10 — *Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum* at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09947.html.

240. Rogers was of the opinion that roll-out requirements are the most effective mechanism to promote competition.

241. *Measures to promote competition — Spectrum caps*. Bell, Rogers, SaskTel and SSi opposed the use of spectrum caps, which they considered would interfere with the efficient allocation of spectrum. Rogers, however, was of the view that a cap on the amount of spectrum which could be obtained in the 2500 MHz auction (i.e. an in-auction cap) would be preferable to either an overall spectrum cap or a set-aside. As well, EastLink and Niagara Networks did not support a spectrum cap, as both considered that a set-aside would be more effective in ensuring that new licensees have access to the 2500 MHz band.

242. Two types of spectrum cap were proposed. Specifically, an in-auction 2500 MHz spectrum cap was proposed by Public Mobile and Xplornet for eligible bidders. Other parties, including MTS Allstream, PIAC, QMI, Shaw, TELUS and WIND, advocated an in-band cap, which would take into consideration the current 2500 MHz holdings of existing licensees.

243. Those parties which advocated the use of spectrum caps in the 2500 MHz band proposed spectrum caps of varying sizes. Table C5 summarizes these proposals:

Table C5 — Proposed spectrum cap[53] sizes

Proposal*	Type of spectrum cap recommended	Respondent supporting
30 MHz (Region B**) and 40-50 MHz (Regions A and C)	In-auction	Xplornet
30 MHz (Region B) and 40 MHz (Region A)	In-band	WIND
40 MHz of paired spectrum (Regions A, B and C)	In-band	QMI
40 MHz of paired and unpaired combined (Regions A, B and C)	In-band	MTS Allstream, Shaw & TELUS
50 MHz of paired and unpaired combined (Regions A, B and C)	In-band (PIAC) In-auction (Public Mobile)	PIAC & Public Mobile

*Bell, EastLink, Niagara Networks, Rogers, SaskTel and SSi did not support the use of a spectrum cap.
**Refer to Figure C2 for a map of the Regions.

244. Xplornet proposed an in-auction spectrum cap of 30 MHz in Region B and 40 MHz or 50 MHz in Region A and Region C. In addition, Xplornet proposed a rural set-aside that would prevent existing BRS licensees from acquiring any additional 2500 MHz spectrum in rural areas.

245. WIND proposed that Rogers and Bell be prohibited from acquiring additional spectrum in the 2500 MHz band. WIND further proposed that an in-band spectrum cap of 30 MHz be applied in Region B and an in-band spectrum cap of 40 MHz be applied in Region A. WIND is of the view that this would enable a reasonable number of service providers to acquire a meaningful amount of 2500 MHz spectrum.

[53] The proposed spectrum caps do not include the restricted bands at 2570-2575 MHz and 2615-2620 MHz.

246. QMI proposed that an in-band spectrum cap of 40 MHz be applied in the paired spectrum only. QMI stated that "by virtue of this cap, the maximum quantity of paired spectrum that any one operator could hold in any geographic service area at the conclusion of the BRS auction would be 20+20 MHz." In QMI's opinion, "any operator that already has, or bids to acquire, a full 20+20 MHz of BRS spectrum in any geographic service area will have a substantial holding with which to pursue its reasonable business objectives." Moreover, QMI stated that its proposal ensures equitable access to the paired spectrum in the 2500 MHz band.

247. MTS Allstream, Shaw and TELUS supported an in-band spectrum cap of 40 MHz in order to promote equitable access to spectrum in the 2500 MHz band. Shaw viewed spectrum caps as an "effective, yet light-handed" mechanism to ensure that all carriers have reasonable opportunities to access the 2500 MHz spectrum. MTS Allstream also recommended that Bell and Rogers not be permitted to acquire any further spectrum in the band where they exceed the 40 MHz cap regardless of the status of their relationship through Inukshuk or otherwise. Similarly, TELUS argued that existing BRS licensees should not be permitted to bid to reacquire returned spectrum (blocks A9-A14 and A9'-A14'). Furthermore, TELUS was of the view that new BRS licensees should not be capped below 40 MHz, given Industry Canada's previous decisions regarding the return of spectrum in the 2500 MHz band by existing BRS licensees.

248. Public Mobile proposed that, along with its suggested block plan (a combination of 10+10 MHz and 15+15 MHz block sizes), a 50 MHz cap be applied in all Regions. Public Mobile submitted that Inukshuk and its affiliated shareholders should not be permitted to participate in the 2500 MHz auction, nor should SaskTel in Saskatchewan. Public Mobile further proposed that service providers with more than 20 MHz of unused spectrum in any commercial mobile band (including the PCS, Cellular or AWS spectrum) not be allowed to participate in the spectrum auction. Public Mobile stated that its overall proposal would allow for at least two new licensees in Region A and Region B, and that each licensee would have "enough spectrum to launch a robust and effective LTE offering." However, Public Mobile indicated that if Industry Canada were to adopt 10+10 MHz block sizes, it would then support a spectrum cap of 40 MHz. Like Public Mobile, PIAC supported a spectrum cap of 50 MHz in the 2500 MHz band.

249. Despite the varying amount of the proposed spectrum caps, those who responded saw no requirement for existing BRS licensees to return additional spectrum in the event that their current holdings exceeded the proposed caps. However, respondents also argued that existing BRS licensees should not be permitted to acquire any additional 2500 MHz spectrum in these areas.

250. MTS Allstream, QMI, Rogers, Shaw and TELUS were of the view that the cap should be shared among associated entities and affiliated companies. MTS Allstream and Shaw argued that Bell, Rogers and Inukshuk should be treated as associated entities. QMI suggested the same if Industry Canada could not obtain a firm public commitment from Bell and Rogers that they would not jointly build or operate any mobile wireless network using BRS spectrum. Rogers indicated that it does not anticipate building and operating a joint LTE network with Bell using 2500 MHz spectrum and stated that any cap which may apply to Rogers should only apply to Rogers' share of the Inukshuk 2500 MHz spectrum holdings. TELUS stated that it was not an affiliate of Bell and maintained that the definition of associated entities should not seek to prohibit roaming or other network access arrangements that reduce costs and speed up deployment of services.

251. The proposed duration of any such cap varied among those parties who provided comments. Xplornet stated that the cap should remain in place for an indefinite period of time. MTS Allstream, PIAC and Shaw suggested a five-year cap (with PIAC proposing a minimum of five years). Shaw and MTS Allstream added that whether a cap continued to be necessary should be reviewed after the initial five-year cap period. Rogers did not propose a specific amount of time but stated that, should a cap be imposed, it should remain in effect for as short a period as possible. TELUS' approach to setting a duration on the cap varied based on the bidder. TELUS proposed that Industry Canada set a cap on existing BRS licensees that would remain in effect for a minimum of two years, whereas for the band entrants, the cap would be lifted after the closing of the auction in order to facilitate the consolidation of spectrum.

252. *Measures to promote competition — Spectrum set-aside*. Bell, MTS Allstream, Public Mobile, QMI, Rogers, SaskTel, Shaw, SSi and TELUS all opposed a set-aside where eligibility to bid for a specific block is limited to entities that meet predefined criteria. Many of these parties argued that the set-aside mechanism is susceptible to gaming opportunities. However, some of the parties[54] proposed that Bell, Rogers, Inukshuk and, in some cases, SaskTel in Saskatchewan and TELUS be barred from the auction.

253. EastLink proposed that, in Region A, 30+30 MHz paired spectrum and 20 MHz unpaired spectrum be set aside for service providers with less than 10% of the national wireless market. In Region B, EastLink proposed that the set-aside be 20+20 MHz of paired spectrum. EastLink submitted that its proposal would allow for at least two service providers with less than 10% of the national wireless market to enter the market in each licence area and "would not unfairly prevent larger existing carriers from acquiring the spectrum they may desire for their future plans."

254. Niagara Networks was of the opinion that, given Bell, Rogers and TELUS' commercial mobile spectrum holdings in various frequency bands, these companies should be completely excluded from participating in this spectrum auction. However, Niagara Networks argued that, "in the event that Industry Canada decides to allow TELUS to participate for any reason, the returned spectrum (blocks A9-A14 and A9'-A14') should be set aside for new entrants only."

255. PIAC supported setting aside sufficient spectrum for service providers holding less than 10% of the national wireless market.

256. Xplornet proposed that a rural set-aside be implemented to prevent existing BRS licensees from acquiring any additional 2500 MHz spectrum in rural areas.

Discussion

257. As stated in Part A above, Industry Canada has concluded that targeted measures related to the 2500 MHz auction are required in order to meet the objectives related to competition, investment and services in Canada. Having considered the comments received, Industry Canada has thus analyzed the appropriateness of specific measures, such as spectrum aggregation limits and set-asides in the context of the 2500 MHz spectrum auction as discussed below.

[54] EastLink, MTS Allstream and Public Mobile proposed that Bell, Rogers and Inukshuk be barred from bidding in the 2500 MHz auction. Public Mobile also proposed that SaskTel be barred from bidding in Saskatchewan. Niagara Networks and PIAC proposed that Bell, Rogers, Inukshuk and TELUS be barred from bidding.

258. Spectrum aggregation limits (spectrum caps) restrict the amount of spectrum that any eligible bidder and its affiliates can purchase or hold in a particular geographical region.

259. Setting the right cap amount is crucial. If the limit is too low, there may not be enough spectrum to satisfy the business needs of some companies. If it is set too high, it might fail to fulfil the goal of facilitating access to spectrum by multiple service providers. Another factor to be considered when applying a spectrum cap is how it should be applied, e.g. whether the cap should apply only to the spectrum being auctioned, to spectrum that is held across one or more bands, or whether it should apply differently across various bidders. How it is applied could constrain the efficient allocation of the spectrum.

260. A spectrum set-aside as part of an auction occurs where eligibility to bid for a specific block is limited to entities that meet predefined criteria. A set-aside was used in the 2008 AWS licensing process where only new entrants, defined as participants holding less than 10% of the national wireless market based on revenues, were permitted to bid on 40 out of 90 MHz of AWS spectrum. Restrictions were also imposed to ensure that the licences arising from set-aside spectrum would not be transferred to companies that did not meet the new entrant criterion for a period of five years from the date of issuance.

261. As discussed above, even some of the respondents who had been eligible to bid on the set-aside blocks in the 2008 AWS auction provided only limited support for the use of a set-aside in the 2500 MHz auction. While several parties argued that Bell and Rogers should be barred from participating in the 2500 MHz auction, which would effectively result in a set-aside for new licensees, only EastLink and Niagara Networks advocated a set-aside mechanism for the 2500 MHz auction. Furthermore, setting aside specific frequency blocks in the 2500 MHz band would be problematic given the mix of paired and unpaired spectrum and the equipment ecosystem, which is in its early stages of development. However, there was widespread support for the implementation of a spectrum cap — apart from those parties who opposed any sort of intervention mechanism whatsoever.

262. The implementation of an in-band spectrum cap would promote equitable access to the 2500 MHz spectrum. In addition, the implementation of an appropriately sized cap would enable the entry of new licensees in each region.

263. An in-band spectrum cap of 40 MHz in each region will ensure that four or more service providers have the opportunity to access the 2500 MHz band in many areas in Canada, and would thus promote the competition of wireless services in this band. The in-band spectrum cap will include both paired and unpaired spectrum, but exclude the restricted bands. A cap of this size would also provide opportunities for licensees to deploy high capacity networks. However, given the limited demand which is expected for spectrum in the Yukon, Northwest Territories and Nunavut, there will be no spectrum cap in those areas.

264. In certain areas, existing licensees already have spectrum holdings in excess of the spectrum cap of 40 MHz. Taking into consideration previous decisions related to the requirement to return spectrum during the MCS/MDS transition to BRS, existing licensees would not be required to return additional spectrum in these areas. However, these licensees would not be permitted to acquire additional spectrum in those areas where the cap has been exceeded.

265. With respect to the duration of the spectrum cap, the in-band spectrum cap of 40 MHz will be in effect for a period of five years from the issuance of a licence. This time frame reduces the attractiveness of the licences for speculators yet permits market adjustments within a reasonable period.

266. *Rollout obligation.* As noted in Part B, Industry Canada has made use of general rollout obligations in several licensing processes to encourage licensees to put the spectrum to use and to deter acquisition of spectrum licences by speculators and those whose intent is to preclude access to the spectrum by their competitors. There is currently a deployment condition of licence applicable to existing BRS licensees in this band. Several respondents have noted the importance of this requirement. This condition of licence will be reviewed along with other existing and proposed conditions of licence in the upcoming consultation on a licensing framework. At that time, comments will be sought on the specific details of the general deployment requirement that will apply to the 2500 MHz licences and the applicability to existing and prospective licensees.

267. *Affiliated and associated entities rules*. The licensing framework for the 2500 MHz band will set out auction rules and conditions of licences, including rules relating to the transfer of licences as they apply to affiliated and associated entities. As discussed in Section B3, Industry Canada will consult with stakeholders regarding the definition and application of rules for associated entities in the upcoming licensing framework consultation in the 700 MHz band. This will also be part of the upcoming licensing framework consultation in the 2500 MHz band.

Decisions related to measures to promote competition for the 2500 MHz band

C2-1: With the exception of licensees in the Yukon, Northwest Territories and Nunavut, all licensees are subject to a spectrum aggregation limit ("spectrum cap") of 40 MHz in the 2500 MHz band, excluding the restricted bands at 2570-2575 MHz and 2615-2620 MHz. This amount represents the total spectrum holdings, including both paired and unpaired spectrum, by each licensee in each licence area.

C2-2: The spectrum cap shall remain in effect in the 2500 MHz band for a period of five years after the issuance of licences. Therefore, no transfer of licences or issuance of new licences will be authorized if it allows a licensee to exceed the spectrum cap during this period.

C2-3: Industry Canada will consult with a view to revising the rules on associated entities.

C2-4: In areas where an existing licensee already has holdings in excess of the spectrum cap set out in Decision C2-1, the licensee will not be required to relinquish any such holdings in order to meet the limit of the spectrum cap. However, such licensees will not be eligible to bid for additional licences in the auction process or otherwise obtain additional licences in licence areas where the cap has been exceeded.

C2-5: Licensees planning to transfer any of their existing holdings in order to increase their eligibility to bid in the related licence areas must do so prior to submitting an application to participate in this auction process.

C2-6: Licensees planning to relinquish any of their existing holdings to Industry Canada in order to increase their eligibility to bid in the related licence areas must do so at least six months prior to the proposed auction date. In the event that Industry Canada decides to offer these relinquished

licences as part of the 2500 MHz auction process, an addendum to the licensing framework for the 2500 MHz auction will be published in order to inform prospective participants of the additional licence offerings.

C2-7: A rollout obligation applicable to all 2500 MHz licences will continue to apply. Industry Canada will consult on the details of the general deployment requirements (e.g. population coverage required and time frame) and their applicability as part of the upcoming consultations on a licensing framework in this band.

Other details related to the rules and licensing process for the 2500 MHz band will be the subject of an upcoming consultation.

C3. Promoting Service Deployment in Rural Areas

268. Industry Canada sought comments on whether specific measures could be adopted within the 2500 MHz spectrum auction process to promote service deployment of BRS in rural areas.

Summary of comments

269. SSi expressed the view that deployment incentives, such as tax incentives, portable subsidies, rebates from the amount paid at spectrum auction or reduction of licence fees, can encourage licensees to deploy or improve mobile broadband service in remote, rural, unserved and underserved areas. SaskTel suggested a condition of licence that would require licensees to demonstrate use of the spectrum within five years of licensing. Further, SaskTel proposed that licensees be required to demonstrate the provision of services beyond census metropolitan areas (CMAs) within their licensed areas.

270. Xplornet indicated that “the economics of 2500 MHz infrastructure and global equipment standards enable providers to extend services at consumer prices which are equivalent to urban prices. Thus, 2500 MHz spectrum is a very effective band to deploy broadband services to rural Canada for which there is no real economic wireline equivalent.” Xplornet further commented that “the propagation characteristics of 2500 MHz are very well suited when it comes to communications with fixed household or business equipment, particularly in rural areas with open terrain.” As such, Xplornet recommended that Industry Canada adopt rural rollout obligations to further the deployment of services in rural areas. Its proposal to unbundle rural areas (see Section C1.3) from urban areas and set aside spectrum for rural areas would, in its view, ensure that the capacity requirements in rural areas are addressed and “prevent winning bidders from sitting on rural spectrum as the large incumbent service providers have done in the past.”

271. Rogers commented that Xplornet’s proposal “would involve a complex and time-consuming redistribution of geographic areas and would introduce countless new situations where competing wireless networks would abut one another and potentially interfere with each other. It will therefore introduce considerable delay and risk to the process of licensing BRS spectrum. Further, Xplornet has not demonstrated that its proposal will not result in serious and detrimental impacts on inter-carrier frequency coordination and mitigation of inter-system interference.” Rogers proposed “that operators that are not prepared to implement services in certain geographic areas can avail themselves of

Industry Canada's subordinate licensing policy such that rollout in these areas can be achieved by parties that are prepared to implement services in such areas."

272. Several respondents, including Bell, MTS Allstream, Public Mobile, QMI, Rogers and Shaw, were of the opinion that, given its propagation characteristics, the 2500 MHz spectrum is not conducive to the deployment of mobile wireless services in rural areas. These parties commented that, given the amount of bandwidth available, the 2500 MHz band is an excellent candidate band to increase capacity in localized areas. Some of these parties also commented that it would cost substantially more (relative to lower frequency bands, such as the 700 MHz) to deploy in rural areas and could potentially disadvantage smaller service providers. TELUS commented that while there will be applications for BRS in rural and remote areas, they will be limited and secondary to services provided through lower frequency bands, such as 700 MHz.

273. Bell, Public Mobile, QMI and Shaw believed that market forces should drive the demand and deployment of BRS in rural areas. Bell commented that no requirement for any specific measures, such as a rollout requirement in the 2500 MHz spectrum auction process, is needed to ensure deployment of BRS in rural and remote areas. On the other hand, parties such as MTS Allstream, QMI, Rogers, SaskTel Shaw, and TELUS recommended that Industry Canada establish rollout targets similar to those established for AWS licensees.

Discussion

274. The 2500 MHz spectrum is recognized as being highly valued. In assessing the need for advanced wireless services in rural Canada, consideration was given to the benefits of both the 700 MHz and 2500 MHz bands.

275. Consistent with the comments received, it is recognized that, although the 2500 MHz spectrum is highly valuable for mobile systems, the propagation characteristics are such that it is not ideal spectrum for mobile systems covering large areas such as rural and remote areas. Overall, a requirement for any 2500 MHz licensee to deploy to a very high percentage of the population (similar to the requirement being imposed in the 700 MHz band) would be overly burdensome. There is, however, the potential for rural areas to benefit from providers which are interested in establishing either fixed or mobile systems in rural areas where there is a desire to increase network capacity. As noted in Section C1.3 (Tier sizes), recognizing the shorter propagation range of the 2500 MHz spectrum in comparison to the 700 MHz band, the impact of potential for interference from adjacent licence areas will be less and, hence, smaller licence areas are more practical for the 2500 MHz band than for the 700 MHz band. This decision to auction licences based on smaller licence areas will provide increased opportunity for those who are not interested in serving the major metropolitan areas to bid on licences for the less populated areas.

276. With regard to suggestions that financial incentives be linked to rural deployment, programs such as Broadband Canada: Connecting Rural Canadians and various provincial programs have provided incentives in the past to help this type of deployment. The establishment of these programs and the use of tax incentives are outside of Industry Canada's mandate under the *Radiocommunication Act* and are thus outside of the policy and licensing considerations of this consultation.

277. With respect to suggestions submitted to redefine licence areas to unbundle rural areas from urban areas, as noted in Section C1.3, it has been determined that Tier 3 licence areas are the most appropriate due to the potential for interference between adjacent licence areas. As a result, the

suggestion to redefine the Tier 4 licence areas is not being undertaken for this licensing process. In comparison to the Tier 2 licence areas being used for licensing of 700 MHz spectrum, the decision to license using Tier 3 service areas for the 2500 MHz band will provide more opportunity for rural service providers to acquire licences without major urban areas included.

278. Given the number of blocks available for auction and the cap on 2500 MHz holdings as set out in sections C1 and C2, it is anticipated that opportunities will exist for bidders that are interested in only the smaller centres and outlying rural areas.

279. The remoteness of some regions creates far greater complexity and cost than urban build-outs. As such, there is a marginal or, at times, a lack of a business case to support the significant investment and higher operational costs required to deploy to rural areas. In some rural and remote areas, the high cost of deployment may not be commercially viable today without government subsidy, such as the program Broadband Canada: Connecting Rural Canadians or the various provincial programs available, although new technology developments may improve the outlook.

280. As stated in Section C2, a requirement for general deployment similar to previous licensing processes will apply. Rural service providers participating in the 2500 MHz auction will have increased opportunity to acquire licences for the specific area of interest as a result of the decision to auction smaller licence areas (Tier 3) and to implement a spectrum cap in this band.

C4. Spectrum Utilization Policy

281. In November 1991, Industry Canada issued SP-2500 MHz, *Spectrum Utilization Policy for the Fixed and Broadcasting Services in the Band 2500-2686 MHz*. This document is currently under review and will be updated to reflect the decisions made following the MCS/MDS transition to BRS.

PART D — Auction Timing and Next Steps

D1. Auction Timing for 700/2500 MHz Auctions

282. In the consultation papers, Industry Canada invited comments on the following three options:

- **Option 1:** to conduct an auction for licences in the 700 MHz band first, followed by an auction for licences in the 2500 MHz band approximately one year later;
- **Option 2:** to conduct an auction for licences in the 2500 MHz band first, followed by an auction for licences in the 700 MHz band approximately one year later; and
- **Option 3:** to conduct one combined auction for licences in both the 700 MHz and 2500 MHz bands, which would take place six months later than the first auction in the case of separate auctions.

283. Comments were sought on the extent to which stakeholders perceive 700 MHz and 2500 MHz spectrum to be substitutes and/or complements of each other, and the extent to which these perceptions may vary among stakeholders. Furthermore, views were requested on the most appropriate timing for both the 700 MHz and 2500 MHz band auction processes.

Summary of comments

284. There was no consensus among respondents as to the preferred option for the timing of the 700 MHz and 2500 MHz auctions. Some respondents took the opportunity to modify their initial positions through the reply comments process. The following comments reflect the respondents' final positions upon review of the comments and reply comments submitted in response to both the 700 MHz and 2500 MHz consultations.

285. EastLink, Mobilicity, MTS Allstream, Shaw and SSi all stated a preference for holding the 700 MHz auction first, as proposed under Option 1. EastLink, Mobilicity and MTS Allstream considered that the resource implications of having to participate in both auctions at the same time would disadvantage some service providers. Mobilicity and SSi noted the current advancement of the ecosystem for equipment and devices in the 700 MHz band compared with that of the 2500 MHz band. Initially, Bell also supported holding the 700 MHz auction first; however, it changed its position to support Option 3 in its reply comments. Mobilicity stated that the 2500 MHz band is more interchangeable with AWS, and that 700 MHz is complementary; hence, the 700 MHz band should be auctioned first.

286. Mobilicity and EastLink considered that the ground rules for the 700 MHz and the 2500 MHz auctions should be developed and understood prior to the first auction.

287. TELUS was initially the only respondent to support holding the 2500 MHz auction first; however, the British Columbia Broadband Association later supported the TELUS position through its reply comments. Shaw opposed this option, noting that the ecosystem for equipment and devices in the 2500 MHz band is not developing as quickly as it is for the 700 MHz band, and that there would be no

economic or technical reason to follow this option. TELUS believed that the existing 2500 MHz licensees have an advantage of a head start in addressing spectrum capacity issues, and further stated that the 2500 MHz auction should take place either before or concurrently with the 700 MHz auction.

288. Axia, Bell, Niagara Networks, Public Mobile, Rogers, SaskTel, QMI, WIND and Xplornet stated a preference for holding both auctions at the same time, as proposed in Option 3. Niagara Networks considered that this option would provide a quick and cost-effective response to the increasing demand for mobile bandwidth. Public Mobile and QMI noted that Option 3 would facilitate improved network planning and provide participants with the ability to assess their spectrum holdings in an integrated, strategic manner and yield a higher level of certainty. Rogers considered that given the complementary nature of the bands, a combined auction would be more economically efficient, and would allow bidders to make dynamic trade-offs during the bidding process based on various factors such as cost, quantity and geographic areas. SaskTel added that a combined auction would ensure the most efficient outcome and offer the best opportunity for all participants while reducing administrative costs. WIND considered that a combined auction would maximize a participant's ability to raise finances and to plan for optimized deployment.

289. Although not their preferred option, Mobilicity and TELUS are not opposed to Option 3. Xplornet supported a combined auction of 700 MHz and 2500 MHz; however, it recommended that Industry Canada consider holding sequential auctions for urban and rural areas, where spectrum blocks at a Tier 2 or Tier 3 service area would be auctioned first, followed by an auction of spectrum blocks at a Tier 4 area, including urban and rural portions of any unbundled service area.

290. Public Mobile noted that if the auctions are held separately, the 700 MHz auction should be held first, with the second auction following no more than three months later. QMI and WIND added that if a combined auction is not the chosen option, they would also support Option 1. Axia also considered that if a combined auction were to delay the availability of any of the spectrum, then Option 1 would be preferable.

Discussion

291. Several respondents stated that other jurisdictions have conducted multiband auctions and that a combined auction would improve network planning, increase business certainty and permit dynamic trade-offs during the bidding process. A combined auction, however, would be highly complex as, unlike many other jurisdictions, Canadian auctions generally include more than one geographic area.

292. In the case of the 700 MHz and 2500 MHz auctions, the auction will be comprised of Tier 2 service areas for 700 MHz and Tier 3 (with Tier 4 in the North) service areas for 2500 MHz. A combined auction would result in a greater auction complexity for bidders that must balance auction rules with bidding strategies over two spectrum bands in multiple service areas along with their financial considerations. This additional complexity would also likely restrict the choice of auction formats. A combined auction may disadvantage some service providers that would not have the necessary resources to be as successful in a combined auction.

293. The simplicity of a single band auction would enable an auction to be held at an earlier date than a more complex combined auction. Many respondents indicated a greater urgency for acquiring spectrum in the 700 MHz band and considered that this would outweigh any benefits of a delayed combined auction.

294. Auctioning the two bands separately will result in the first auction being expedited and the second being delayed, which will allow smaller companies additional time to secure financing for the second auction.

295. Given that there was stronger demand indicated for the 700 MHz band, and because the ecosystem for equipment and devices in the 700 MHz band is more advanced compared with that of the 2500 MHz band, Industry Canada will auction the 700 MHz band prior to the 2500 MHz band. Bidders will benefit from a less complex auction while being able to take advantage of the most advanced auction formats.

296. Given that the 2500 MHz ecosystem is less developed than the 700 MHz ecosystem and that the 2500 MHz auction will be held less than a year after the 700 MHz auction, Industry Canada considers that the head start advantage that will accrue to existing 2500 MHz licensees is limited.

297. Some respondents noted the importance of having business certainty. As a result, Industry Canada will publish all decisions on auction design, opening bids and conditions of licence for licences in the 2500 MHz band prior to the start of the 700 MHz auction. This will enable companies to formulate their overall business plans prior to the first auction.

Decisions related to auction timing

D1-1:	Industry Canada will proceed with an auction process for the 700 MHz band in the first half of 2013, followed by an auction process for the 2500 MHz band in early 2014.
D1-2:	To mitigate uncertainty for the auction participants, the policy decisions for both bands are being published at the same time. Further, the auction design, opening bids and conditions of licence for the 2500 MHz auction will be published prior to the start of the 700 MHz auction.

D2. Next Steps

Subsequent Consultations

298. *Licensing and auction frameworks — commercial spectrum.* Industry Canada will initiate separate consultations on the licensing frameworks for the 700 MHz and 2500 MHz spectrum. These consultations will include, but not be limited to:

(1) auction design, rules and attributes;
(2) opening bids;
(3) implementation details of government measures to enhance competition;
(4) licence conditions; and
(5) revisions to rules for associated entities.

299. *Tower Sharing and Roaming.* Industry Canada will seek stakeholder input on proposed changes to the existing tower sharing and roaming policy in early 2012.

300. *Public safety*. There will be a further consultation to establish a policy framework for the use of the spectrum in the 758-763 MHz and 788-793 MHz bands (D block in the upper 700 MHz band), as well as on general issues related to public safety broadband in the 700 MHz band. It will be followed by an additional consultation regarding technical, licensing and operational matters related to public safety broadband spectrum in the 700 MHz band.

D3. Obtaining Copies

301. All spectrum-related documents referred to in this paper are available on the Spectrum Management and Telecommunications website at www.ic.gc.ca/spectrum.

302. For further information concerning the process outlined in this document or related matters, contact:

Director, Mobile Services Engineering
Engineering, Planning and Standard Branch
Industry Canada
19th Floor
300 Slater Street
Ottawa, Ontario K1A 0C8
Telephone: 613-998-3874
Fax: 613-952-5108
E-mail: Spectrum.Engineering@ic.gc.ca

Annex 1 — Respondents to the 700 MHz Consultation (SMSE-018-10)

Companies and Organizations

Alcatel-Lucent Canada Inc.
Assembly of First Nations
Astral Media Inc.
Axia NetMedia Corporation
Barrett Xplore Inc. and Barrett Broadband Networks Inc. (Xplornet)
Bell Mobility Inc. (Bell)
Bragg Communications Inc. (EastLink)
British Columbia Broadband Association (BCBA)
Brockville and District Chamber of Commerce
Cambridge Chamber of Commerce
Canadian Advanced Technology Alliance (CATA)
Canadian Association of Community Television Users and Stations (CACTUS)
Canadian Cable Systems Alliance (CCSA)
Canadian Electricity Association (CEA)
Canadian Media Guild
Capital Region Emergency Service Telecommunications
Cogeco Cable Inc. (Cogeco)
Daniels Electronics
E-Comm 9-1-1, Emergency Communication for Southwest British Columbia
Ericsson Canada
Federation of Canadian Municipalities (FCM)
Fire Service Association of Nova Scotia
Globalive Wireless Management Corporation (WIND)
Greater Sudbury Chamber of Commerce
Harris Canada Systems, Inc.
Huawei Canada (Huawei)
Huntsville/Lake of Bays Chamber of Commerce
Initiatives Prince George Development Corporation
Kingston Economic Development Corporation
Media Access Canada
Mobilexchange Limited (MobilExchange)
Mobilicity
Motorola Canada Ltd.
Motorola Mobility
MTS Allstream Inc. (MTS Allstream)

National Public Safety Telecommunications Council (NPSTC)

Niagara Networks

Nokia and Nokia Siemens Networks

Ontario Telecommunications Association

Peace Region Internet Society (PRiS)

Public Interest Advocacy Centre (PIAC)

Public Mobile Inc. (Public Mobile)

Quebecor Media Inc. (QMI)

Radio Advisory Board of Canada (RABC)

Research in Motion Limited (RIM)

Rogers Communications Inc. (Rogers)

Saskatchewan Telecommunications (SaskTel)

Shaw Communications Inc. (Shaw)

SSi Micro Ltd. (SSi)

Tbaytel

Telecommunities Canada

TELUS Communications Company (TELUS)

Tri-Services Joint Interoperability Committee (JSJIC): Ontario Association of Chiefs of Police, Ontario Association of Fire Chiefs, Association of Municipal Emergency Medical Services of Ontario

Tri-Services Special Purpose Committee

Tucows Inc.

Utilities Telecom Council of Canada (UTCC)

Westman Communications Group

Federal Government

Interdepartmental Committee for Search and Rescue (ICSAR) and National Search and Rescue Secretariat (NSRS)

Public Safety Canada

Royal Canadian Mounted Police (RCMP)

Scott Simms, M.P.

Provincial, Regional and Municipal Governments

Canadian Council of Emergency Management Organizations (CCEMO)

Cariboo Regional District

Centre de services partagés du Québec (CSPQ)

City of Calgary

City of Dieppe

City of Fort St. John

City of Nelson

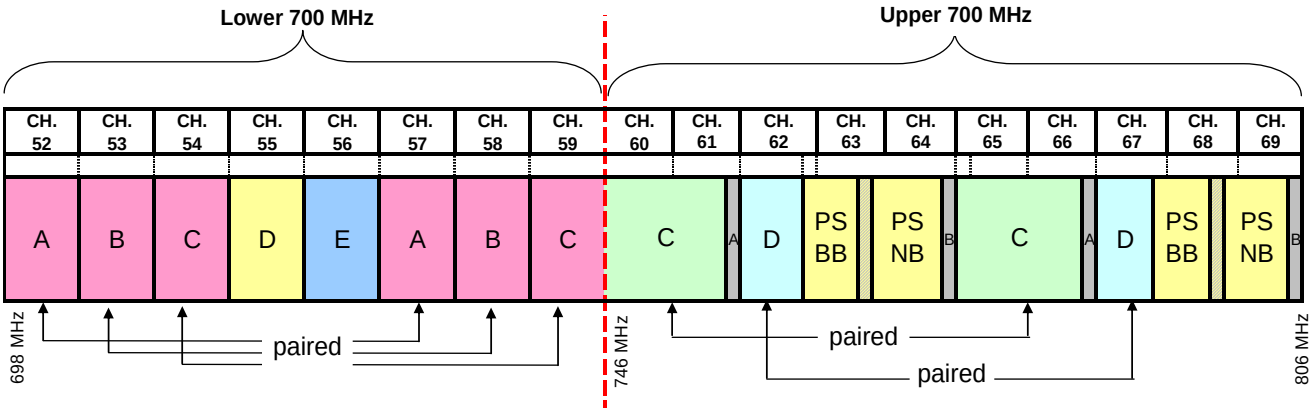
City of St. Thomas Fire Department
City of Temiskaming Shores
Corporation de la Cité de Clarence-Rockland
Corporation of the City of Timmins
Corporation of the Town of Hawkesbury
Corporation of the Township of Larder Lake
District of Vanderhoof
Elk Lake, Township of James
Government of Alberta
Government of Saskatchewan
Maritime Radio Communications Initiative
Parry Sound Area Chamber of Commerce
Province of British Columbia
Province of Ontario
Provincial/Territorial Ministers Responsible for Emergency Management
Service de sécurité incendie de Montréal
SOREM Interoperability Working Group
Temiskaming Mayors Action Group (TeMAG)
Town of Aurora
Town of Whitchurch-Stouffville
Township of Coleman
Township of Hilliard
Township of Muskoka Lakes
Village of Chase
Ville de Québec
Ville de Thetford Mines
Yukon Government

Private Individuals

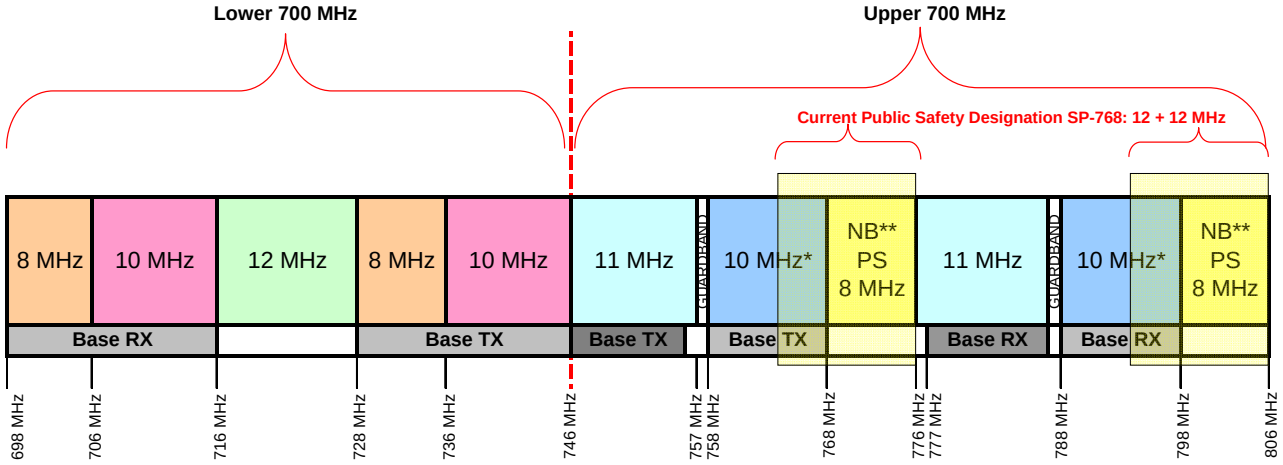
Bourque, Mr. Jerry
Gadient, Mr. Matthew
Hales, Mr. Douglas
Howley, Mr. Brendan
Ingoldsby, Mr. Terrance R.
May, Mr. Steven James
Nechiporenko, Mr. Tyler
Ruggier, Mr. Simon
Taylor, Dr. Gregory and Middleton, Dr. Catherine (Ryerson University)

Annex 2 — 700 MHz Band Plan Options as Shown in the 700 MHz Consultation Paper (SMSE-018-10)

Option 1 Band Plan Architecture (U.S. Band Plan)

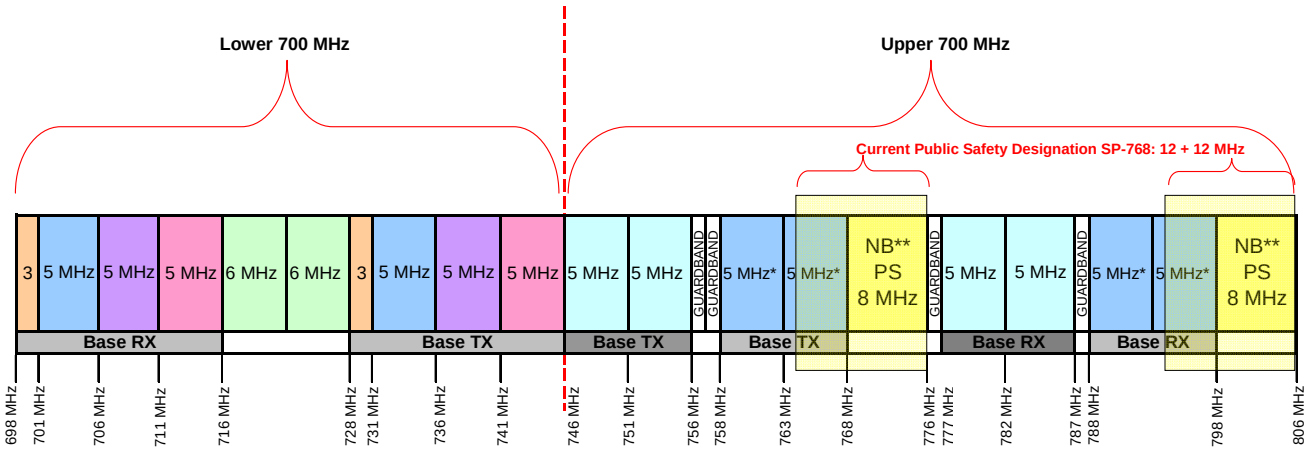


Option 2a Band Plan Architecture (Modified U.S. Band Plan)



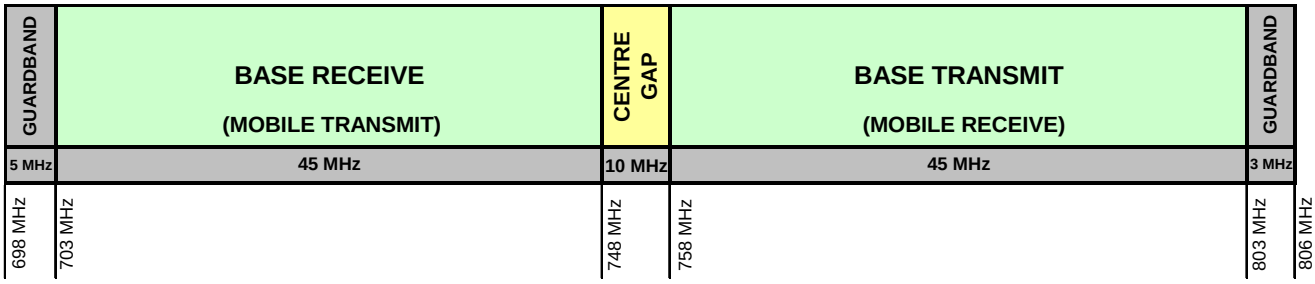
*Use of this range is subject to the pending decision on spectrum use for broadband public safety.
**This range is designated for narrowband public safety.

Option 2b Band Plan Architecture
(Modified U.S. Band Plan)



*Use of this range is subject to the pending decision on spectrum use for broadband public safety.
**This range is designated for narrowband public safety.

Option 3 Band Plan Architecture
(APT Band Plan for FDD operations in the 698-806 MHz range)



Annex 3 — List of TV Broadcasting Stations on Channel 51

The list of full power TV broadcasting stations operating in channel 51, or for which Industry Canada has received applications for broadcasting certificates, is included below:

CALL SIGN	STATUS*	CITY	PROV	MODULATION
CICA-TV-51	Operational	Penetanguishene	ON	Analog
CBOT-4	Operational	Maynooth	ON	Analog
CRC-DT-1	Experimental — until 2013	Ottawa	ON	Digital
CHCH-DT-2	Authorized	London	ON	Digital
MONTRÉAL51	Referred to the CRTC[55]	Montréal	QC	Digital
CJMT-DT	Temporary Operation until December 31, 2011	Toronto	ON	Digital
CJMT-DT (1)	Authorized	Toronto	ON	Digital
CBWFT-DT	Authorized	Winnipeg	MB	Digital
CHNM-DT-3	Application received	Kelowna	BC	Digital

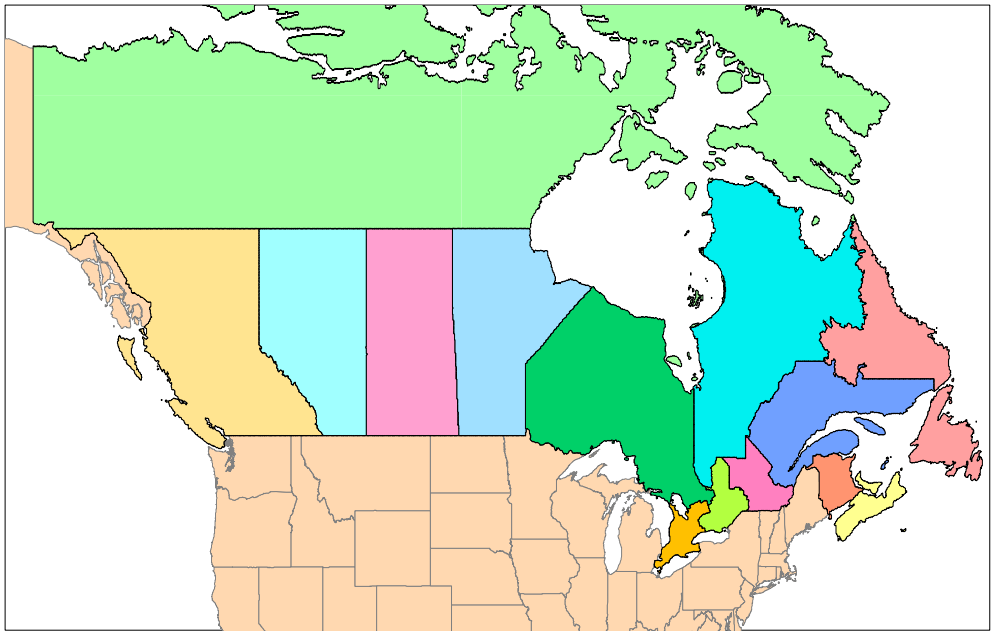
*As of November 2011.

[55] Refer to Section B (Application Processing for Regular and Low Power Undertakings Prepared by Broadcasting Engineering Consultants) of Broadcasting Circular BC-1: *AM, FM and TV Broadcasting Process*, for technical processing of applications referred to the CRTC.

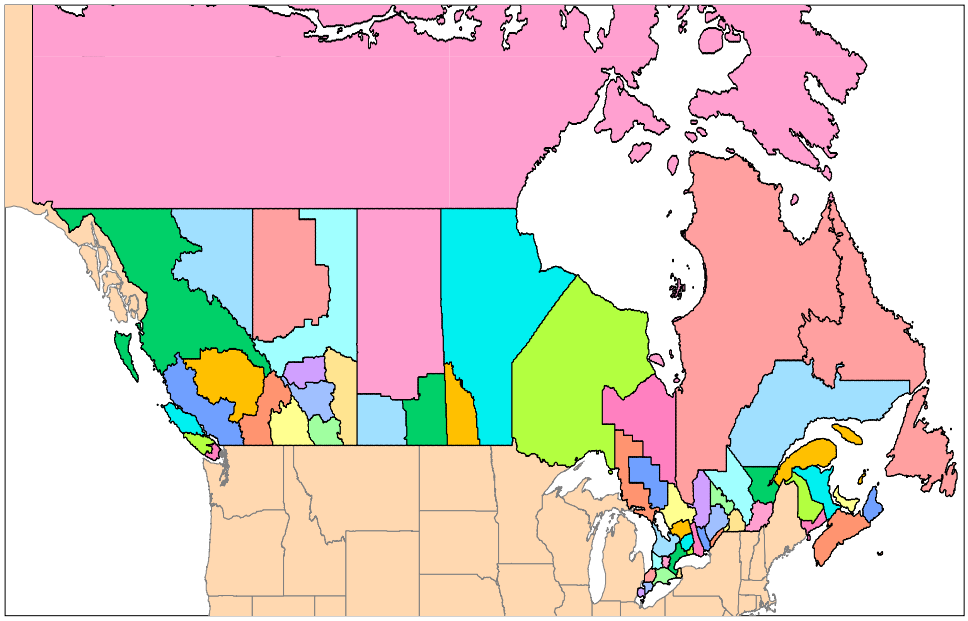
Annex 4 — Tier Areas For Spectrum Licensing

Tier 1 (1 National Licence)

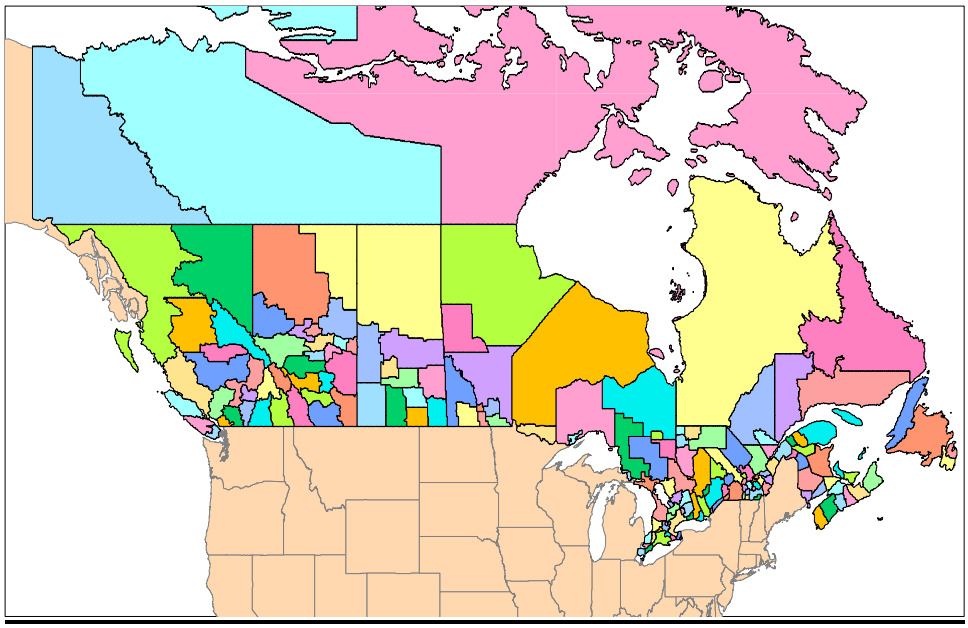
Tier 2 (14 Large Areas)



Tier 3 (59 Regional Areas)



Tier 4 (172 Localized Areas)



Annex 5 — List of Low-Power Television (LPTV) Stations Operating in the 700 MHz Band, Post DTV-Transition

The following LPTV stations operating in the 700 MHz band are subject to a notification period as follows.

Stations potentially affecting mobile deployments in urban areas
A notification period of one year will apply to LPTV stations in proximity of urban areas, as detailed below:

Call Sign	City	Province	Banner code	Station Class	Latitude	Longitude	Channel	Notification period
CH4698	Logan Lake	BC	OP	LP	50°30'4"N	120°48'51"W	54	1 year
CH4699	Logan Lake	BC	OP	LP	50°30'4"N	120°48'51"W	58	1 year
CH4700	Logan Lake	BC	OP	LP	50°30'4"N	120°48'51"W	62	1 year
CH4701	Logan Lake	BC	OP	LP	50°30'4"N	120°48'51"W	66	1 year
CJOL-TV-31	Kirby's Corner	ON	OP	LP	46°42'49"N	84°16'39"W	57	1 year

Stations in other Areas
A notification period of two years will apply to LPTV stations located outside of urban areas, as detailed below:

Call Sign	City	Province	Banner code	Station Class	Latitude	Longitude	Channel	Notification period
CBRT-10	Bellevue	AB	OP	LP	49°33'55"N	114°20'57"W	57	2 years
CBUAT-6	Trail	BC	OP	LP	49°5'27"N	117°47'59"W	52	2 years
CFTF-TV-9	Gaspé	QC	OP	LP	48°50'15"N	64°29'32"W	58	2 years
CH2752	Cheticamp	NS	OP	LP	46°36'24"N	61°3'12"W	53	2 years
CH2753	Cheticamp	NS	OP	LP	46°36'24"N	61°3'12"W	57	2 years
CH2768	Tracadie	NS	OP	LP	45°34'21"N	61°40'28"W	60	2 years
CH3063	Tracadie	NS	OP	LP	45°34'21"N	61°40'28"W	52	2 years
CH3064	Tracadie	NS	OP	LP	45°34'21"N	61°40'28"W	56	2 years
CH3065	Tracadie	NS	OP	LP	45°34'21"N	61°40'28"W	58	2 years
CH3066	Tracadie	NS	OP	LP	45°34'21"N	61°40'28"W	66	2 years
CH4148	Chetwynd	BC	OP	LP	55°40'7"N	121°34'57"W	52	2 years
CH5529	Cheticamp	NS	OP	LP	46°36'24"N	61°3'12"W	55	2 years
CH6457	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	54	2 years
CH6458	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	60	2 years
CH6459	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	62	2 years
CH6460	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	66	2 years
CH6461	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	68	2 years
CH6496	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	52	2 years
CH6497	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	56	2 years
CH6498	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	58	2 years
CH6499	Fort St. James	BC	OP	LP	54°26'35"N	124°13'33"W	64	2 years
CHET-TV	Chetwynd	BC	OP	LP	55°40'7"N	121°34'57"W	55	2 years
CICA-TV-4	Hilliardton	ON	OP	LP	47°43'28"N	79°41'43"W	55	2 years
CICA-TV-93	Harty	ON	OP	LP	49°28'35"N	82°40'48"W	53	2 years
CICO-TV-63	Wikwemikong	ON	OP	LP	45°47'53"N	81°43'36"W	53	2 years
CICO-TV-65	Dack Township	ON	OP	LP	47°48'42"N	79°55'12"W	59	2 years

CICO-TV-67	Evanturel Township	ON	OP	LP	47°47'55"N	79°49'18"W	57	2 years
CICO-TV-68	Hallam	ON	OP	LP	46°14'49"N	81°50'8"W	55	2 years
CICO-TV-69	Kenabeek	ON	OP	LP	47°38'23"N	79°58'24"W	56	2 years
CICO-TV-83	Chamberlain Township	ON	OP	LP	47°53'58"N	79°56'43"W	61	2 years
CICO-TV-97	Birch Island	ON	OP	LP	46°4'3"N	81°46'29"W	56	2 years
CIMT-TV-7	Les Escoumins	QC	OP	LP	48°19'0"N	69°25'41"W	57	2 years
CISR-TV	Santa Rosa	BC	OP	LP	49°1'30"N	118°3'34"W	68	2 years
CITL-TV-10	Alcot Trail	SK	OP	LP	53°53'8"N	108°24'35"W	58	2 years
WOLLASTON 54	Wollaston Lake	SK	RE	VLP	58°6'27"N	103°10'15"W	54	2 years
WOLLASTON 55	Wollaston Lake	SK	RE	VLP	58°6'27"N	103°10'15"W	60	2 years
WOLLASTON 57	Wollaston Lake	SK	RE	VLP	58°6'27"N	103°10'15"W	57	2 years

LPTV Stations converted from full power, as a part of the DTV transition

The stations listed below will be allowed to operate until the date of the 700 MHz auction:

Call Sign	City	Province	Banner code	Station Class	Latitude	Longitude	Channel	Notification period
CBHFT-6(1)	Digby	NS	AU	LP	44°40'35"N	65°44'1"W	58	n/a
CBHT-7(1)	Digby	NS	AU	LP	44°40'35"N	65°44'1"W	52	n/a
CBHT-8(1)	Truro	NS	AU	LP	45°27'10"N	63°17'17"W	55	n/a
CBJET	Saguenay	QC	AU	LP	48°25'29"N	71°6'30"W	58	n/a
CBLFT-8(1)	Kitchener	ON	AU	LP	43°27'0"N	80°36'7"W	61	n/a
CBLFT-9(1)	London	ON	AU	LP	42°57'20"N	81°21'19"W	53	n/a
CBLN-TV-3(1)	Chatham	ON	AU	LP	42°27'0"N	82°4'59"W	55	n/a
CBVT-4(1)	Lac-Etchemin	QC	AU	LP	46°24'42"N	70°35'35"W	55	n/a
CBXT-12(1)	Forestburg	AB	AU	LP	52°40'8"N	111°56'57"W	52	n/a

Annex 6 — Respondents to the 2500 MHz Consultation (SMSE-005-11)

Comments and/or reply comments were received from:

Barrett Xplore Inc. and Barrett Broadband Networks Inc. (Xplornet)
Bell Mobility Inc. (Bell)
Bragg Communications Inc. (EastLink)
Globalive Wireless Management Corp. (WIND)
Huawei Canada (Huawei)
MTS Allstream Inc. (MTS Allstream)
Niagara Networks
Public Interest Advocacy Centre (PIAC)
Public Mobile Inc.
Quebecor Media Inc. (QMI)
Radio Advisory Board of Canada (RABC)
Research In Motion Limited (RIM)
Rogers Communications Partnership (Rogers)
Saskatchewan Telecommunications (SaskTel)
Shaw Communications Inc. (Shaw)
SSi Micro Ltd. (SSi)
TELUS Communications Company (TELUS)

Annex 7 — Spectrum Availability in the 2500 MHz Band

(as of November 2011, subject to change prior to the 2500 MHz spectrum auction)

LEGEND: Yellow — Region A, green — Region B, purple — Region C

Tier #	Region	Name	Frequency blocks available for auction (marked with an "X")								
			Paired spectrum (10 + 10 MHz)							Unpaired spectrum (25 MHz)	
			A1 to A2 / A1' to A2'	A3 to A4 / A3' to A4'	A5 to A6 / A5' to A6'	A7 to A8 / A7' to A8'	A9 to A10 / A9' to A10'	A11 to A12 / A11' to A12'	A13 to A14 / A13' to A14'	B1 to B5	B6 to B10
3-01	A	Newfoundland & Labrador			X	X	X	X	X		X
3-02	A	Prince Edward Island			X	X	X	X	X		X
3-03	A	Mainland Nova Scotia			X	X	X	X	X		X
3-04	A	Cape Breton			X	X	X	X	X		X
3-05	A	Southern New Brunswick			X	X	X	X	X		X
3-06	A	Western New Brunswick			X	X	X	X	X		X
3-07	A	Eastern New Brunswick			X	X	X	X	X		X
3-08	B	Bas du fleuve/Gaspésie					X	X	X		
3-09	B	Québec					X	X	X		
3-10	A	Chicoutimi-Jonquière			X	X	X	X	X		X
3-11	A	Eastern Townships			X	X	X	X	X		X
3-12	B	Trois-Rivières					X	X	X		
3-13	B	Montréal					X	X	X		
3-14	A	Upper Outaouais			X	X	X	X	X		X
3-15	B	Ottawa/Outaouais					X	X	X		
3-16	A	Pembroke			X	X	X	X	X		X
3-17	A	Abitibi			X	X	X	X	X		X
3-18	A	Cornwall			X	X	X	X	X		X
3-19	A	Brockville			X	X	X	X	X		X
3-20	A	Kingston			X	X	X	X	X		X
3-21	A	Belleville			X	X	X	X	X		X
3-22	A	Cobourg			X	X	X	X	X		X
3-23	A	Peterborough			X	X	X	X	X		X
3-24	A	Huntsville			X	X	X	X	X		X
3-25	B	Toronto					X	X	X		
3-26	B	Barrie					X	X	X		
3-27	B	Guelph/Kitchener					X	X	X		
3-28	A	Listowel/Goderich/ Stratford			X	X	X	X	X		X
3-29	B	Niagara-St. Catharines					X	X	X		
3-30	B	London/Woodstock/ St. Thomas					X	X	X		
3-31	A	Chatham			X	X	X	X	X		X
3-32	A	Windsor/Leamington			X	X	X	X	X		X
3-33	A	Strathroy			X	X	X	X	X		X
3-34	A	North Bay			X	X	X	X	X		X
3-35	A	Sault Ste. Marie			X	X	X	X	X		X
3-36	A	Sudbury			X	X	X	X	X		X
3-37	A	Kirkland Lake					X	X	X		
3-38	A	Thunder Bay			X	X	X	X	X		X
3-39	C	Winnipeg	X	X			X	X	X	X	
3-40	C	Brandon	X	X			X	X	X	X	
3-41	B	Regina					X	X	X		
3-42	B	Moose Jaw					X	X	X		
3-43	B	Saskatoon					X	X	X		
3-44	A	Edmonton			X	X	X	X	X		X
3-45	A	Medicine Hat/Brooks			X	X	X	X	X		X
3-46	A	Lethbridge			X	X	X	X	X		X
3-47	A	Calgary			X	X	X	X	X		X
3-48	A	Red Deer			X	X	X	X	X		X

3-49	A	Grande Prairie			X	X	X	X	X		X
3-50	A	Kootenays			X	X	X	X	X		X
3-51	B	Okanagan/Columbia					X	X	X		
3-52	B	Vancouver					X	X	X		
3-53	B	Victoria					X	X	X		
3-54	A	Nanaimo			X	X	X	X	X		X
3-55	A	Courtenay			X	X	X	X	X		X
3-56	A	Thompson/Cariboo			X	X	X	X	X		X
3-57	A	Prince George			X	X	X	X	X		X
3-58	A	Dawson Creek			X	X	X	X	X		X
4-170	A	Yukon			X	X	X	X	X		X
4-171	A	Nunavut			X	X	X	X	X		X
4-172	A	Northwest Territories			X	X	X	X	X		X

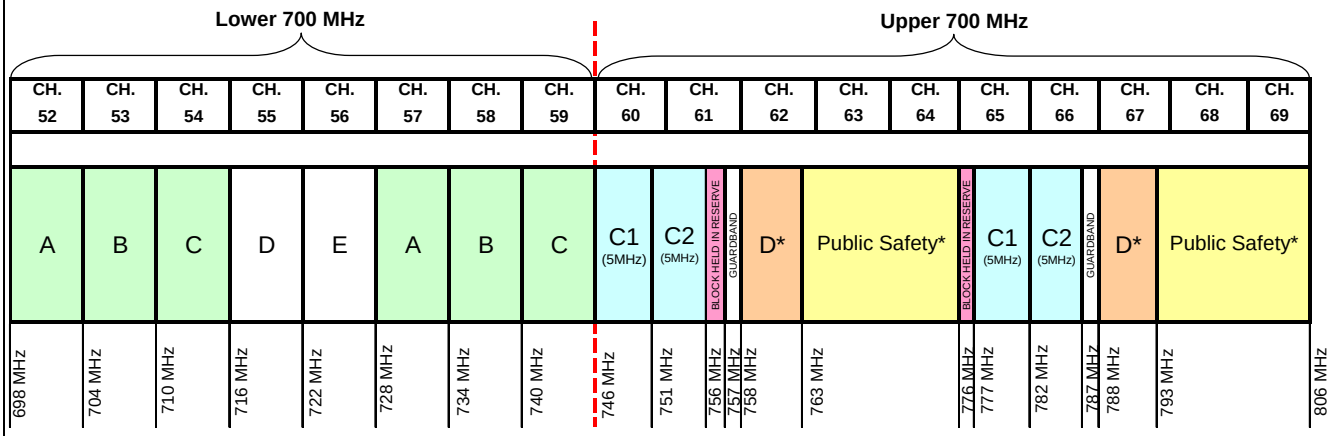
Annex 8 — Summary of Decisions

PART B — Decisions on a Policy and Technical Framework for Commercial Mobile Broadband Spectrum in the 700 MHz Band

Decisions related to the band plan and block sizes

B1-1: The band plan shown in Figure B2 below will be adopted for the 700 MHz auction, with the Upper C block subdivided into two separate blocks, namely C1 and C2. The following figure shows the band plan architecture for commercial mobile spectrum use.

Figure B2 — Canadian band plan for the bands 698-756 MHz and 777-787 MHz



* Decisions regarding D block (in the Upper 700 MHz band) and frequency ranges designated for public safety are discussed in Section B2.

The following frequency blocks will be available for the 700 MHz auction:

Block	Frequency	Pairing	MHz
A	698 – 704 MHz/ 728 – 734 MHz	paired	6+6 MHz
B	704 – 710 MHz/ 734 – 740 MHz	paired	6+6 MHz
C	710 – 716 MHz/ 740 – 746 MHz	paired	6+6 MHz
D	716 – 722 MHz	unpaired	6 MHz
E	722 – 728 MHz	unpaired	6 MHz
C1	777 – 782 MHz/ 746 – 751 MHz	paired	5+5 MHz
C2	782 – 787 MHz/ 751 – 756 MHz	paired	5+5 MHz

A Standard Radio Systems Plan (SRSP) and a Radio Standards Specification (RSS) will be released before the auction to establish the technical rules for systems operating in the commercial mobile spectrum in the 700 MHz band.

B1-2: The two 1 MHz blocks (the frequency bands 756-757 MHz and 776-777 MHz resulting from subdividing the Upper C block into blocks C1 and C2) will be held in reserve, and will thus not be part of the upcoming auction.

B1-3: As per the letter addressed to the CRTC, no new applications for broadcasting certificates will be accepted for TV stations operating on channel 51 (692-698 MHz). Block A licensees, in areas where mobile deployments are affected by TV broadcasting on channel 51, are encouraged to enter into mutually acceptable arrangements with the relevant broadcasters.

Decision related to guardbands between adjacent services

B1-4: The two guardbands (i.e. the frequency bands 757-758 MHz and 787-788 MHz) between adjacent services in the Upper 700 MHz band will be held in reserve until further notice.

Decision related to Tier Sizes

B1-5: Tier 2 service areas will be used to license all frequency blocks for the auction of 700 MHz spectrum licences.

Decisions related to the public safety spectrum

B2-1: The bands 763-768 MHz and 793-798 MHz (PSBB block) are designated for public safety broadband use. Consequently, these bands will not be part of the 700 MHz auction.

B2-2: A decision on the use of the bands 758-763 MHz and 788-793 MHz (the D block in the Upper 700 MHz band) will be made following a separate consultation.

Decisions on mechanisms to promote competition in the 700 MHz auction

B3-1: A spectrum cap of two paired frequency blocks in the 700 MHz band (blocks A, B, C, C1 and C2) is applicable to all licensees.

B3-2: A spectrum cap of one paired spectrum block from within blocks B, C, C1 and C2 is applicable to all large wireless service providers. Large wireless service providers are defined as companies with 10% or more of national wireless subscriber market share, or 20% or more wireless subscriber market share in the province of the relevant licence area.[56, 57]

B3-3: Unpaired blocks D and E in the Lower 700 MHz band are not subject to a spectrum cap.

[56] The subscriber market share for Ontario will apply for the licence area 2-06, Eastern Ontario and Outaouais.

[57] For the Tier 2-14 licence area (Yukon, Northwest Territories and Nunavut), only the national market share criteria will apply.

B3-4: Industry Canada will consult with a view to revising the rules on associated entities.

B3-5: A general rollout obligation will apply to all 700 MHz commercial licences. Industry Canada will consult on the details of the general deployment requirements (e.g. population coverage and time frame).

Decision regarding limitations on licence transfers in the 700 MHz band

B3-6: The spectrum caps put in place for the 700 MHz auction will continue to be in place for five years following licence issuance. Therefore, no transfer of licences or issuance of new licences will be authorized if it allows a licensee to exceed the spectrum cap during this period.

Decision related to general regulatory measures for rural deployments

B4-1: RP-019, *Policy for the Provision of Cellular Services by New Parties*, will be reviewed to assess possible changes to improve the process and determine whether the policy should be expanded to apply to other bands.

Decision related to specific measures to be adopted with the 700 MHz spectrum auction process

B4-2: A condition of licence will apply to 700 MHz licensees which requires the following:

(1) In each licence area where a licensee holds two or more paired blocks of spectrum in the 700 MHz band, or has access to two or more paired blocks of spectrum in the 700 MHz band through association, that licensee must deploy its 700 MHz spectrum:

(a) to cover 90% of the population of its existing HSPA network footprint within five years from the date of the issuance of the 700 MHz licence; and

(b) to cover 97% of the population of its existing HSPA network footprint within seven years from the date of the issuance of the 700 MHz licence.

(2) Coverage provided only through a roaming agreement is not considered to be part of the licensee's HSPA network footprint.

(3) Existing HSPA network footprint coverage is the coverage in effect as of the release date of this paper.

Decision related to open access

B5-1: No measures to ensure open access provisions, for devices and/or applications, are to be implemented at this time.

Decisions related to existing users of the 700 MHz band

B6-1: LPTV stations are permitted to continue to operate, but are subject to displacement. Industry Canada may issue a displacement notice on the following basis:

(a) Where a licensee planning to deploy services in the bands 698-768 MHz and 776-798 MHz identifies a specific LPTV station that may prevent its deployment, the licensee can approach Industry Canada with an identification of the areas, the spectrum required and planned time frames for its deployment. Industry Canada will examine the submission and, if it is determined that the continued operation of the LPTV station will interfere with these new services, will issue a displacement notice providing for termination of the broadcast certificate and requiring the LPTV operator to cease or migrate its operations.

(b) The following minimum notification periods between the displacement notice and termination of the broadcast will apply: (i) LPTV stations located in the proximity of urban areas (as detailed in Annex 5) will be afforded a minimum of a one-year notification period; and (ii) LPTV stations located in all other areas (also listed in Annex 5) will be afforded a minimum of a two-year notification period.

(c) Voluntary agreements between the LPTV station operators and 700 MHz licensees may provide for earlier displacement or for the continued operation of the LPTV stations.

B6-2: The nine full power stations which converted to LPTV in order to remain in the 700 MHz band on a secondary basis after August 31, 2011, will only be permitted to operate up to the date of the 700 MHz auction. These stations are also listed in Annex 5.

B6-3: Low-power licensed devices, including wireless microphones, will only be allowed to operate in the bands 698-764 MHz and 776-794 MHz until March 31, 2013.

Decision related to the 700 MHz spectrum utilization policy

B7-1: Systems for MBS shall comply with the Radio Policy RP-014 definition for CMRS, and no restrictions will be placed on the types of services offered by licensees (other than technical compatibility considerations).

Decision on changes to the Canadian Table of Frequency Allocations

B8-1: The *Canadian Table of Frequency Allocations* will be updated to include the following:

MHz
470 – 608 BROADCASTING 5.293 5.297 C24
…
614 – 698 BROADCASTING 5.293 C24
698 - 806 BROADCASTING FIXED MOBILE 5.317A C7 5.293

C24 **(CAN-11)** In the bands 470-608 MHz and 614-806 MHz, international footnotes **5.293** and **5.297** have raised the fixed and mobile services to a co-primary status with the broadcasting service. In Canada the fixed and mobile services have primary allocations only in the 698-806 MHz range. Industry Canada will carry out public consultation in the future in order to consider adopting the other service allocation provisions of international footnotes **5.293** and **5.297** in the frequency bands 470-608 MHz and 614-698 MHz.

C7 **(CAN-11)** International Footnote **5.317A** provides administrations with the flexibility to implement International Mobile Telecommunications (IMT) in the parts of the band 698-960 MHz that are allocated to the mobile service on a primary basis. The application of **5.317A** is limited to the bands designated for cellular mobile radio systems, cellular mobile telephony and trunked mobile systems. The bands 698-758 MHz and 776-788 MHz, 824-849 MHz and 869-894 MHz are designated for cellular mobile radio systems, cellular telephony services and the bands 806-821 MHz, 851-866 MHz, 896-902 MHz and 935-941 MHz are designated for trunked mobile services and, as such, can evolve to accommodate IMT service capabilities.

PART C — Decisions on Spectrum Packaging and the Licensing of Broadband Radio Service (BRS) in the 2500 MHz Band

Decisions related to block sizes in the 2500 MHz band

C1-1: In the bands 2500-2570 MHz and 2620-2690 MHz ("the paired spectrum"), the spectrum is to be licensed in blocks of 10+10 MHz in all licence areas.

C1-2: In the band 2570-2620 MHz ("the unpaired spectrum"), the spectrum is to be licensed in blocks of 25 MHz (which includes the respective 5 MHz restricted band[58]) in all licence areas.

Decisions related to Tier sizes

C1-3: In the Yukon, Northwest Territories and Nunavut, the licensing of 2500 MHz spectrum shall be based on Tier 4 service areas.

C1-4: In all other areas, the licensing of 2500 MHz spectrum shall be based on Tier 3 service areas.

Decisions related to measures to promote competition for the 2500 MHz band

C2-1: With the exception of licensees in the Yukon, Northwest Territories and Nunavut, all licensees are subject to a spectrum aggregation limit ("spectrum cap") of 40 MHz in the 2500 MHz band, excluding the restricted bands at 2570-2575 MHz and 2615-2620 MHz. This amount represents the total spectrum holdings, including both paired and unpaired spectrum, by each licensee in each licence area.

C2-2: The spectrum cap shall remain in effect in the 2500 MHz band for a period of five years after the issuance of licences. Therefore, no transfer of licences or issuance of new licences will be authorized if it allows a licensee to exceed the spectrum cap during this period.

C2-3: Industry Canada will consult with a view to revising the rules on associated entities.

C2-4: In areas where an existing licensee already has holdings in excess of the spectrum cap set out in Decision C2-1, the licensee will not be required to relinquish any such holdings in order to meet the limit of the spectrum cap. However, such licensees will not be eligible to bid for additional licences in the auction process or otherwise obtain additional licences in licence areas where the cap has been exceeded.

[58] Operation in the restricted bands (2570-2575 MHz and 2615-2620 MHz) is specified in SMSE-005-11: *Decisions on a Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band 2500-2690 MHz.*

C2-5: Licensees planning to transfer any of their existing holdings in order to increase their eligibility to bid in the related licence areas must do so prior to submitting an application to participate in this auction process.

C2-6: Licensees planning to relinquish any of their existing holdings to Industry Canada in order to increase their eligibility to bid in the related licence areas must do so at least six months prior to the proposed auction date. In the event that Industry Canada decides to offer these relinquished licences as part of the 2500 MHz auction process, an addendum to the licensing framework for the 2500 MHz auction will be published in order to inform prospective participants of the additional licence offerings.

C2-7: A rollout obligation applicable to all 2500 MHz licences will continue to apply. Industry Canada will consult on the details of the general deployment requirements (e.g. population coverage required and time frame) and their applicability as part of the upcoming consultations on a licensing framework in this band.

Other details related to the rules and licensing process for the 2500 MHz band will be the subject of an upcoming consultation.

Part D — Auction Timing and Next Steps

Decisions related to auction timing

D1-1: Industry Canada will proceed with an auction process for the 700 MHz band in the first half of 2013, followed by an auction process for the 2500 MHz band in early 2014.

D1-2: To mitigate uncertainty for the auction participants, the policy decisions for both bands are being published at the same time. Further, the auction design, opening bids and conditions of licence for 2500 MHz auction will be published prior to the start of the 700 MHz auction.