Industry Canada Industrie Canada

DGSO-004-12
October 2012

Spectrum Management and Telecommunications

Consultation on a Licensing Framework for Broadband Radio Service (BRS) — 2500 MHz Band

Aussi disponible en français

Canada

Contents

1. Intent

1. Through the release of this paper, Industry Canada is hereby initiating a consultation on a licensing framework for Broadband Radio Service (BRS) in the band 2500-2690 MHz (also known as the 2500 MHz band) as announced in *Canada Gazette* notice SMSE-002-12, *Policy and Technical Framework: Mobile Broadband Services (MBS) — 700 MHz Band, Broadband Radio Service (BRS) — 2500 MHz Band.*[1]

2. In February 2011, through *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] Industry Canada announced its decisions related to the adoption of a new band plan, as well as the mapping of Multipoint Communications Systems (MCS) and Multipoint Distribution Service (MDS) licensees into the new BRS band plan.

3. In SMSE-005-11, Industry Canada also initiated the consultation on a policy and technical framework to license spectrum in the 2500 MHz band. The subsequent decisions were announced in the SMSE-002-12[3] document.

4. Industry Canada is now seeking comments on licensing considerations related to auction format, rules and processes, as well as on conditions of licence for spectrum in the 2500 MHz band. Although many of the proposals in this consultation are similar to those presented in the April 2012 *Consultation on a Licensing Framework for Mobile Broadband Services (MBS) — 700 MHz Band,*[4] the two consultations will involve separate considerations and decisions. The inclusion of similar proposals herein should not be taken as an indication of a decision or direction taken by Industry Canada.

2. Background

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 Canadian telecommunications policy set out in section 7 of the *Telecommunications Act*, is responsible for spectrum management in Canada. As such, the Minister is responsible for developing national policies for spectrum utilization and ensuring effective management of the radio frequency spectrum resource.

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1 See *Canada Gazette* notice SMSE-002-12, *Policy and Technical Framework: Mobile Broadband Services (MBS) – 700 MHz Band, Broadband Radio Service (BRS) – 2500 MHz Band* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10223.html).

2 See *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* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09992.html).

3 See SMSE-002-12, *Policy and Technical Framework: Mobile Broadband Services (MBS) – 700 MHz Band, Broadband Radio Service (BRS) – 2500 MHz Band* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10223.html).

4 See DGSO-002-12, *Consultation on a Licensing Framework for Mobile Broadband Services (MBS) – 700 MHz Band* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10374.html).

6. In developing a licensing framework for BRS in the 2500 MHz band, Industry Canada will be guided by the objectives stated in section 7 of the *Telecommunications Act*, the policy objective stated in the *Spectrum Policy Framework for Canada* (SPFC)[5] to maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum, and the policy objectives outlined in SMSE-002-12,[6] 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.

7. Industry Canada will also be guided by the general approaches and processes outlined in the *Framework for Spectrum Auctions in Canada* (FSAC),[7] revised in March 2011.

3. General

8. In SMSE-002-12, Industry Canada announced specific policy decisions related to the licensing process for spectrum in the 2500 MHz band. Consistent with those decisions, the following provides an overview of the licences to be auctioned:

- licences will be "spectrum licences in respect of the utilization of specified radio frequencies within a defined geographic area," as defined in subparagraph 5(1)(a)(i.1) of the *Radiocommunication Act*;
- licences will be auctioned using Tier 3 service areas (58 service areas), except in the Northwest Territories, Yukon and Nunavut, where Tier 4 service areas (three service areas) will be used;
- in the bands 2500-2570 MHz and 2620-2690 MHz ("the paired spectrum"), the spectrum will be licensed in blocks of 10 + 10 MHz in each available service area;
- in the band 2570-2620 MHz ("the unpaired spectrum"), the spectrum will be licensed in blocks of 25 MHz (which includes the respective 5 MHz restricted band[8]) in each available service area;

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5 See *Spectrum Policy Framework for Canada* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08776.html).

6 See SMSE-002-12, *Policy and Technical Framework: Mobile Broadband Services (MBS) – 700 MHz Band, Broadband Radio Service (BRS) – 2500 MHz Band* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10223.html).

7 See *Framework for Spectrum Auctions in Canada* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01626.html).

8 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* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09992.html).

- a total of 318 licences will be offered;

- excluding the restricted bands (2570-2575 MHz and 2615-2620 MHz), a spectrum aggregation limit of 40 MHz will apply in each service area of the 2500 MHz band, except in the Northwest Territories, Yukon and Nunavut where there is no limit. This amount represents the total spectrum licence holdings in the 2500 MHz band, including both paired and unpaired spectrum, by each licensee in each licence area;

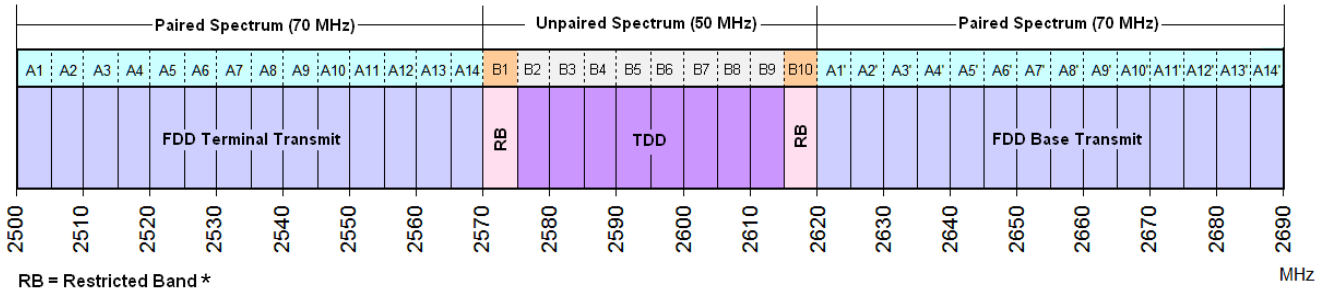
- in service areas where an existing licensee already has spectrum licence holdings in excess of the spectrum aggregation limit, the licensee will not be required to divest any such holdings in order to meet the spectrum aggregation limit. However, such licensees will not be eligible to bid for additional licences in the auction process or otherwise obtain additional licences in service areas where the limit has been met or exceeded.

9. For a complete list of policy decisions related to the 2500 MHz band, refer to Section C of SMSE-002-12.[9]

3.1 Spectrum Available for Licensing

10. As per SMSE-005-11, the following general band plan was adopted for BRS in the 2500 MHz band (see Figure 1). Also shown in the figure is the 5 MHz block grid used for referencing purposes in SMSE-005-11.

Figure 1 — General band plan for BRS in the band 2500-2690 MHz



* **Note:** The policy with respect to operation in the restricted bands (2570-2575 MHz and 2615-2620 MHz) is specified in SMSE-005-11.

11. Figures 2 to 5 and Annex A show the amount of spectrum available in the three Regions[10] of Canada:

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[9] See SMSE-002-12, *Policy and Technical Framework: Mobile Broadband Services (MBS) – 700 MHz Band, Broadband Radio Service (BRS) – 2500 MHz Band* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10223.html).

[10] Refer to Appendix A in SMSE-005-11 (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 2 — Map of Regions

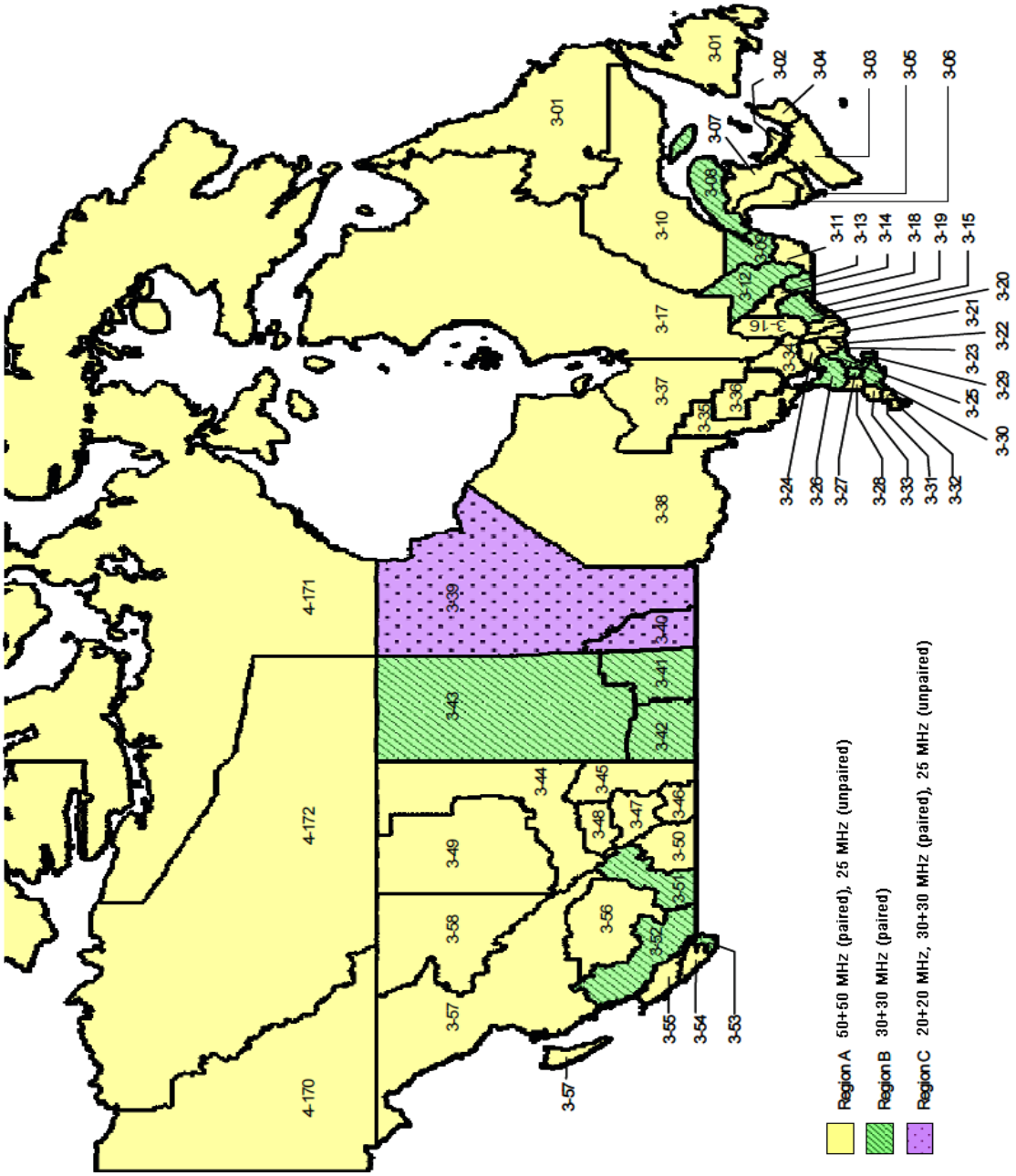


Figure 3 — Spectrum available for licensing in Region A

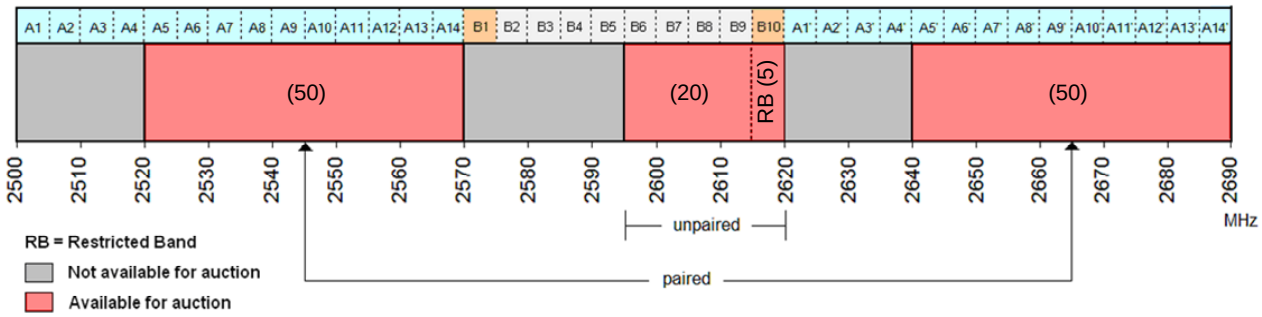


Figure 4 — Spectrum available for licensing in Region B

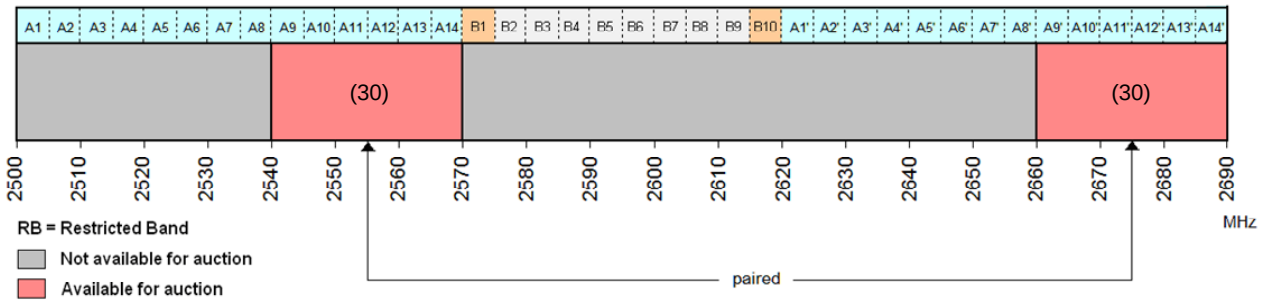
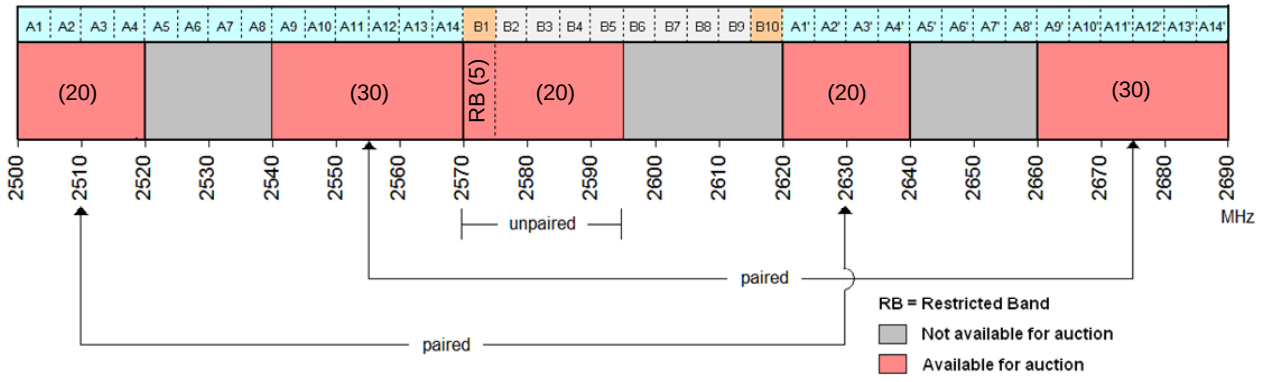


Figure 5 — Spectrum available for licensing in Region C



12. As shown in figures 3 to 5, a minimum of 30 + 30 MHz and a maximum of 50 + 50 MHz of paired spectrum are available for licensing throughout Canada. As well, 25 MHz of unpaired spectrum (including the respective 5 MHz restricted band) is available for licensing in most areas across the nation.

3.2 Radio Frequency Block Arrangement Description

13. In accordance with SMSE-002-12, *Policy and Technical Framework, Mobile Broadband Services (MBS) — 700 MHz Band, Broadband Radio Service (BRS) — 2500 MHz Band*,

- the band 2500-2570 MHz, which is paired with the band 2620-2690 MHz, is divided into seven 10 + 10 MHz paired blocks with a frequency separation of 120 MHz; and

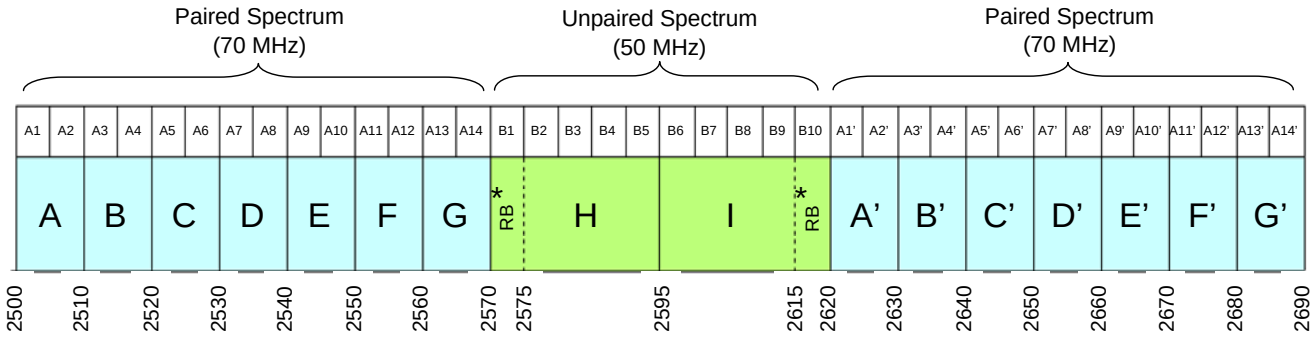
- the band 2570-2620 MHz is divided into two 25 MHz unpaired blocks. The unpaired blocks will each include a 5 MHz restricted band separating the paired and unpaired spectrum (i.e. 2570-2575 MHz and 2615-2620 MHz).

14. The BRS 2500 MHz band plan and block sizes are shown in Table 1 and Figure 6 respectively.

Table 1 — BRS Frequency Blocks

Block	Frequencies	Total Spectrum	Pairing
A / A’	2500-2510 MHz / 2620-2630 MHz	10 + 10 MHz	paired
B / B’	2510-2520 MHz / 2630-2640 MHz	10 + 10 MHz	paired
C / C’	2520-2530 MHz / 2640-2650 MHz	10 + 10 MHz	paired
D / D’	2530-2540 MHz / 2650-2660 MHz	10 + 10 MHz	paired
E / E’	2540-2550 MHz / 2660-2670 MHz	10 + 10 MHz	paired
F / F’	2550-2560 MHz / 2670-2680 MHz	10 + 10 MHz	paired
G / G’	2560-2570 MHz / 2680-2690 MHz	10 + 10 MHz	paired
H	2570-2595 MHz	25 MHz (includes 5 MHz restricted band)	unpaired
I	2595-2620 MHz	25 MHz (includes 5 MHz restricted band)	unpaired

Figure 6 — BRS Frequency Block Plan



*Restricted Band

Note: The policy with respect to operation in the restricted bands 2570-2575 MHz and 2615-2620 MHz is specified in SMSE-005-11.

15. Various channel sizes may be used within the blocks depending on technology choices of the licensee, subject to the applicable Standard Radio System Plan (SRSP) and/or Radio Standards Specifications (RSS).

16. For Frequency Division Duplex (FDD) operations in the paired spectrum, the subscriber-to-base links are to be deployed in the band 2500-2570 MHz, and the base-to-subscriber links are to be deployed in the band 2620-2690 MHz.

17. The operation of non-FDD systems in the bands 2500-2570 MHz and 2620-2690 MHz are subject to the operation and displacement policy in SMSE-005-11.

18. Time Division Duplex (TDD) systems may operate in the band 2570-2620 MHz.

3.3 Restricted Bands

19. As per SMSE-005-11, Industry Canada decided to impose 5 MHz restricted bands, 2570-2575 MHz and 2615-2620 MHz, to mitigate interference between systems operating in the paired and unpaired spectrum.

20. TDD operations by licensees within the restricted bands 2570-2575 MHz and 2615-2620 MHz are permitted on a no-protection, no-interference basis with respect to FDD operations in the paired spectrum.

21. The technical rules for operation within the 2500 MHz band restricted bands will be provided in an SRSP and/or RSS.

3.4 Existing Licensees in the 2500 MHz Band

22. Site-specific fixed service licensees currently operate in the 2500 MHz band in certain areas of British Columbia and Quebec. These existing licences are subject to transition policies set out in SMSE-005-11[11] and are listed in Annex B. The site-specific licences in Alberta and the Canadian Radio-television Telecommunications Commission (CRTC) licence-exempt broadcasting stations discussed in SMSE-005-11 are no longer in operation.

23. Site-specific licences in Manitoba are grandfathered, as stated in DGSO-001-10,[12] and may continue to operate in the 2500 MHz band. These existing licensees are protected from harmful interference from BRS. An updated list of the grandfathered licences in Manitoba is provided in Annex C.

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[11] See 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).

[12] 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* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09882.html).

24. Furthermore, there may be MCS and BRS licensees that operate in the 2500 MHz band and that have yet to transition their systems to the new band plan. These systems are subject to the transition policies set out in SMSE-005-11.[13] Up-to-date lists of MCS and BRS licensees are available through Industry Canada's Spectrum Licence Browser at http://sd.ic.gc.ca/pls/engdoc_anon/speclic_browser$.startup.

3.5 Services in Adjacent Bands

25. In accordance with the *Canadian Table of Frequency Allocations,*[14] authorized stations may be operating the following services within the adjacent frequency bands:

- mobile-satellite service (MSS) downlink operations in the band 2483.5-2500 MHz;
- radio astronomy service[15] (RAS) in the band 2690-2700 MHz;
- ground-based radar operations in the band 2700-2900 MHz for aeronautical radionavigation services or meteorological purposes; and
- shore-based radar operations in the band 2850-2900 MHz for maritime radionavigation services.

26. In light of the above, BRS operations in the 2500 MHz band will be required to coexist and may need to be coordinated with the operations of authorized stations in the aforementioned bands.

27. Further details will be provided in a SRSP and/or RSS, which will be developed in consultation with industry.

3.6 Tier Sizes

28. 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. Table 2 summarizes the frequency blocks, tiers and the number of licences available for the 2500 MHz auction. Annex A provides a more detailed table of spectrum availability for all licence areas.

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[13] See 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).

[14] Source: The *Canadian Table of Frequency Allocations* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01678.html, pages 35-36)

[15] Canada has two radio astronomy observatories, the Dominion Radio Astrophysical Observatory, located near Penticton, British Columbia (Latitude 49° 19′ 12¨ North, Longitude 119° 37′ 12¨ West), and the Algonquin Radio Observatory, located in Algonquin Provincial Park in Ontario (Latitude 45° 57′ 20¨ North, Longitude 078° 04′ 23¨ West).

Table 2 — Block size, tiers and number of licences available for the 2500 MHz auction in each Region

	Block	Frequency	Pairing	MHz	Tier	Licences
Region A (excluding the Northwest Territories, Yukon and Nunavut)	C/C’	2520-2530 MHz / 2640-2650 MHz	paired	10 + 10	3	40
	D/D’	2530-2540 MHz / 2650-2660 MHz	paired	10 + 10	3	40
	E/E’	2540-2550 MHz / 2660-2670 MHz	paired	10 + 10	3	40
	F/F’	2550-2560 MHz / 2670-2680 MHz	paired	10 + 10	3	40
	G/G’	2560-2570 MHz / 2680-2690 MHz	paired	10 + 10	3	40
	I	2595-2620 MHz*	unpaired	25 *	3	40
Region A (the Northwest Territories, Yukon and Nunavut only)	C/C’	2520-2530 MHz / 2640-2650 MHz	paired	10 + 10	4	3
	D/D’	2530-2540 MHz / 2650-2660 MHz	paired	10 + 10	4	3
	E/E’	2540-2550 MHz / 2660-2670 MHz	paired	10 + 10	4	3
	F/F’	2550-2560 MHz / 2670-2680 MHz	paired	10 + 10	4	3
	G/G’	2560-2570 MHz / 2680-2690 MHz	paired	10 + 10	4	3
	I	2595-2620 MHz*	unpaired	25 *	4	3
Region B	E/E’	2540-2550 MHz / 2660-2670 MHz	paired	10 + 10	3	16
	F/F’	2550-2560 MHz / 2670-2680 MHz	paired	10 + 10	3	16
	G/G’	2560-2570 MHz / 2680-2690 MHz	paired	10 + 10	3	16
Region C	A/A’	2500-2510 MHz / 2620-2630 MHz	paired	10 + 10	3	2
	B/B’	2510-2520 MHz / 2630-2640 MHz	paired	10 + 10	3	2
	E/E’	2540-2550 MHz / 2660-2670 MHz	paired	10 + 10	3	2
	F/F’	2550-2560 MHz / 2670-2680 MHz	paired	10 + 10	3	2
	G/G’	2560-2570 MHz / 2680-2690 MHz	paired	10 + 10	3	2
	H	2570-2595 MHz*	unpaired	25 *	3	2

* Includes restricted band

3.7 Service Area for Lloydminster (Alberta/Saskatchewan)

29. In SMSE-002-12, Industry Canada indicated that Tier 3 and Tier 4 service areas will be used to license the frequency blocks for the auction of 2500 MHz spectrum licences. It also stated that the tier boundaries around Lloydminster, Saskatchewan, would be discussed in the 700 MHz and 2500 MHz consultations on licensing issues.

30. The issue concerning Lloydminster was raised by SaskTel in its response to SMSE-005-11 in which it proposed that tier area boundaries around Lloydminster warrant further consideration by Industry Canada.

31. Industry Canada uses service areas, called tiers, for all competitive licensing processes. These areas are based on Statistics Canada’s Census Divisions and Subdivisions. Four tier sizes, as outlined in the document *Service Areas for Competitive Licensing*, have been established to accommodate various wireless services, applications and frequency bands. The definition of the service areas within these tiers and accompanying maps and data tables are available on Industry Canada’s website.[16]

[16] *Service Areas for Competitive Licensing* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01627.html).

32. The smallest tier service areas roll up to fit within the larger tier areas. Some minor deviations from provincial borders exist. These deviations were made around provincial borders to avoid having a service area boundary cut through a population centre, thereby minimizing potential interference problems.

33. For example, a large portion of Lloydminster, which falls in both Saskatchewan and Alberta, has been captured by service area 4-129 Lloydminster (Alberta). Consequently, the majority of the City of Lloydminster is included in service area 4-129 Lloydminster (Alberta) and respectively in the Tier 3 service area 3-44 (Edmonton) and Tier 2 service area 2-12 (Alberta). As the smaller service area 4-129 is part of the Alberta tier, the effect is that the majority of the City of Lloydminster is currently part of the Alberta service area in tiers 2, 3 and 4.

34. Industry Canada considers that the rationale for the deviations around provincial borders continues to be valid and that any changes which would affect the licensing consistency of existing and future licensing processes are not warranted. Therefore, it is proposed that the current boundaries surrounding service area 4-129 (and thus tiers 3-44 and 2-12) continue to apply.

3-1 Industry Canada is seeking comments on whether the service area boundary for licences in the 2500 MHz band should deviate from the provincial boundary around the City of Lloydminster (Alberta/Saskatchewan).

Note: Annex I provides a summary of all proposals for consideration.

4. Auction Format and Rules

35. The auction format should be simple, fair and transparent for bidders; one that leads to an efficient assignment of spectrum. In the selection of an auction format and related rules, consideration is given to the characteristics of the spectrum being auctioned, for example, the quantity and size of the blocks, their geographic characteristics, as well as the similarities and complementarities that may exist among the blocks.

4.1 Auction Format

36. Industry Canada used the Simultaneous Multiple Round Ascending (SMRA) auction format in its first auction in 1999 and in four of its six subsequent spectrum auctions.[17] The SMRA auction format

[17] Industry Canada used an SMRA for the 24 and 38 GHz auction in 1999, the Personal Communications Services (PCS) auction in 2001, the 2300/3500 MHz auction in 2004, the two-phased residual auction for 2300/3500 MHz in 2004 (Phase 1) and 2005 (Phase 2), and the Advanced Wireless Services (AWS) auction in 2008. Industry Canada used a sealed bid, second-price auction design for two auctions held in 2009 (the Air-Ground auction and the auction of residual spectrum licences in the 2300/3500 MHz bands).

has been used in spectrum auctions in many countries for more than 15 years. Countries that have used this format in recent spectrum auctions include Italy, Germany, Mexico, Spain, the United States, as well as the Special Administrative Region of Hong Kong.

37. In an SMRA auction, all licences are auctioned simultaneously over a series of rounds. In each round, bids are submitted on individual licences at the announced prices. At the end of each round, a standing high bidder is identified for each licence. The standing high bidder is then committed to the licence and cannot withdraw its bid without the possibility of incurring a penalty. The standing high bidder is released from its commitment when outbid by another bidder. When a licence receives at least one bid, the price for the licence increases in the next round. As the prices rise gradually over multiple rounds, bidders gather information about how the other auction participants value the licences. This price discovery helps to reduce a bidder's uncertainty regarding the value of the licences. Bidders are able to respond to these changes in prices accordingly, shifting their bids to licences that continue to be consistent with their business objectives. Activity rules are in place to compel active bidding and encourage truthful bids throughout the auction, that is, bidding that is consistent with how they truly value the licences. The auction ends when a round passes in which no new bids are received on any licences.

38. The SMRA auction format is a well understood, effective approach to assigning spectrum licences and it remains popular to date; however, it does have some weaknesses. The most notable weakness is the exposure risk, that is, the possibility that a bidder will win some but not all of the licences needed for its business case and may be left stranded with licences that cannot be used as effectively. In an SMRA auction format, bidding is for individual licences only, leaving bidders which seek to aggregate blocks of licences that are contiguous and/or across multiple service areas, vulnerable to the exposure risk.

39. In an SMRA auction, in order to mitigate the exposure risk, bidders are able to withdraw their standing high bids, switching to other desired licences or withdrawing from the auction altogether. However, they may be subject to withdrawal penalties, which are in place to discourage bidders from bidding frivolously and then withdrawing their bids.

40. Advancements in auction theory and design have led to the development of new auction formats and rules. Industry Canada has been examining these new developments in consideration of the auction format and rules for the 700 MHz and 2500 MHz auctions. One of these advancements is the combinatorial clock auction (CCA) format, which is a variation of the SMRA format in that all licences are auctioned at the same time over multiple rounds. Similar to the SMRA format, the CCA format provides a simple bidding process for participants, including a price discovery stage; however, instead of bidding on individual licences, bidders express their demand for a package of licences at the prevailing prices. The use of package bidding eliminates the exposure risk inherent in the SMRA format. Furthermore, unlike the SMRA format, the CCA format does not require the identification of a "standing high bidder" that is held responsible for individual licences at the end of each round, which makes it easier for bidders to move to substitute licences in response to price changes.

4.2 Proposed Auction Format for the 2500 MHz Auction

41. Industry Canada proposes to implement a CCA format for the 2500 MHz auction. Pricing and activity rules are established to encourage truthful bidding throughout the auction (see Section 4.2.3). Industry Canada proposes to limit the amount of information disclosed regarding bidding activity during the auction process (see Section 4.2.4). Further information on the proposed CCA format and auction rules for the 2500 MHz auction can be found in Annex D.

42. CCAs have been used in several countries since 2008, including the United Kingdom, the Netherlands, Denmark, Austria and Switzerland, and are planned for upcoming digital dividend auctions in Australia, Ireland and the United Kingdom. Industry Canada is also proposing to use the CCA format for the upcoming 700 MHz auction.

4.2.1 Proposed Auction Attributes

43. One of the key attributes of the CCA is the use of package bidding wherein for each round, the bidder specifies the set of licences that it would like, at the announced prices, and submits a single bid for the package. The package bid is treated as an all-or-nothing bid and the package is awarded in its entirety, or not at all. Bidding on a package of licences eliminates the possibility that a bidder will win some but not all the licences needed for its business case and may be left stranded with licences that cannot be used as effectively, that is, there is no exposure risk. This is particularly important given the regional nature of the licences to be auctioned and the potential for strong and varied complementarities across these regional licences.

Generic Licences

44. A category is a single block of spectrum or a grouping of similar (generic) blocks of spectrum that is made available for auction. A category in a given service area is referred to as a product.

45. Generic licences are blocks of spectrum that are sufficiently similar and comparable in value such that they can be offered in a single category in each service area. The use of generic licences simplifies the bidding process, as it reduces the possible number of combinations on which bids may be placed.

46. For the upcoming 2500 MHz auction, Industry Canada is proposing two categories of licences, paired and unpaired. For the paired categories, Industry Canada is proposing that the following licences be treated as generic in service areas of the respective regions:

- Region A: blocks C/C’ to G/G’ (five paired generic licences);
- Region B: blocks E/E’ to G/G’ (three paired generic licences); and
- Region C: blocks A/A’ to B/B’ and E/E’ to G/G’ (five paired generic licences).

47. In both Region A and Region C, the unpaired category would consist of one unpaired licence, either H or I, in each service area. The unpaired blocks are not available in Region B.

48. The generic licence categories were determined based on the anticipated substitutability of the blocks. In creating the generic licence categories, Industry Canada considered the frequency location in the band, the block size, and possible technology and interference constraints.

49. In Region C, some of the products are currently subject to the operations of grandfathered licensees: in Winnipeg (paired blocks A/A', paired blocks E/E' to G/G' and unpaired block H) and in Brandon (paired blocks E/E' to F/F' and unpaired block H). It is unclear whether the operations of the grandfathered licensees affect the value of these licences sufficiently to warrant separate categories. Industry Canada is therefore proposing to auction the five paired blocks as generic licences, with bidders able to express their preferences for specific licences in the assignment stage of the auction.

50. Consequently, there would be two categories for the 43 service areas of Region A, one which includes five paired generic licences and one that includes one unpaired licence. For the 16 service areas in Region B, there would be one category that includes three paired generic licences. For the two service areas in Region C, there would be two categories, one that includes five paired generic licences and one that includes a single unpaired licence. In total, two categories and 106 products are proposed for the 2500 MHz auction. Table 3 illustrates the categories and products that are proposed for the 2500 MHz auction.

Table 3 — Proposed product configuration for 2500 MHz auction

	Paired							**Unpaired**		**Products**
	A/A'	B/B'	C/C'	D/D'	E/E'	F/F'	G/G'	H	I	
Region A (43 service areas)			**X**	**X**	**X**	**X**	**X**		**X**	86 (2 × 43)
Region B (16 service areas)					**X**	**X**	**X**			16 (1 × 16)
Region C (2 service areas)	**X**	**X**			**X**	**X**	**X**	**X**		4 (2 × 2)

Note: Products available for auction are indicated by an "X."

51. It is recognized that contiguous spectrum within a service area is preferable to non-contiguous spectrum in terms of technological efficiency. It is also Industry Canada's understanding that any user equipment operating in the 2500 MHz paired spectrum will be able to operate across the complete 2500 MHz paired spectrum, and so acquiring contiguous blocks within a service area may be more important than acquiring the same block(s) across multiple service areas.

52. For those products comprised of multiple generic licences, bidders will be able to specify the number of contiguous licences that they would like to acquire as part of their package. Industry Canada is proposing that winners of multiple licences receive contiguous licences within a given product, with the opportunity to express their preference for specific contiguous frequencies in the assignment stage of the auction. This guarantee of contiguity may impact the ability of some bidders to obtain the same blocks of spectrum across a collection of service areas.

4.2.2 Overview of the CCA Process

53. There are typically two stages in the CCA process: the allocation stage, and if there are generic licences, the assignment stage. The process is shown in Figure D1 of Annex D.

54. In the **allocation stage**, the number of spectrum licences that a bidder wins in each service area is determined. It consists of the following:

- **clock rounds**, a series of rounds where, in each round, bidders submit a bid for a package of licences (some of which may be generic) in response to prices announced by Industry Canada. The clock rounds continue until there is no excess demand for any of the licences. This is the price discovery stage of the auction.

- **a supplementary round**, a single round where bidders have the opportunity to make additional bids for packages of licences at prices that are decided by the bidder, but subject to limits that are based on their clock round bids.

55. The **assignment stage** is where winning bidders have the opportunity to make additional bids to express their preferences for particular frequency assignments within the generic licences that they have won.

56. The assignment stage will consist of a sequence of rounds. Each assignment round will determine the specific frequencies to be assigned to winners of generic licences in one or more of the paired products. Assignment rounds will not be required for any of the products containing unpaired licences, as there is only one unpaired licence in each of those products.

57. Given the large number of service areas, Industry Canada is proposing to run product-by-product assignment rounds in descending order of the populations of the associated service areas, conducting a separate assignment round for each product, where necessary. This process will enable bidders to know which specific frequencies they have won in the most populated service areas before they participate in the assignment rounds for the adjacent, less populated service areas. However, two or more products will be aggregated into a single assignment round if all of the following criteria are met: the products are in the same region (i.e. Region A, Region B or Region C); their service areas form a contiguous geographic area; and the winners, and the number of generic licences they have won are sufficiently similar across service areas, according to predefined criteria. This may result in a separate assignment round for each service area. Industry Canada welcomes suggestions for alternative methods of conducting the assignment stage, including suggestions for ways to minimize the number of rounds in the assignment stage.

58. In the event that more than one licence in a product remains unallocated at the end of the allocation stage, Industry Canada is proposing to retain the unallocated licences as a contiguous block within a product. This proposal may affect the specific frequency options available in the assignment rounds and the possibility of obtaining the same blocks of spectrum across service areas, as the combination of the block of unallocated licences and the licences won by the bidder(s) must be feasible. Industry Canada is not proposing to specify the exact blocks that it will retain as unallocated, but rather to let the bidding in

the assignment stage determine which specific frequency blocks remain unallocated. This will provide more flexibility for bidders to express their preference for a particular assignment. This is consistent with other spectrum auctions held internationally; for example, Austria, Denmark and Switzerland specified that unallocated licences in the 2.6 GHz band would be contiguous in the upper end of the band.

59. As announced in SMSE-002-12, a spectrum aggregation limit of 40 MHz in each service area of the 2500 MHz band, with the exception of the Northwest Territories, Yukon and Nunavut, will apply to all bidders. The limit includes both the paired and unpaired spectrum available for auction and any 2500 MHz spectrum licence holdings that a bidder may already have, but excludes the restricted bands at 2570-2575 MHz and 2615-2620 MHz. Therefore, bidders will not be permitted to bid on additional licences in a service area which would result in their spectrum aggregation limit being exceeded.

60. The use of the CCA format and, in particular, the use of generic licences, is expected to contribute to a reduction in the length of the auction, in comparison with the length of an SMRA auction. As well, Industry Canada would use activity-based increments in the clock rounds, where bid increments for a product reflect the level of demand. This is also expected to shorten the auction duration, as round prices would increase more quickly for products with higher demand.

4.2.3 Proposed CCA Rules

61. The proposed activity and pricing rules for the 2500 MHz auction are designed to encourage truthful bidding and to promote price discovery throughout the auction. These are described below and further elaborated in Annex D.

Activity Rules

62. In previous SMRA auctions, Industry Canada used an eligibility-based activity rule where each licence was assigned a specific number of eligibility points. Bidders were then required to bid actively on a certain number of eligibility points in order to maintain their ability to bid in subsequent rounds. In general, the required level of activity increased through the different stages of the auction, from a minimum of 70% in the first stage to 100% in the final stage. This allowed bidders the flexibility to switch their bids to other licences in response to price changes, thereby mitigating the exposure risk.

63. With the use of an eligibility-based activity rule, a bidder could respond to price increases by bidding on fewer licences, which would result in a decrease of eligibility points in subsequent rounds. As a general rule, eligibility points cannot be increased once they have been reduced. Consequently, a bidder was not able to switch its bid to a package that was larger in terms of eligibility points but relatively less expensive.

64. In the 2500 MHz auction, Industry Canada is proposing activity rules in the allocation stage that will afford bidders the flexibility to bid on their most preferred packages. The proposed rules will also ensure that bids in the supplementary round are consistent with the bidders' preferences expressed in the clock rounds.

Revealed Preference/Eligibility Point Hybrid Activity Rule

65. In the clock rounds, Industry Canada proposes to use a hybrid activity rule, which includes an eligibility points-based activity rule in conjunction with a revealed preference activity rule. A revealed preference activity rule constrains bids based on the bids submitted in previous rounds.

66. To begin, each licence will be assigned a specific number of eligibility points (see Annex D, Section 7). In every clock round, bidders will be required to bid on 100% of their eligibility if they wish to maintain the same level of eligibility in subsequent rounds. When a bidder reduces its bid to a smaller package, then its eligibility for the next round will be reduced accordingly.

67. In addition, a revealed preference rule is proposed, which will allow bidders to exceed their eligibility in order to bid on packages that have become comparatively less expensive relative to every prior round where the bidder reduced its eligibility. This will afford bidders greater flexibility to fully express their preferences in the clock rounds of the auction, ensuring that the activity rules do not prevent a bidder from bidding on its most preferred package. Further information on the proposed activity rules in the clock rounds can be found in Annex D, Section 8. As well, a detailed example of the proposed revealed preference activity rule is included in Annex E and an algebraic description of the revealed preference rule is included in Annex F.

Revealed Preference Limit

68. In the supplementary round, Industry Canada is proposing to limit bids based on revealed preference with respect to the bids that a bidder submitted in the clock rounds. The rule, referred to as the “revealed preference limit,” encourages truthful bidding throughout the auction, not just in its latter stages. Further information on the proposed revealed preference limit in the supplementary round can be found in Annex D, Section 10.

69. All valid bids submitted in the clock rounds and the supplementary round are binding bids, and are included in determining the winning packages and base prices after the end of the supplementary round. Bids cannot be withdrawn. Bid withdrawals were permitted in the SMRA auction format to mitigate the exposure risk inherent in the auction design. Bid withdrawals are not necessary in the CCA format because bidding is for a package of licences and bidders do not risk acquiring only some of the licences that they require.

Pricing Rules

70. In the CCA format, prices are determined at the end of the allocation stage and after each assignment round. Base prices are calculated at the end of the allocation stage following the supplementary round, taking into consideration all valid bids from the clock rounds and supplementary round. Assignment prices are determined after each assignment round, in which bidders that have won generic licences in the allocation stage bid for specific assignments. The assignment prices are incremental to the base prices. The final price to be paid by a bidder will be determined following the assignment stage, and is equal to the bidder’s base price plus the sum of all associated assignment prices. If the sum of a bidder’s assignment prices is zero, then the final price will be equal to the base price determined at the end of the allocation stage.

71. Two common pricing rule options for calculating the prices to be paid by winning bidders are a first-price rule and a second-price rule. A first-price rule requires winning bidders to pay the full amount of their winning bid. A second-price rule requires each winning bidder to pay an amount that is sufficient to ensure that no other bidder, or group of bidders, was prepared to pay more than the winning bidder for the licence(s) in question.

72. Under a first-price rule, the bidder has a strong incentive to bid less than its true value, which can lead to inefficient outcomes. A second-price rule promotes a more efficient outcome by increasing the incentive for bidders to bid their true value. Bidders, knowing that they will only be required to pay the minimum amount necessary to win their package, will have the incentive to bid truthfully during the entire auction.

73. Industry Canada is proposing to use a second-price rule to determine the base price to be paid by winning bidders for their packages of generic licences won at the end of the allocation stage, and to determine assignment prices to be paid by winning bidders for their specific licence assignments.

74. There are several approaches to determine second prices in a CCA. Industry Canada proposes to apply bidder-optimal core prices and to use the “nearest Vickrey” approach, which is one of most common approaches used for CCAs. Further information on the proposed pricing rules is provided in Annex G.

4.2.4 Information Disclosure

75. In previous SMRA auctions, Industry Canada made all information regarding the bidding activity of all bidders available after each round. Although this transparency facilitated price discovery, it also increased the potential for anti-competitive behaviour. Industry Canada proposes to use anonymous bidding during the 2500 MHz auction. After each clock round, bidders would be provided with information regarding their own bidding activity in the previous round and their eligibility for the next round. In addition, bidders will be informed of the aggregate demand for each product from the previous round and the price of each product for the next round. The aggregate demand and price information from the end of each clock round would also be made available on Industry Canada’s website.

76. With the use of anonymous bidding, enough information will still be provided to permit price discovery, allowing bidders to make informed decisions regarding their bidding strategies. Bidders will be able to focus on their valuations for the licences, the level of aggregate demand and the prices rather than on the bidding behaviour of their individual competitors. Thus, the potential for anti-competitive behaviour is minimized and the bidding process is simplified.

77. At the end of the allocation stage, each bidder will be informed of its own winning package and the associated base price to be paid. All bidders will be informed of the number of winning bidders and the number of licences within each product that have been allocated.

78. After each assignment round, each participating bidder will be informed of the specific licences that it was assigned and the associated assignment price.

79. At the end of the assignment stage, Industry Canada will inform winning bidders of the final price they will have to pay for the licences they have won.

80. Industry Canada is proposing to make the following information publicly available following the conclusion of the auction:

- the list of winning bidders, licences won and final prices to be paid;
- the bid submitted by each bidder in every clock round, including the bidder's identity;
- the supplementary bids submitted by each bidder, including the bidder's identity; and
- the assignment bids submitted by each bidder, including the bidder's identity.

81. Full disclosure of all bidding information at the end of the auction will allow all interested parties to verify the results of the auction, facilitating greater transparency regarding the winner and price determination.

82. Consistent with past practice, the identity of applicants and qualified bidders will be made available to the public prior to the auction, so that all bidders have knowledge of the identity of the other bidders.

4.2.5 Summary

83. The proposed CCA format has many advantages. The exposure risk is eliminated, anti-competitive behaviour is reduced, substitution among similar licences is enhanced and the duration of the auction will likely be reduced. In addition, the proposed activity rules, which combine both eligibility points and revealed preference, will provide flexibility for bidders to bid on their preferred packages as prices rise. These aspects create a more straightforward bidding process for participants and improve the effectiveness of the auction process.

4-1 Industry Canada is seeking comments on its proposal to use the CCA format, as well as the general attributes outlined above, including:

(a) the products available for auction, e.g. the categorization of generic licences;
(b) the use of product-specific stages in the assignment round, ordered by population;
(c) the combined eligibility point and revealed preference activity rule in the clock rounds, and the revealed preference limit in the supplementary round;
(d) the use of a second-price rule;
(e) the information to be disclosed during and post-auction;
(f) the guarantee of contiguity for generic licences won within a product; and
(g) the contiguity of blocks retained by Industry Canada.

5. Bidder Participation — Affiliated and Associated Entities

84. In SMSE-002-12, Decision C2-3, Industry Canada indicated that it would consult the public with a view to revising the rules on associated and affiliated entities to provide improved flexibility and clarity.

85. It has been noted that several Canadian service providers have entered into different forms of network and spectrum sharing arrangements, driven by the investment and spectrum efficiencies that such arrangements can bring, particularly in rural areas. However, in previous auctions, parties entering into agreements and arrangements that were deemed to be either affiliated or associated entities were only permitted to participate in the auction process through a single bidder.

86. In support of the stated policy objectives of competition investment, and in light of 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, as well as the spectrum and network efficiencies that can be achieved through such arrangements, Industry Canada recognizes that changes to the rules should be considered.

87. The intent of the proposed changes is to provide increased flexibility in the treatment of a certain subset of associated entities such that they could be allowed to participate in the auction as separate entities, and have the spectrum aggregation limit apply separately to them, as long as this would not have an adverse impact on the integrity of the auction, or the intent of the spectrum aggregation limit.

88. ***Proposed Definition of Associated Entities*:** As a basis for participating in the 2500 MHz auction, Industry Canada proposes that associated entities be defined as follows:

> **Any entities that enter into any partnerships, joint ventures, agreements to merge, consortia or any arrangements, agreements or understandings of any kind, either explicit or implicit, relating to the acquisition or use of any spectrum in the 2500 MHz band will be treated as Associated Entities. Typical roaming and tower sharing agreements would not cause entities to be deemed associated.**

89. Depending on the nature of the association, it may not preclude the ability of the entities to participate separately in the auction or to have the spectrum aggregation limit applied individually.

90. ***Auction Integrity and Transparency*:** In order to ensure auction integrity and transparency, all entities wishing to participate in the auction process will be required to disclose in writing, as part of their application, the names of affiliated and associated entities. It is proposed that a narrative also be submitted, describing all key elements and the nature of the affiliation or association in relation to the acquisition of the spectrum licences being auctioned and the post-auction relationships of the said entities. It is proposed that this would include arrangements with another potential bidder that relate in any way to the future use of the 2500 MHz spectrum directly or indirectly.

91. Some examples of arrangements that would require disclosure include, but are not limited to, agreements to establish a joint network using spectrum licences acquired by each of the entities and agreements with respect to a joint backhaul network. It is also proposed that agreements such as significant joint equipment purchases be disclosed. Typical roaming and tower sharing agreements and

other agreements, such as the purchase of backhaul capacity, would not cause entities to be deemed associated entities and hence need not be disclosed.

92. The submitted narrative would be made available to other bidders and to the public on Industry Canada's website prior to the auction in order to ensure transparency of the licensing process.

93. ***Eligibility to participate separately in the auction*:** In the past, associated entities were not permitted to participate in an auction separately. It is now proposed that associated entities could be permitted to apply to Industry Canada to participate in the auction separately. The submitted narrative would be assessed to determine whether permitting both entities to participate separately would negatively impact the integrity of the auction process. The auction integrity would be best assured by the transparent disclosure of the relationships between bidders participating in the auction. Industry Canada may request additional documents. Any information considered by the applicant to be confidential should be properly marked as such. If Industry Canada deems it necessary to disclose any information marked as confidential, the applicant would be consulted prior to release.

94. ***Eligibility to have aggregation limits apply to associated entities separately*:** It is proposed that in addition to the above, associated entities could request that the spectrum aggregation limit apply individually. To obtain this approval, entities would be required to demonstrate that they intend to compete separately in the applicable licence area and continue to function as competitors to a level satisfactory to Industry Canada. In making this determination, Industry Canada would consider all relevant factors. Depending on the nature of the agreement, documentation may be required that sets out the details of the association, including copies of all arrangements or agreements, for example, agreements related to network architecture and spectrum use and documents related to corporate decision making, marketing and customer information, sales and financing. Assessment criteria may include, but would not be limited to, consideration of the degree to which the entities would offer branded services, pricing and device selection that are unique from each other. For additional information on the application of the spectrum aggregation limit for associated entities, refer to the condition of licence entitled "Spectrum Aggregation Limit" in Section 6 of this document.

95. Bidders are reminded that the provisions of the *Competition Act* apply independently of, and in addition to, the proposed policy.

96. Associated entities wishing to participate in the auction separately would be required to submit their application at least 30 days in advance of the final application deadline to participate in the auction. This requirement would provide Industry Canada with the additional time necessary to assess the association between the entities and decide on the associated entities' ability to participate in the auction separately, and have the aggregation limit apply individually, if so requested. Should the request be denied, only one of the associated entities will be eligible to apply to participate in the auction.

97. ***Definition of Affiliated Entities*:** It is proposed that the definition of affiliated entities remain essentially as it was for the AWS auction, as follows:

> **An affiliated entity is defined as a person who controls the entity, or who is controlled by the entity or by any person who controls the entity. "Control" means control in any manner that results in control in fact, whether directly through the ownership of securities or indirectly**

through a trust, agreement or arrangement, the ownership of a body corporate or otherwise. Control in fact is the ongoing power or ability, whether exercised or not, to determine or decide the strategic decision-making activities of an enterprise, or to manage or run the day-to-day operations of an enterprise.

98. Please note that all entities participating in the auction will be subject to the same prohibition of collusion rules, as stated below in Section 5.1.

5-1 Industry Canada is seeking comments on its proposed changes to the definition and rules related to associated entities. Specifically, comments are sought on:

(a) the types of agreements that should be captured under the definition of associated entities;
(b) the amount of information to be disclosed to the public prior to the auction;
(c) the provision that typical roaming and tower sharing be specifically excluded from the revised definition of associated entities and whether other types of agreements such as the purchase of backhaul capacity should be deemed excluded;
(d) the proposal that entities that are deemed associated entities may apply to be treated as separate entities for participation in the auction;
(e) the proposal that associated entities may request to have the spectrum aggregation limit apply to them separately, based on an analysis of their association and of whether they intend to compete in the same licence service area;
(f) the criteria to be considered in determining whether the entities are competing; and
(g) the proposal that no changes be made to the affiliated entities rule.

5.1 Prohibition of Collusion

99. As in previous auctions, in order to ensure the integrity of the bidding process, all applicants will be prohibited from cooperating, collaborating, discussing or negotiating agreements with other bidders regarding the licences being auctioned or the post-auction market structure. This prohibition will be in effect from the deadline to submit applications to participate in the auction until the deadline for the final payment of winning bids.

100. The rules regarding prohibition of collusion used for the AWS auction were essentially stated as follows:

Applicants are prohibited from cooperating, collaborating, discussing or negotiating settlement agreements with competitors, relating to the licences being auctioned or relating to the post-auction market structure, until the deadline for the final payment on winning bids.

The application form to participate in the auction will include a declaration that the applicant will be required to sign certifying that the applicant has not entered into and will not enter into any agreements or arrangements of any kind with any competitor regarding the amount to be bid,

bidding strategies or the particular licence(s) on which the applicant or competitors will or will not bid. For the purposes of this certification, "competitor" means any entity, other than the applicant and/or its affiliates or associated entities, which could potentially be a bidder in this auction based on its qualifications, abilities or experience.

101. In order to maintain the integrity of the auction, bidders are prohibited from signalling either publicly or privately, their bidding intentions or post-auction market structure related to spectrum in the 2500 MHz band, while the auction is ongoing. This would include comments or any communication with or via the media. An example would be making a public announcement regarding which licences the company intends to bid on or its rollout intentions.

102. Given that Industry Canada is proposing to allow the participation of some associated entities as separate bidders in this auction process, the prohibition of collusion rules are proposed as follows:

From the date of application until the deadline for the final payment on winning bids, each applicant is prohibited from cooperating, collaborating, discussing, negotiating or entering into agreements, arrangements or understandings with any competitors regarding the licences being auctioned, bids or bidding strategies in the auction, or the post-auction market structure. Each applicant is also prohibited from signalling its bidding intentions, either publicly or privately, from the application deadline until the end of the bidding process.

The application form to participate in the auction will include a declaration that the applicant will be required to sign certifying that the applicant has not entered into any agreements, arrangements or understandings of any kind with any competitor, other than those disclosed to Industry Canada, regarding the spectrum licences being auctioned or the post-auction market structure. The applicant must also certify that it will not discuss during the auction, any agreements, arrangements or understandings of any kind with any competitor, including its disclosed associated entities, regarding the spectrum licences being auctioned or the post-auction market structure. For the purposes of this certification, "competitor" means any entity, other than the applicant and/or its affiliates, which could potentially be a bidder in this auction based on its qualifications, abilities or experience.

Should a bidder fail to comply with this prohibition, it may be subject to disqualification from the auction and/or forfeiture penalties.

5-2 Industry Canada is seeking comments on the rules prohibiting collusion that would apply to bidders in the 2500 MHz auction.

6. Conditions of Licence for Spectrum Licences to be Auctioned in the 2500 MHz Band

103. Industry Canada proposes that the following conditions apply to licences issued through the auction process for spectrum in the 2500 MHz band. Some updated conditions of licence are being proposed for existing 2500 MHz licences in order to harmonize them with licences to be auctioned (see Section 7).

104. It should be noted that licences are subject to the relevant provisions in the *Radiocommunication Act* and the *Radiocommunication Regulations*. For example, the Minister continues to have the power to amend the terms and conditions of spectrum licences pursuant to paragraph 5(1)(b) of the *Radiocommunication Act*. The Minister may do so for a variety of reasons, including furtherance of the policy objectives related to the band. Such action would normally only be undertaken after consultation.

105. ***Licence Term*:** Traditionally, spectrum licences auctioned by Industry Canada have been issued for a 10-year licence term. This duration was deemed to provide enough certainty in the marketplace to secure the investments necessary to acquire spectrum and build related networks. The revised *Framework for Spectrum Auctions in Canada*, published in March 2011, states that Industry Canada is now adopting a flexible approach in determining licence terms (up to 20 years) based on the specific spectrum being offered and subject to a public consultation preceding the specific auction or renewal process.

106. This decision was based on the recognition that licence terms in excess of 10 years would create greater incentive for financial institutions to invest in the telecommunications industry and for the industry itself to further invest in the development of network infrastructure, technologies and innovation.

107. The 2500 MHz band has the potential to facilitate the offering of high-capacity broadband services to Canadians. Given that the use of this band for mobile services is globally harmonized, there is little risk that there will be any usage changes to this spectrum in the foreseeable future. It is also unlikely that any developments in technology would result in a change to another use that is incompatible with mobile broadband.

108. In light of the above, Industry Canada is proposing that auctioned spectrum licences in the 2500 MHz band have a licence term of 20 years. The proposed condition of licence is as follows:

> **The term of this licence is 20 years. At the end of this term, the licensee will have a high expectation that a new licence will be issued for a subsequent term through a renewal process unless a breach of licence condition has occurred, a fundamental reallocation of spectrum to a new service is required, or an overriding policy need arises.**

6-1 Industry Canada is seeking comments on its proposal to issue spectrum licences in the 2500 MHz band with a 20-year licence term.

109. ***Spectrum Aggregation Limit*:** Where competitive measures have been put in place, such as a limitation on the amount of spectrum held by a licensee, a condition of licence to that effect is typically applied to the licence in question. With respect to spectrum in the 2500 MHz band, the competitive measures announced in SMSE-002-12 are:

- **Decision C2-1:** With the exception of licensees in the Northwest Territories, Yukon and Nunavut, all licensees are subject to a spectrum aggregation limit 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 licence holdings, including both paired and unpaired spectrum, by each licensee in each licence area.

- **Decision C2-2:** The spectrum aggregation limit 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 aggregation limit during this period.

110. The wording for the proposed condition of licence is as follows:

> **The licensee must comply with the spectrum aggregation limit as follows:**
>
> **A limit of 40 MHz in the 2500 MHz band, excluding the restricted bands at 2570-2575 MHz and 2615-2620 MHz, applies to all licensees, with the exception of the Northwest Territories, Yukon and Nunavut service areas, where there is no limit.**
>
> **The spectrum aggregation limit put in place for the 2500 MHz auction will continue for five years from the date of the licence issuance. Therefore, no transfer of licences or issuance of new licences will be authorized if it would result in a licensee exceeding the spectrum aggregation limit during this period. Any change in ownership or control granting a right or interest to another licensee in this band may be considered as licence transfer for the purpose of this condition of licence whether or not the licensee name is changed as a result. The licensee must request approval by the Minister of Industry for any change that would have a material effect on its compliance with this spectrum aggregation limit. Such a request must be made in advance of any proposed transactions within its knowledge.**

111. In certain areas, existing 2500 MHz licensees hold licences in excess of the spectrum aggregation limit of 40 MHz in the 2500 MHz band. 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 divest additional 2500 MHz spectrum in these areas. As stated in SMSE-002-12, Decision C2-4, these licensees would not be permitted to acquire additional spectrum in those areas where the aggregation limit has been met or exceeded, but will be permitted to transfer existing 2500 MHz spectrum licence holdings thereby reducing their spectrum licence holdings prior to the auction in order to be eligible to participate. Information regarding licensees planning to transfer existing spectrum licence holdings in order to increase their eligibility to bid in the related licence areas is provided in Section 8.1, Application to Participate.

112. If the proposal in Section 5 is adopted, associated entities requesting that the spectrum aggregation limit be applied individually rather than jointly, would be required to demonstrate to the satisfaction of Industry Canada that they will be competing in the applicable service area.

113. Where licensees establish an agreement to share spectrum such that another entity has control over the use of the spectrum, a subordinate licence is required. This requirement applies to all spectrum sharing arrangements. Subordinate licences may not count towards the licensee's aggregation limit if the licensees demonstrate to the satisfaction of Industry Canada that they meet the criteria with respect to competing in the applicable service area. For further information on the application of the spectrum aggregation limit as it relates to associated entities and subordinate licences, see Section 5 of this document.

114. At any time, at the request of Industry Canada, the licensee will be required to provide updated information demonstrating ongoing compliance with this condition of licence.

6-2 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the spectrum aggregation limit.

115. ***Licence Transferability and Divisibility***: In general, licences obtained through an auction may be transferred in whole or in part (either in geographic area or in bandwidth) to a third party, subject to the conditions stated on the licence and other applicable regulatory requirements.

116. As noted above, where competitive measures have been put in place, either to limit the amount of spectrum held by a licensee (spectrum aggregation limit), or to restrict the eligibility of access to a specific spectrum band (set-aside), the ability to transfer and divide the licence in question will be similarly restricted. With respect to spectrum in the 2500 MHz band, transfers are not permitted where they will result in a licensee exceeding the spectrum aggregation limit. However, Industry Canada may consider requests to exchange spectrum licences under certain conditions.

117. Industry Canada is proposing the following wording for the condition of licence on transferability and divisibility:

> **The licensee may apply, in writing, to transfer its licence in whole or in part (divisibility), in both the bandwidth and geographic dimensions in accordance with Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time. Licensees may apply to use a subordinate licensing process.**
>
> **Industry Canada's approval is required for each proposed subordinate licence or transfer, whether the transfer is in whole or in part. Industry Canada may define a minimum bandwidth and/or geographic dimension (such as the grid cell) for the proposed transfer.**

Subordinate licences may not count towards the licensee's aggregation limit if the subordinate licensee demonstrates to the satisfaction of Industry Canada that the relevant licensees meet the criteria with respect to competing in the post-auction market (see condition of licence regarding spectrum aggregation limits).

The transferor(s) must provide an attestation and other supporting documentation demonstrating that all conditions, technical or otherwise, of the licence have been met. The transferee(s) must provide an attestation and other supporting documentation demonstrating that it meets the eligibility criteria, including documentation related to associates and affiliates demonstrating that the transfer is in accordance with any spectrum aggregation limit.

Industry Canada may consider requests from licensees to exchange spectrum blocks in the same geographic area provided that the exchange does not result in the spectrum aggregation limit being exceeded or an increase in spectrum licence holdings for existing licensees that already exceed the aggregation limit. Industry Canada may grant such requests based on the merits of the proposal.

The transferee must satisfy all applicable conditions of licence, including general deployment requirements.

118. Licensees must apply to Industry Canada for the issuance of subordinate licences prior to the implementation of any spectrum sharing agreements or any agreement that provides for another party to operate the licensee's spectrum. For further information on these requirements, refer to Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time. These requirements are subject to revision and amendment for a variety of reasons including furtherance of the policy objectives related to the 2500 MHz band.

119. Generally, a subordinate licence will count towards the spectrum aggregation limit in a service area in addition to licences held directly and those held by associates or affiliates. However, the proposed transferee may apply to have the subordinate licence(s) excluded from the calculation of its spectrum licence holdings for the purposes of the spectrum aggregation limit, if it can demonstrate as part of its application that it will compete with its associated entities in the service area. For further information on the application of the spectrum aggregation limit as it relates to associated entities that hold subordinate licences, see Section 5 of this document.

120. Licence transfers may also be subject to the provisions of the *Competition Act*.

6-3 Industry Canada is seeking comments on the proposed wording of the condition of licence related to transferability and divisibility.

121. ***Eligibility*:** Generally, spectrum licences contain an eligibility condition of licence, which reads as follows: *The licensee must comply on an ongoing basis with the eligibility criteria for a radiocommunication carrier, including compliance with subsection 10(2) of the Radiocommunication Regulations. The licensee must notify the Minister of Industry of any change that would have a material effect on its eligibility. Such notification must be made in advance for any proposed transaction within its knowledge. For further information, refer to Industry Canada's Client Procedures Circular CPC-2-0-15, Canadian Ownership and Control, as amended from time to time*.

122. On June 29, 2012, the *Jobs, Growth and Long-term Prosperity Act* (Bill C-38) received royal assent, whereby amendments were made to the *Telecommunications Act*, to lift the foreign investment restrictions for telecommunications companies that hold less than a 10-percent share of the total Canadian telecommunications market. Amendments are reflected in section 16 of the published version of the *Telecommunications Act*.

123. Industry Canada will update Client Procedures Circular CPC-2-0-15*, Canadian Ownership and Control,* in order to clarify the effects on spectrum licence holders operating under the *Radiocommunication Act* and *Radiocommunication Regulations*.

124. The proposed wording for the condition of licence for spectrum in the 2500 MHz band now refers to the "applicable" subsection of the Regulations, as follows:

> **A licensee must comply on an ongoing basis with the applicable eligibility criteria of the *Radiocommunication Regulations*. The licensee must notify the Minister of Industry of any change that would have a material effect on its eligibility. Such notification must be made in advance for any proposed transactions within its knowledge.**
>
> **For further information, refer to Client Procedures Circular CPC-2-0-15, *Canadian Ownership and Control*, as amended from time to time.**

6-4 Industry Canada is seeking comments on the proposed wording of the condition of licence related to eligibility criteria.

125. ***Treatment of Existing Spectrum Users***: For information regarding existing licensees in the 2500 MHz band, see Section 3.4 of this document.

126. The proposed wording for the condition of licence is as follows:

> **The licensee must comply with all displacement and/or transition policies set out in SMSE-005-11,[18] *Decisions on the 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 addition, the licensee must not cause harmful interference to the grandfathered stations in Manitoba, as per SMSE-005-11.**

6-5 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the treatment of existing spectrum users.

127. ***Radio Station Installations*:** Radiocommunication and broadcasting services are important for all Canadians and are used daily by the public, safety and security organizations, government, wireless service providers, broadcasters, utilities and businesses. In order for radiocommunication and broadcasting services to work, antenna systems, including masts, towers and other supporting structures, are required. There is a certain measure of flexibility in the placement of antenna systems, which is constrained to some degree by the need to achieve acceptable coverage for the service area, the availability of sites, technical limitations and safety. In exercising its mandate, Industry Canada believes that it is important that antenna systems be deployed in a manner that considers the local surroundings.

128. Section 5 of the *Radiocommunication Act* states that the Minister of Industry may, taking into account all matters that the Minister considers relevant for ensuring the orderly development and efficient operation of radiocommunication in Canada, issue radio authorizations and approve each site on which radio apparatus, including antenna systems, may be located. Furthermore, the Minister may approve the erection of all masts, towers and other antenna-supporting structures. Accordingly, proponents must follow the procedures outlined in Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems,* when installing or modifying an antenna system. Also, the installation of an antenna system or the operation of a currently existing antenna system that is not in accordance with these procedures may result in its alteration or removal and other sanctions against the operator as per the *Radiocommunication Act*.

129. Industry Canada is therefore proposing the following wording for this condition of licence:

> **The licensee must comply with Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems*, as amended from time to time.**

[18] All transition policies related to the 2500 MHz band will be incorporated into Spectrum Policy SP 2500 MHz to be updated and published in the future. Reference to SMSE-005-11 may be changed accordingly. 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).

6-6 Industry Canada is seeking comments on the proposed wording of the condition of licence related to radio station installations.

130. ***Provision of Technical Information*:** Spectrum licences are issued for a specific geographic area and, as such, associated technical information for each radiocommunication installation is not required for the issuance of a spectrum licence. However, technical information associated with radiocommunication installations covered by the spectrum licence is required by Industry Canada to carry out certain spectrum management responsibilities. To provide this capability, Industry Canada requires information to maintain an up-to-date technical database of radiocommunication installations. Industry Canada therefore proposes that such a condition of licence be applied:

131. The proposed wording for the condition of licence is as follows:

> **When Industry Canada requests technical information on a particular station or network, the licensee must provide the information in accordance with the definitions, criteria, frequency and timelines specified. For further information, refer to Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time.**

6-7 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the provision of technical information.

132. ***Compliance with Legislation, Regulation and Other Obligations*:** Licensees must comply with the requirements set out for use of the radio frequency spectrum in general and for the specific frequency band being licensed. In some cases, these requirements are legislative. The proposed wording for the condition of licence is as follows:

> **The licensee is subject to, and must comply with, the *Radiocommunication Act*, the *Radiocommunication Regulations* and the International Telecommunication Union's *Radio Regulations* pertaining to its licensed radio frequency bands. The licence is issued on condition that the certifications made in relation to this licence are all true and complete in every respect. The licensee must use the assigned spectrum in accordance with the *Canadian Table of Frequency Allocations* and the spectrum policies applicable to this band, as amended from time to time.**

6-8 Industry Canada is seeking comments on the proposed wording of the condition of licence related to compliance with legislation, regulation and other obligations.

133. ***Technical Considerations, and International and Domestic Coordination*:** Industry Canada will work with the Radio Advisory Board of Canada to develop applicable Radio Standards Specifications (RSS) and Standard Radio System Plans (SRSP) in relation to the 2500 MHz band. Spectrum licence holders are also subject to applicable international coordination agreements and arrangements between Canada, the United States and other foreign administrations.

134. Industry Canada proposes the following wording for this condition of licence:

> **The licensee must comply on an ongoing basis with the technical aspects of the appropriate Radio Standards Specifications (RSS) and Standard Radio System Plans (SRSP), as amended from time to time. Where applicable, the licensee must use its best efforts to enter into mutually acceptable agreements with other parties for facilitating the reasonable and timely development of their respective systems, and to coordinate with other licensed users in Canada and internationally.**
>
> **The licensee must comply with the obligations arising from current and future frequency coordination agreements established with other countries and shall be required to provide information or take actions to implement these obligations as indicated in the applicable SRSP. Although frequency assignments are not subject to site licensing, the licensee may be required to furnish all necessary technical data for each relevant site.**

6-9 Industry Canada is seeking comments on the proposed wording of the condition of licence related to technical considerations, and international and domestic coordination.

135. ***Lawful Intercept*:** Certain spectrum licences contain a lawful intercept condition of licence that requires the licensee to maintain interception capabilities so that information can be provided when required by a warrant. The current condition of licence reads as follows:

> "Licensees using spectrum for circuit-switched voice telephony systems must, from the inception of service, provide for and maintain lawful interception capabilities as authorized by law. The requirements for lawful interception capabilities are provided in the *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications* (Rev. Nov. 95). These standards may be amended from time to time.
>
> The licensee may request the Minister of Industry to forbear from enforcing certain assistance capability requirements for a limited period. The Minister, following consultation with Public Safety Canada, may exercise the power to forbear from enforcing a requirement or requirements where, in the opinion of the Minister, the requirement is not reasonably achievable. Requests for forbearance must include specific details and dates indicating when compliance to the requirement can be expected."

136. Industry Canada is proposing changes to the lawful intercept condition of licence in order to bring the wording in line with current technologies. The proposed change is to remove the text "circuit-switched voice telephony" from the lawful intercept condition, as networks are no longer limited to circuit-switched technology. This proposed change does not affect existing spectrum licences issued under other licensing processes; with the exception of existing BRS licences (see Section 7). Forbearance may be granted where Industry Canada deems it warranted.

137. The condition of licence refers to standards for lawful interception, entitled the *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications*. Public Safety Canada is currently responsible for these standards, which were last revised in 1995. Public Safety Canada has informed Industry Canada that it is proposing modifications to the standards. Industry Canada is proposing to simply refer to the requirement to provide for and maintain lawful interception capabilities, in accordance with the enforcement standards in effect at the time of licence issuance and as amended from time to time. For further information on proposed changes to the Solicitor General's Enforcement Standards, please contact Public Safety Canada via the General Enquiries line at 1-800-830-3118.

138. In consideration of the above, the proposed wording of the condition of licence is as follows:

> **The licensee, operating as a service provider using an interconnected radio-based transmission facility for compensation, must provide for and maintain lawful interception capabilities as authorized by law and in accordance with the *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications*, as amended from time to time.**
>
> **The licensee may request the Minister of Industry to forbear from enforcing certain assistance capability requirements for a limited period. The Minister, following consultation with Public Safety Canada, may exercise the power to forbear from enforcing a requirement or requirements where, in the opinion of the Minister, the requirement is not reasonably achievable. Requests for forbearance must include specific details and dates indicating when compliance to the requirement can be expected.**

6-10 Industry Canada is seeking comments on the proposed wording of the condition of licence related to lawful intercept requirements.

139. ***Research and Development*:** Currently, many long-term licences are subject to a condition of licence which requires licensees to invest a percentage of their adjusted gross revenues in research and development (R&D).[19] In 2009, Industry Canada initiated DGRB-001-09, *Consultation on Revisions to the Framework for Spectrum Auctions in Canada*, in which comments were sought on the continued

[19] Spectrum licences subject to the R&D condition of licence include cellular, PCS, AWS, 24 GHz, 38 GHz, 2.3 GHz, 3.5 GHz and Air-Ground Services.

need for the R&D condition of licence. The resultant decision paper[20] stated that Industry Canada's decision with regard to the R&D condition of licence would be the subject of a separate paper to be issued at a later date. In addition, the *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz* proposed that conditions of licence for BRS licences be consistent with existing licences for similar services (e.g. Cellular, Personal Communication Services and Advanced Wireless Services). Therefore, until such a time as a decision is released, Industry Canada proposes that the R&D condition of licence apply to licences in the 2500 MHz band as stated below, but may be amended during the licence term.

140. The proposed wording of this condition of licence is as follows:

> **The licensee must invest, as a minimum, 2 percent of its adjusted gross revenues resulting from its operations in this spectrum, averaged over the term of the licence, in eligible research and development activities related to telecommunications. Eligible research and development activities are those which meet the definition of scientific research and experimental development adopted in the *Income Tax Act*. Adjusted gross revenues are defined as total service revenues, less inter-carrier payments, bad debts, third party commissions, and provincial and goods and services taxes collected. Businesses with less than $5 million in annual gross operating revenues are exempt from research and development expenditure requirements, except where they have affiliations with licensees that hold other licences with the research and development condition of licence and where the total annual gross revenues of the affiliated licensees are greater than $5 million.**
>
> **To facilitate compliance with this condition of licence, the licensee should consult Industry Canada's *Guidelines for Compliance with the Radio Authorization Condition of Licence Relating to Research and Development* (GL-03).**

6-11 Industry Canada is seeking comments on the proposed condition of licence related to the research and development requirement.

141. ***General Deployment Requirement*:** In accordance with SMSE-002-12, a general deployment requirement will apply to licensees in the 2500 MHz band. Decision C2-7 states that: *A general rollout obligation applicable to all 2500 MHz licences will continue to apply. Industry Canada will consult on the details of the general deployment requirement (e.g. population coverage required and time frame).*

142. This condition will apply to all licences issued through this process, regardless of the amount of spectrum that licensees hold. The objective of this general rollout requirement is to ensure that the 2500 MHz spectrum is deployed in a timely manner. As well, such a condition will serve to deter the acquisition of spectrum licences by speculators and those whose intent is to prevent access to the spectrum by their competitors.

143. Similar conditions of licence have been applied to previously auctioned spectrum licences in order

[20] See DGSO-001-11, *Decisions on the Revisions to the Framework for Spectrum Auctions in Canada and Other Related Issues* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/dgso-001-11decisions-e.pdf/$FILE/dgso-001-11decisions-e.pdf).

to encourage the deployment of systems and to dissuade speculative spectrum acquisition. The intent is to encourage either the deployment of spectrum or the transfer of the spectrum licence where another entity may have a use for it. Prior to the AWS auction, deployment was required to 50% of the population in the licence area or to a level acceptable to Industry Canada. In the AWS auction, different levels were set for each licence area based on the population of the major urban centres for that particular licence area. It is proposed that the AWS levels be used as deployment requirements for the 2500 MHz licences. It is further proposed that these levels be required within 10 years of the licence issuance to allow market forces to determine the best pace of deployment, while providing an opportunity to intervene if the spectrum is left unused for an extended period of time.

144. Where a licence is transferred during the initial 10 years, the requirement for the new licensee to deploy will continue to be based on the initial licence issuance date.

145. The proposed wording of the condition of licence is as follows:

> **Licensees will be required to demonstrate to the Minister of Industry that their spectrum has been put to use, as specified in the table below, within 10 years of the initial issuance of the licence.**

Table 4 — Proposed General Deployment Requirements

Tier 3	Service Area Name	Minimum Population Coverage*
3-01	Newfoundland and Labrador	30%
3-02	Prince Edward Island	30%
3-03	Mainland Nova Scotia	40%
3-04	Cape Breton	30%
3-05	Southern New Brunswick	50%
3-06	Western New Brunswick	30%
3-07	Eastern New Brunswick	30%
3-08	Bas du fleuve / Gaspésie	15%
3-09	Québec	50%
3-10	Chicoutimi-Jonquière	40%
3-11	Eastern Townships	30%
3-12	Trois-Rivières	30%
3-13	Montréal	50%
3-14	Upper Outaouais	10%
3-15	Ottawa / Outaouais	50%
3-16	Pembroke	15%
3-17	Abitibi	30%
3-18	Cornwall	50%
3-19	Brockville	40%
3-20	Kingston	50%
3-21	Belleville	40%
3-22	Cobourg	30%
3-23	Peterborough	50%
3-24	Huntsville	30%

3-25	Toronto	50%
3-26	Barrie	30%
3-27	Guelph / Kitchener	50%
3-28	Listowel / Goderich / Stratford	15%
3-29	Niagara-St. Catharines	50%
3-30	London / Woodstock / St. Thomas	50%
3-31	Chatham	50%
3-32	Windsor / Leamington	50%
3-33	Strathroy	50%
3-34	North Bay	40%
3-35	Sault Ste. Marie	50%
3-36	Sudbury	50%
3-37	Kirkland Lake	30%
3-38	Thunder Bay	40%
3-39	Winnipeg	50%
3-40	Brandon	20%
3-41	Regina	40%
3-42	Moose Jaw	25%
3-43	Saskatoon	40%
3-44	Edmonton	50%
3-45	Medicine Hat / Brooks	30%
3-46	Lethbridge	40%
3-47	Calgary	50%
3-48	Red Deer	25%
3-49	Grande Prairie	25%
3-50	Kootenays	15%
3-51	Okanagan / Columbia	40%
3-52	Vancouver	50%
3-53	Victoria	50%
3-54	Nanaimo	40%
3-55	Courtenay	50%
3-56	Thompson / Cariboo	40%
3-57	Prince George	40%
3-58	Dawson Creek	30%
4-170	Yukon	20%
4-171	Nunavut	20%
4-172	Northwest Territories	20%

* Based on most recent census information available at the time of assessment.

6-12 Industry Canada is seeking comments on the application of the general deployment condition of licence as stated above. Specifically, comments are sought on:

(a) the population coverage, as specified in Table 4, for each licence service area; and
(b) the proposed time frame.

146. ***Mandatory Antenna Tower and Site Sharing*:** Industry Canada proposed changes to the mandatory antenna tower and site sharing conditions of licence through a separate process announced in *Canada Gazette* notice DGSO-001-12.[21] The related decisions will be announced separately. The proposed wording of the condition of licence is as follows:

> **Licensees must comply with the mandatory antenna tower and site sharing requirements set out in Client Procedures Circular CPC-2-0-17, *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements*, as amended from time to time.**

6-13 Industry Canada is seeking comments only on the proposed wording of the condition of licence related to mandatory antenna tower and site sharing.

147. ***Mandatory Roaming:*** Industry Canada proposed changes to the mandatory roaming condition of licence through a separate process announced in *Canada Gazette* notice DGSO-001-12.[22] The related decisions, including the applicability of the mandatory roaming condition to the 2500 MHz band, will be announced separately. If the condition is applied, the proposed wording is as follows:

> **The licensee must comply with the mandatory roaming requirements set out in Client Procedures Circular CPC-2-0-17, *Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements*, as amended from time to time.**

6-14 Industry Canada is seeking comments only on the proposed wording of the condition of licence related to mandatory roaming.

148. ***Annual Report*:** Currently, spectrum licences include a requirement to submit an annual report to Industry Canada to provide some basic information on spectrum use and existing company reports. This provides valuable information without requiring extensive report generation by the licensees. It is proposed that this requirement apply to 2500 MHz licensees.

149. The proposed wording of the condition of licence is as follows:

> **The licensee must submit an annual report for each year of the licence term, which includes the following information:**
>
> - **a statement indicating continued compliance with all conditions of licence;**
> - **an update on the implementation and spectrum usage within the area covered by the**

[21] See *Canada Gazette* notice DGSO-001-12, *Proposed Revisions to the Frameworks for Mandatory Roaming and Antenna Tower and Site Sharing* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10251.html).

[22] Ibid.

licence;

- **existing audited financial statements with an accompanying auditor's report;**
- **a report of the research and development expenditures for licensees operating as radiocommunication carriers as set out in these conditions of licence. Industry Canada reserves the right to request an audited statement of research and development expenditures with an accompanying auditor's report;**
- **supporting financial statements where licensees are claiming an exemption based on an annual gross revenue of less than $5 million; and**
- **a copy of any existing corporate annual report for the licensee's fiscal year with respect to the authorization.**

All reports and statements are to be certified by an officer of the company and submitted, in writing, within 120 days of the licensee's fiscal year end to the address below. Confidential information provided will be treated in accordance with subsection 20(1) of the *Access to Information Act.*

Manager, Emerging Networks
Spectrum Management Operations Branch
Industry Canada
300 Slater Street, 15th Floor
Ottawa, Ontario K1A 0C8

150. Where a licensee holds multiple licences, spectrum implementation reports should be broken down by service area. This information, including the extent of implementation and spectrum usage, is important for analyzing each licensee's individual performance against its conditions of licence. In addition, it allows Industry Canada to monitor the effectiveness of these conditions in meeting the policy objectives regarding the band and the department's intent that the spectrum be deployed in a timely manner for the benefit of Canadians.

6-15 Industry Canada is seeking comments on the proposed condition of licence related to the requirement for annual reporting.

7. Conditions of Licence for Existing BRS Licensees in the 2500 MHz Band

151. In DGRB-005-09, *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz*,[23] Section 6, Industry Canada stated that all conditions of licence and authorizations (i.e. MCS, BRS and MDS broadcasting certificates) are subject to change following the consultation on the policy and licensing framework for the auction of available and liberated spectrum in the band 2500-2690 MHz in order to allow for licence conditions to be aligned and consistent with future licences issued in this frequency band. Therefore, effective the auction closing date, Industry Canada is proposing that certain conditions of licence for existing 2500 MHz BRS licences be updated to harmonize with the conditions of licence of auctioned licences. The remaining conditions of licence that are not updated, for example, the licence term and the deployment requirements, will remain consistent with the conditions initiated in the June 2010 *Decisions on the Transition to Broadband and Radio Service (BRS) in the Band 2500-2690 MHz and Consultation on the Changes Related to the Band Plan.*[24]

152. In DGRB-005-09, Section 9.2, Industry Canada also indicated that it will consult on a licence fee for BRS licences; the consultation may take place after the auction of available spectrum. Until such time, the existing fees will continue to apply.

153. It should be noted that licences are subject to the relevant provisions in the *Radiocommunication Act* and the *Radiocommunication Regulations*. For example, the Minister continues to have the power to amend the terms and conditions of spectrum licences pursuant to paragraph 5(1)(b) of the *Radiocommunication Act*. The Minister may do so for a variety of reasons, including furtherance of the policy objectives related to the band. Such action would normally only be undertaken after consultation.

154. Industry Canada proposes that the six following conditions of licence be modified for existing 2500 MHz BRS licensees:

155. ***Treatment of Existing Spectrum Users***: Existing BRS licensees would be required to comply with all displacement/transition polices and the obligations to protect grandfathered stations in Manitoba. For information regarding existing licensees in the 2500 MHz band, see Section 3.4 of this document.

156. The proposed wording for the condition of licence is as follows:

> **The licensee must comply with all displacement and/or transition policies set out in SMSE-005-11,[25] *Decisions on the Band Plan for Broadband Radio Service (BRS) and Consultation on a Policy and Technical Framework to License Spectrum in the Band***

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[23] See DGRB-005-09, *Consultation on Transition to Broadband Radio Service (BRS) in the Band 2500-2690 MHz* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09305.html#toc6).

[24] 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* (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09882.html).

[25] All transition policies related to the 2500 MHz band will be incorporated into an updated Spectrum Policy SP 2500 MHz to be published in the future. Reference to SMSE-005-11 may be changed accordingly. See 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).

***2500-2690 MHz*. In addition, the licensee must not cause harmful interference to the grandfathered stations in Manitoba as per SMSE-005-11.**

7-1 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the existing BRS licensees' treatment of existing spectrum users.

157. ***Spectrum Aggregation Limit*:** The competitive measures, as outlined in Section 6 regarding the 2500 MHz spectrum auction, would be harmonized for existing BRS licensees.

158. As stated in SMSE-002-12, Decision C2-4, in areas where existing 2500 MHz BRS licensees have spectrum licence holdings in excess of the spectrum aggregation limit of 40 MHz in the 2500 MHz band, the licensee would not be required to divest any such holdings in order to meet the aggregation limit. 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 aggregation limit has been met or exceeded. As per SMSE-002-12, Decision C2-5, licensees planning to transfer any of their existing spectrum licence 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 the auction process. Information regarding licensees planning to reduce existing spectrum licence holdings in order to increase their eligibility to bid in the related licence areas is provided in Section 8.1 Application to Participate.

159. Where licensees establish an agreement to share spectrum such that another entity has control over the use of the spectrum, a subordinate licence is required. This requirement applies to all spectrum sharing arrangements. Subordinate licences may not count towards the licensee's aggregation limit if the licensees demonstrate to the satisfaction of Industry Canada that they will be competing in the applicable service area. For further information on the application of the spectrum aggregation limit as it relates to associated entities that hold subordinate licences, see Section 5 of this document.

160. At any time, at the request of Industry Canada, the licensee will be required to provide updated information demonstrating ongoing compliance with this condition of licence.

161. Industry Canada proposes the following wording for this condition of licence:

The licensee must comply with the spectrum aggregation limit as follows:

A limit of 40 MHz in the 2500 MHz band, excluding the restricted bands at 2570-2575 MHz and 2615-2620 MHz, applies to all licensees, with the exception of the Northwest Territories, Yukon and Nunavut service areas, where there is no limit.

The spectrum aggregation limit will apply for five years following the close of the 2500 MHz auction. Therefore, no transfer of licences or issuance of new licences will be authorized that allows a licensee to increase their spectrum licence holdings above the spectrum aggregation limit during this period. Any change in ownership or control granting a right or interest to

another licensee in this band may be considered as a licence transfer for the purpose of this condition of licence whether or not the licensee name is changed as a result. The licensee must request approval by the Minister of Industry for any change that would have a material effect on its compliance with this spectrum aggregation limit. Such a request must be made in advance of any proposed transactions within its knowledge.

7-2 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the spectrum aggregation limit for existing BRS licensees.

162. ***Licence Transferability and Divisibility***: It is proposed that this condition of licence be harmonized with that for auctioned spectrum as outlined in Section 6.

163. Industry Canada is proposing the following wording for the condition of licence on transferability and divisibility for existing BRS licensees:

The licensee may apply, in writing, to transfer its licence in whole or in part (divisibility), in both the bandwidth and geographic dimensions in accordance with Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time. Licensees may apply to use a subordinate licensing process.

Industry Canada's approval is required for each proposed subordinate licence or transfer, whether the transfer is in whole or in part. Industry Canada may define a minimum bandwidth and/or geographic dimension (such as the grid cell) for the proposed transfer.

Subordinate licences may not count towards the licensee's aggregation limit if the subordinate licensee demonstrates to the satisfaction of Industry Canada that the relevant licensees meet the criteria with respect to competing in the post-auction market (see condition of licence regarding spectrum aggregation limits).

The transferor(s) must provide an attestation and other supporting documentation demonstrating that all conditions, technical or otherwise, of the licence have been met. The transferee(s) must provide an attestation and other supporting documentation demonstrating that it meets the eligibility criteria, including documentation related to associates and affiliates demonstrating that the transfer is in accordance with any spectrum aggregation limit.

Industry Canada may consider requests from licensees to exchange spectrum blocks within the same geographic area provided that the exchange does not result in the spectrum aggregation limit being exceeded or an increase in spectrum licence holdings for existing licensees already exceeding the aggregation limit. Industry Canada may grant such requests based on the merits of the proposal.

The transferee must satisfy all applicable conditions of licence, including general deployment requirements.

164. Licensees must apply to Industry Canada for the issuance of subordinate licences prior to the implementation of any spectrum sharing agreements or any agreement that provides for another party to operate the licensee's spectrum. For further information on these requirements, refer to Client Procedures Circular CPC-2-1-23, *Licensing Procedure for Spectrum Licences for Terrestrial Services*, as amended from time to time. These requirements are subject to revision and amendment for reasons including furtherance of the policy objectives related to the 2500 MHz band.

165. Generally, a subordinate licence will count towards the spectrum aggregation limit in a service area in addition to licences held directly and those held by associates or affiliates. However, the proposed transferee may apply to have the subordinate licence(s) excluded from the calculation of its spectrum licence holdings for the purposes of the spectrum aggregation limit, if it can demonstrate as part of its application that it will compete with its associated entities in the service area. For further information on the application of the spectrum aggregation limit as it relates to associated entities that hold subordinate licences, see Section 5 of this document.

166. Licence transfers may also be subject to the provisions of the *Competition Act*.

7-3 Industry Canada is seeking comments on the proposed wording of the condition of licence related to transferability and divisibility for existing BRS licensees.

167. ***Eligibility*:** The same amendments to the eligibility condition of licence that are being proposed for new licensees would apply to existing BRS licensees.

> **A licensee must comply on an ongoing basis with the applicable eligibility criteria of the *Radiocommunication Regulations*. The licensee must notify the Minister of Industry of any change that would have a material effect on its eligibility. Such notification must be made in advance for any proposed transactions within its knowledge.**
>
> **For further information, refer to Client Procedures Circular CPC-2-0-15, *Canadian Ownership and Control*, as amended from time to time.**

7-4 Industry Canada is seeking comments on the proposed wording of the condition of licence related to eligibility criteria for existing BRS licensees.

168. ***Technical Considerations, and International and Domestic Coordination*:** Industry Canada proposes that the wording for this condition of licence be harmonized with that for auctioned spectrum as outlined in Section 6. Industry Canada will work with the Radio Advisory Board of Canada to develop applicable Radio Standards Specifications (RSS) and Standard Radio System Plans (SRSP) in relation to the 2500 MHz band. Spectrum licence holders are also subject to applicable international coordination agreements and arrangements between Canada, the United States and other foreign administrations.

169. Industry Canada proposes the following wording for this condition of licence:

The licensee must comply on an ongoing basis with the technical aspects of the appropriate Radio Standards Specifications (RSS) and Standard Radio System Plans (SRSP), as amended from time to time. Where applicable, the licensee must use its best efforts to enter into mutually acceptable agreements with other parties for facilitating the reasonable and timely development of their respective systems, and to coordinate with other licensed users in Canada and internationally.

The licensee must comply with the obligations arising from current and future frequency coordination agreements established with other countries and shall be required to provide information or take actions to implement these obligations as indicated in the applicable SRSP. Although frequency assignments are not subject to site licensing, the licensee may be required to furnish all necessary technical data for each relevant site.

7-5 Industry Canada is seeking comments on the proposed condition of licence related to technical considerations, and international and domestic coordination for existing BRS licensees.

170. ***Lawful Intercept*:** Industry Canada is proposing changes to the lawful intercept condition of licence for existing BRS licences in order to bring the wording in line with current technologies. The proposed change is to remove the text "circuit-switched voice telephony" from the lawful intercept condition, as networks are no longer limited to circuit-switched technology. Forbearance may be granted where Industry Canada deems it warranted. Greater detail regarding the proposed change is outlined in Section 6.

171. Industry Canada proposes the following wording for this condition of licence:

The licensee, operating as a service provider using an interconnected radio-based transmission facility for compensation, must provide for and maintain lawful interception capabilities as authorized by law and in accordance with the *Solicitor General's Enforcement Standards for Lawful Interception of Telecommunications*, as amended from time to time.

The licensee may request the Minister of Industry to forbear from enforcing certain assistance capability requirements for a limited period. The Minister, following consultation with Public Safety Canada, may exercise the power to forbear from enforcing a requirement or requirements where, in the opinion of the Minister, the requirement is not reasonably achievable. Requests for forbearance must include specific details and dates indicating when compliance to the requirement can be expected.

7-6 Industry Canada is seeking comments on the proposed wording of the condition of licence related to lawful intercept requirements for existing BRS licensees.

8. Auction Process

172. The following section outlines the general process for submitting an application to participate in the 2500 MHz auction, as well as the general requirements and rules that apply prior to, during and post-auction.

8.1 Application to Participate

173. To participate in an auction, all applicants must submit a completed application form, along with a financial deposit, details of the applicant's beneficial ownership, information on any affiliations and associations as discussed in Section 5 of this document, and other corporate documentation as required. Industry Canada will make the relevant information available to the public prior to the auction, so that all bidders have knowledge of the identity of the other bidders.

174. In areas where an existing licensee has spectrum licence holdings in excess of the spectrum aggregation limit set out in SMSE-002-12, Decision C2-4, the licensee will not be required to divest any such holdings in order to meet the spectrum aggregation limit. However, such licensees will not be eligible to bid for additional licences or otherwise obtain additional licences in licence areas where the aggregation limit has been met or exceeded.

175. Licensees planning to transfer any of their existing spectrum licence 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 (SMSE-002-12, Decision C2-5). The submission date will be provided in the licensing framework.

176. Licensees planning to return any of their existing spectrum licence holdings to Industry Canada in order to increase their eligibility to bid in the related licence areas must do so by October 4, 2013. In the event that Industry Canada decides to offer the returned 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 any additional licence offerings (SMSE-002-12, Decision C2-6).

8.2 Opening Bids

177. Opening bids are the prices for the spectrum licences at the start of the auction, and the minimum amount that will be accepted for each licence. The proposed opening prices are based on the population in each service area and adjusted by their relative value. The proposed opening bid prices are for spectrum blocks of 20 MHz, irrespective of whether the block is a paired block of 10 + 10 MHz or an unpaired block of 20 MHz.[26] They can be found in Table 5 below.

178. The determination of the proposed opening bid prices takes into account recent market transactions for spectrum licences in Canada, recent prices paid for 2500 MHz spectrum licences assigned in international auctions and technical considerations. Service areas were grouped into four price levels according to Statistics Canada's 33 defined census metropolitan areas (CMAs) and their population estimates. Based on relative values for these groups, service areas with a population greater than

[26] Although the unpaired spectrum will be licensed in 25 MHz blocks, the 5 MHz restricted bands are not considered when determining the opening bid prices.

2 million (3-25 Toronto, 3-13 Montréal and 3-52 Vancouver) were priced at $0.14/MHz/pop; for service areas that provide coverage to a CMA with a population between 1 million and 2 million, a rate of $0.10/MHz/pop was applied; and for service areas that provide coverage to a CMA with a population less than 1 million, a rate of $0.065/MHz/pop was applied. For all other service areas (those that do not provide coverage to a CMA), a base rate of $0.051/MHz/pop was applied.

179. The total amount of the proposed opening bids for all spectrum blocks is $251,853,000.

Table 5 — Proposed Opening Bid Prices

Service Area #	Service Area Name	Available Spectrum (MHz)	$/MHz/pop	Opening Bid ($)
3-01	Newfoundland and Labrador	120	0.065	665,000
3-02	Prince Edward Island	120	0.051	143,000
3-03	Mainland Nova Scotia	120	0.065	1,017,000
3-04	Cape Breton	120	0.051	137,000
3-05	Southern New Brunswick	120	0.065	223,000
3-06	Western New Brunswick	120	0.051	221,000
3-07	Eastern New Brunswick	120	0.065	466,000
3-08	Bas du fleuve / Gaspésie	60	0.051	300,000
3-09	Québec	60	0.100	2,009,000
3-10	Chicoutimi-Jonquière	120	0.065	476,000
3-11	Eastern Townships	120	0.065	703,000
3-12	Trois-Rivières	60	0.065	1,048,000
3-13	Montréal	60	0.140	11,773,000
3-14	Upper Outaouais	120	0.051	126,000
3-15	Ottawa / Outaouais	60	0.100	2,883,000
3-16	Pembroke	120	0.051	116,000
3-17	Abitibi	120	0.051	194,000
3-18	Cornwall	120	0.051	68,000
3-19	Brockville	120	0.051	85,000
3-20	Kingston	120	0.065	227,000
3-21	Belleville	120	0.051	199,000
3-22	Cobourg	120	0.051	64,000
3-23	Peterborough	120	0.065	267,000
3-24	Huntsville	120	0.051	80,000
3-25	Toronto	60	0.140	18,606,000
3-26	Barrie	60	0.065	871,000
3-27	Guelph / Kitchener	60	0.065	900,000
3-28	Listowel / Goderich / Stratford	120	0.051	137,000
3-29	Niagara-St. Catharines	60	0.065	476,000
3-30	London / Woodstock / St. Thomas	60	0.065	1,077,000
3-31	Chatham	120	0.051	103,000
3-32	Windsor / Leamington	120	0.065	504,000
3-33	Strathroy	120	0.051	174,000
3-34	North Bay	120	0.051	129,000
3-35	Sault Ste. Marie	120	0.051	135,000
3-36	Sudbury	120	0.065	229,000
3-37	Kirkland Lake	120	0.051	117,000
3-38	Thunder Bay	120	0.065	289,000
3-39	Winnipeg	120	0.100	2,064,000

Service Area #	Service Area Name	Available Spectrum (MHz)	$/MHz/pop	Opening Bid ($)
3-40	Brandon	120	0.051	178,000
3-41	Regina	60	0.065	474,000
3-42	Moose Jaw	60	0.051	102,000
3-43	Saskatoon	60	0.065	728,000
3-44	Edmonton	120	0.100	2,930,000
3-45	Medicine Hat / Brooks	120	0.051	194,000
3-46	Lethbridge	120	0.051	180,000
3-47	Calgary	120	0.100	2,780,000
3-48	Red Deer	120	0.051	244,000
3-49	Grande Prairie	120	0.051	189,000
3-50	Kootenays	120	0.051	137,000
3-51	Okanagan / Columbia	60	0.065	537,000
3-52	Vancouver	60	0.140	7,517,000
3-53	Victoria	60	0.065	558,000
3-54	Nanaimo	120	0.051	190,000
3-55	Courtenay	120	0.051	117,000
3-56	Thompson / Cariboo	120	0.051	183,000
3-57	Prince George	120	0.051	191,000
3-58	Dawson Creek	120	0.051	67,000
4-170	Yukon	120	0.051	34,000
4-171	Nunavut	120	0.051	32,000
4-172	Northwest Territories	120	0.051	42,000
	Total for a national licence			**$66,905,000**
	Total for all blocks			**$251,853,000**

8-1 Industry Canada is seeking comments on the proposed opening bids as presented in Table 5.

8.3 Proposed Eligibility Points for the 2500 MHz Spectrum Auction

180. The proposed eligibility points associated with the licences being made available in the 2500 MHz auction are based on the population per service area and the estimated value of the spectrum. The population data below are based on Statistics Canada's 2011 census.

181. Proposed points per service area for paired and unpaired spectrum in the 2500 MHz band are listed in Table 6. The proposed eligibility points are for blocks of 20 MHz, irrespective of whether the block is a paired block of 10 + 10 MHz or an unpaired block of 20 MHz.[27]

182. One eligibility point has been assigned per 50,000 in population for each 20 MHz block of spectrum (either paired or unpaired) in a service area. The eligibility points per spectrum block were

[27] Although the unpaired spectrum will be licensed in 25 MHz blocks, the 5 MHz restricted bands are not considered when determining the eligibility points.

then adjusted to reflect the estimated value of the spectrum licences as indicated by the opening bid price base rate.

183. There are 1,320 eligibility points associated with a 20 MHz national licence, which comprises 61 service areas covering the country.

Table 6 — Proposed Eligibility Points for the 2500 MHz Band

Service Area #	Service Area Name	Population	Eligibility Points per 20 MHz Block
3-01	Newfoundland and Labrador	514,641	13
3-02	Prince Edward Island	140,204	3
3-03	Mainland Nova Scotia	786,567	20
3-04	Cape Breton	135,075	3
3-05	Southern New Brunswick	172,374	4
3-06	Western New Brunswick	217,152	4
3-07	Eastern New Brunswick	360,416	9
3-08	Bas du fleuve / Gaspésie	295,519	6
3-09	Québec	1,004,614	40
3-10	Chicoutimi / Jonquière	368,261	9
3-11	Eastern Townships	543,762	14
3-12	Trois-Rivières	810,609	21
3-13	Montréal	4,204,654	232
3-14	Upper Outaouais	124,011	2
3-15	Ottawa / Outaouais	1,441,718	57
3-16	Pembroke	114,135	2
3-17	Abitibi	190,605	4
3-18	Cornwall	67,207	1
3-19	Brockville	84,068	2
3-20	Kingston	175,801	4
3-21	Belleville	196,021	4
3-22	Cobourg	62,610	1
3-23	Peterborough	206,250	5
3-24	Huntsville	78,790	2
3-25	Toronto	6,645,088	366
3-26	Barrie	673,898	17
3-27	Guelph / Kitchener	696,136	18
3-28	Listowel / Goderich / Stratford	134,384	3
3-29	Niagara - St. Catherines	368,119	9
3-30	London / Woodstock / St. Thomas	832,870	21
3-31	Chatham	100,951	2
3-32	Windsor / Leamington	389,729	10
3-33	Strathroy	170,801	3
3-34	North Bay	126,711	3
3-35	Sault Ste. Marie	132,309	3
3-36	Sudbury	177,004	5
3-37	Kirkland Lake	114,942	2
3-38	Thunder Bay	223,809	6
3-39	Winnipeg	1,032,187	41
3-40	Brandon	174,781	3
3-41	Regina	366,413	9
3-42	Moose Jaw	100,292	2

Service Area #	Service Area Name	Population	Eligibility Points per 20 MHz Block
3-43	Saskatoon	563,107	14
3-44	Edmonton	1,465,386	58
3-45	Medicine Hat / Brooks	190,930	4
3-46	Lethbridge	177,303	4
3-47	Calgary	1,390,206	55
3-48	Red Deer	240,343	5
3-49	Grande Prairie	185,998	4
3-50	Kootenays	134,351	3
3-51	Okanagan / Columbia	415,214	11
3-52	Vancouver	2,684,495	148
3-53	Victoria	431,520	11
3-54	Nanaimo	186,396	4
3-55	Courtenay	114,658	2
3-56	Thompson / Cariboo	179,949	4
3-57	Prince George	187,802	4
3-58	Dawson Creek	65,553	1
4-170	Yukon	33,584	1
4-171	Nunavut	31,906	1
4-172	Northwest Territories	41,455	1
Total			**1,320**

8-2 Industry Canada is seeking comments on the proposed eligibility points for spectrum licences in the 2500 MHz band, as outlined in Table 6 above.

8.4 Pre-auction Deposits

184. In order to enhance the integrity of the auction, Industry Canada requires that all bidders submit a pre-auction financial deposit with their auction application. The deposit is to be in the form of a certified cheque or money order payable to the Receiver General for Canada, or an irrevocable standby letter of credit.

185. Similar to previous auctions, Industry Canada proposes to determine the value of the pre-auction financial deposit based on the licences on which the applicant wishes to be eligible to bid. Each licence has been assigned a specific number of eligibility points that are approximately proportionate to the population covered by the licence and adjusted for value, as proposed in Table 6 above. For spectrum licences to be auctioned in the 2500 MHz band, Industry Canada proposes that the financial deposit be equal to $50,000 per eligibility point.

186. An individual bidder wanting to be eligible to bid on the equivalent of one national paired block would have to submit a deposit covering 1,320 points, which would equate to $66,000,000 (i.e. $50,000 x 1,320). Financial deposit(s) will be returned to any applicant that is found not to be a qualified bidder and to any applicant that provides written notification to Industry Canada of its withdrawal from the process prior to the auction's commencement. Financial deposits will be returned to unsuccessful bidders once the auction has closed.

8-3 Industry Canada is seeking comments on the proposed pre-auction deposits as outlined above.

8.5 Bid Payment and Forfeiture Penalties

187. Within 10 business days following the close of the auction, each provisional licence winner will be required to submit 20 percent (20%) of its winning bids. This payment will be non-refundable. The remaining portion of the winning bids will be due within 30 business days of the auction's close.

188. Following the conclusion of the auction, winning bidders that fail to comply with the specified payment schedule or fail to come into compliance with the eligibility requirements of the *Radiocommunication Regulations*, will forfeit their right to the licence. Furthermore, non-compliant bidders will be subject to a penalty in the amount of the difference between the forfeited bid and the eventual revenue from bids or fees of the licence(s) (determined by a subsequent licensing process) if that revenue is lower than the forfeited bid.

9. Bidder Training and Support

189. Qualified bidders will receive the necessary information to participate in the auction several weeks prior to the start of the auction. Information will include a user manual for the auction system, instructions and passwords to access the secure auction system, along with the schedules for training, mock auctions and the start of the bidding process.

190. A mock auction will be held, likely during the week prior to the start of the auction, in order to allow qualified bidders to better familiarize themselves with the auction system.

191. On May 30, 2012, Industry Canada held an auction design information session to assist potential 700 MHz and 2500 MHz auction participants in gaining a greater understanding of the proposed auction format and rules. DVDs of the information session are available by contacting:

Information Session, Spectrum Auctions
Spectrum Auction Branch
Industry Canada
300 Slater Street
Ottawa, Ontario K1A 0C8
Telephone: 613-991-0179
Fax: 613-957-4076
E-mail: spectrum.auctions@ic.gc.ca

10. Post-auction Licensing Process for Unassigned Licences

192. Industry Canada will consider making unassigned licences available for licensing through an alternative process, which could include a subsequent auction at a later date following the close of the initial auction. The timing and form of such a process will depend on the demand for the available licences. Industry Canada may conduct a public consultation should it consider it necessary.

11. Licence Renewal Process

193. Following the end of the initial licence term, the licensee will have a high expectation that a new licence will be issued for a subsequent term through a renewal process unless a breach of licence condition has occurred, a fundamental reallocation of spectrum to a new service is required, or an overriding policy need arises.

194. As part of the licence renewal process, the Minister of Industry retains the power to fix and amend the terms and conditions of spectrum licences during the term of the licence and at the end of the term in accordance with subsection 5(1) of the *Radiocommunication Act*. As noted in the FSAC, licence fees that reflect some measure of market value will apply to licences issued through a renewal process. Accordingly, the renewal process will serve to determine whether new licences will be issued, the terms and conditions that will apply to the new licences and the applicable licence fees.

195. Generally, approximately two years prior to the end of the licence term, Industry Canada will review whether there is a need for a fundamental reallocation of the spectrum to a new service, or whether an overriding policy need has arisen. A review of the licensee's continued compliance with the conditions of licence will also begin. Industry Canada will launch a public consultation to discuss whether or not, in light of the above-noted issues, new licences should be issued for a subsequent term. The consultation paper will also propose, and invite comments on, licence conditions and fees that would apply during the subsequent licence term.

196. It is proposed that the renewal process include a public consultation process that would commence approximately two years prior to the end of the licence term.

11-1 Industry Canada is seeking comments on the proposed renewal process for spectrum licences in the 2500 MHz band.

12. Clarification Questions Process

197. As done in previous auctions, following a decision on the questions raised in this consultation paper, Industry Canada will accept written questions soliciting clarification of the rules and policies set out in the decision paper for a limited period of time, which will be specified in the final licensing framework. Written questions, submitted by the deadline and Industry Canada's responses will be made public on Industry Canada's website.

13. Submitting Comments

198. Respondents are requested to provide their comments in electronic format (WordPerfect, Microsoft Word or Adobe PDF) to the following e-mail address: spectrum.auctions@ic.gc.ca.

199. Written submissions should be addressed to the Director General, Spectrum Auctions Branch, DGSA, Industry Canada, 300 Slater Street, Ottawa, Ontario K1A 0C8.

200. All submissions should cite the *Canada Gazette*, Part I, the publication date, the title and the notice reference number (DGSO-004-12). Parties should submit their comments no later than November 19, 2012, to ensure consideration. Soon after the close of the comment period, all comments received will be posted on Industry Canada's Spectrum Management and Telecommunications website at http://www.ic.gc.ca/spectrum.

201. Industry Canada will also provide interested parties with the opportunity to reply to comments from other parties. Reply comments will be accepted until December 17, 2012.

202. Following the initial comment period, Industry Canada may, at its discretion, request additional information if needed to clarify significant positions or new proposals. In such a case, the reply comment deadline may be extended.

14. Related Information

203. All spectrum-related documents referred to in this paper are available on Industry Canada's Spectrum Management and Telecommunications website at http://www.ic.gc.ca/spectrum.

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

Manager, Spectrum Auction Policy
Spectrum Auction Branch
Industry Canada
300 Slater Street
Ottawa, Ontario
K1A 0C8
Telephone: 613-954-3323
Fax: 613-957-4076
E-mail: spectrum.auctions@ic.gc.ca

Annex A — Spectrum Availability in the 2500 MHz Band as of June 2012

(Subject to change prior to the 2500 MHz spectrum auction)

Region A

Tier No.	Region	Name	Frequency blocks available for auction (indicated by "X")								
			Paired spectrum (10 + 10 MHz)							Unpaired spectrum (25 MHz)	
			A/A'	B/B'	C/C'	D/D'	E/E'	F/F'	G/G'	H	I
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
3-10	A	Chicoutimi-Jonquière			X	X	X	X	X		X
3-11	A	Eastern Townships			X	X	X	X	X		X
3-14	A	Upper Outaouais			X	X	X	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
3-28	A	Listowel / Goderich / Stratford			X	X	X	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	X	X		X
3-38	A	Thunder Bay			X	X	X	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
3-54	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

Region B

Tier No.	Region	Name	Frequency blocks available for auction (indicated by "X")								
			Paired spectrum (10 + 10 MHz)							Unpaired spectrum (25 MHz)	
			A/A'	B/B'	C/C'	D/D'	E/E'	F/F'	G/G'	H	I
3-08	B	Bas du fleuve / Gaspésie					X	X	X		
3-09	B	Québec					X	X	X		
3-12	B	Trois-Rivières					X	X	X		
3-13	B	Montréal					X	X	X		
3-15	B	Ottawa / Outaouais					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		
3-29	B	Niagara-St. Catharines					X	X	X		
3-30	B	London / Woodstock / St. Thomas					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		
3-51	B	Okanagan / Columbia					X	X	X		
3-52	B	Vancouver					X	X	X		
3-53	B	Victoria					X	X	X		

Region C

Tier No.	Region	Name	Frequency blocks available for auction (indicated by "X")								
			Paired spectrum (10 + 10 MHz)							Unpaired spectrum (25 MHz)	
			A/A'	B/B'	C/C'	D/D'	E/E'	F/F'	G/G'	H	I
3-39	C	Winnipeg	X	X			X	X	X	X	
3-40	C	Brandon	X	X			X	X	X	X	

Annex B — 2500 MHz Band Site-specific Fixed Service Licensees as of June 2012

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
BELL ALIANT REGIONAL COMM. INC.	MONT APICA (RR)	475842	712550	3-09	2588	2358
BELL ALIANT REGIONAL COMM. INC.	CHUTES DES PASSES	495105	711023	3-10	2351	2581
CHANTIERS CHIBOUGAMAU LTEE	MONT CARBONNEAU, QC	501241	734100	3-10	2351.3	2581.3
BELL ALIANT REGIONAL COMM. INC.	ALMA (RR)	483432	713335	3-10	2358	2588
BELL ALIANT REGIONAL COMM. INC.	ALMA (RR)	483432	713335	3-10	2358	2588
BELL ALIANT REGIONAL COMM. INC.	ALMA (RR)	483432	713335	3-10	2358	2588
BELL ALIANT REGIONAL COMM. INC.	ALMA (RR)	483432	713335	3-10	2358	2588
CHANTIERS CHIBOUGAMAU LTEE	MONT CARBONNEAU, QC	501241	734100	3-10	2358.3	2588.3
BELL ALIANT REGIONAL COMM. INC.	LAC DES GRANDES POINTES	490918	712741	3-10	2581	2351
CHANTIERS CHIBOUGAMAU LTEE	BUDEMONT, QC	503842	731019	3-10	2581.3	2351.3
BELL ALIANT REGIONAL COMM. INC.	ST ANDRE DE METABETCHOUAN	482107	715429	3-10	2588	2358
BELL ALIANT REGIONAL COMM. INC.	METABETCHOUAN (CH. CARON)	482307	715207	3-10	2588	2358
BELL ALIANT REGIONAL COMM. INC.	ST NAZAIRE (RANG NO 8)	483720	712944	3-10	2588	2358
BELL ALIANT REGIONAL COMM. INC.	ST HENRI DE TAILLON, CH. PLAGE WILSON	483754	714733	3-10	2588	2358
BELL ALIANT REGIONAL COMM. INC.	L'ASCENSION (RANG NO 7)	484052	713751	3-10	2588	2358
BELL ALIANT REGIONAL COMM. INC.	LAC DES GRANDES POINTES	490918	712741	3-10	2588	2358
CHANTIERS CHIBOUGAMAU LTEE	BUDEMONT, QC	503842	731019	3-10	2588.3	2358.3
TELEBEC, DIVISION DE BELL ALIANT	CHAPAIS	494640	745038	3-17	2295.5	2525.5
TELEBEC, DIVISION DE BELL ALIANT	LG 2, RR, QUEBEC	534705	773659	3-17	2295.5	2525.5
TELEBEC, DIVISION DE BELL ALIANT	JOUTEL	492715	781926	3-17	2315.5	2545.5
CHANTIERS CHIBOUGAMAU LTEE	TOURNEMINE LA TOUR, QC	505353	725210	3-17	2358.3	2588.3
TELEBEC, DIVISION DE BELL ALIANT	LAC OPEMISCA	495003	745849	3-17	2525.5	2295.5
TELEBEC, DIVISION DE BELL ALIANT	BAIE JAMES (LG2, AEROPORT)	533741	774137	3-17	2525.5	2295.5
TELEBEC, DIVISION DE BELL ALIANT	MILE 72, QC	492658	780712	3-17	2545.5	2315.5
CHANTIERS CHIBOUGAMAU LTEE	CAMP CLAVERIE, QC	502830	732438	3-17	2581.3	2351.3
CHANTIERS CHIBOUGAMAU LTEE	MONT BOURBEAU, QC	495654	742041	3-17	2588.3	2358.3
WESTCOAST ENERGY INC.	DEVON (10-12-63-12W6M) ALBERTA	542611	1194016	3-49	2351	2581
TELUS Communications Company	SPILLIMACHEEN BC	505400	1162037	3-50	2535	2305
TELUS Communications Company	GOLDEN BC	511625	1165917	3-51	2305	2535
TELUS Communications Inc.	TOFINO BC	490846	1255400	3-54	2305	2535
TELUS Communications Inc.	MT OZZARD, BC	485733	1252935	3-54	2535	2305
TELUS Communications Company	BEAVERLY BC	534826	1225749	3-57	2299	2529
TELUS Communications Company	TABOR MOUNTAIN BC	535444	1222706	3-57	2529	2299
Northwestel Inc.	PINK MOUNTAIN BC	570416	1225227	3-58	2323.3	2553.3
Northwestel Inc.	ATICK CREEK BC	570955	1224025	3-58	2323.3	2553.3
Northwestel Inc.	JEDNEY, BC	571333	1221322	3-58	2323.3	2553.3
Northwestel Inc.	JEDNEY, BC	571333	1221322	3-58	2330.3	2560.3
WESTCOAST ENERGY INC.	PERRY CREEK BC	550945	1210829	3-58	2337	2567
WESTCOAST ENERGY INC.	SOUTH SUKUNKA (MR20) BC	551801	1214103	3-58	2337	2567
Northwestel Inc.	JOHN KITTS	563825	1213013	3-58	2337.3	2567.3
Northwestel Inc.	BLUEBERRY FARMS, BC (SUB)	564008	1212821	3-58	2337.3	2567.3
Northwestel Inc.	PINK MOUNTAIN BC	570416	1225227	3-58	2337.3	2567.3
WESTCOAST ENERGY INC.	LITTLE PRAIRIE BC	544022	1202904	3-58	2344	2574
WESTCOAST ENERGY INC.	LITTLE PRAIRIE BC	544022	1202904	3-58	2344	2574

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
WESTCOAST ENERGY INC.	LITTLE PRAIRIE BC	544022	1202904	3-58	2344	2574
WESTCOAST ENERGY INC.	BULLMOOSE (MR16) BC	550858	1212708	3-58	2344	2574
WESTCOAST ENERGY INC.	PERRY CREEK BC	550945	1210829	3-58	2344	2574
WESTCOAST ENERGY INC.	BRAZION PLANT (MR56) BC	552355	1220831	3-58	2344	2574
Northwestel Inc.	MONTEITH CREEK REPEATER BC	563000	1220357	3-58	2344.3	2574.3
Northwestel Inc.	ATICK CREEK BC	570955	1224025	3-58	2344.3	2574.3
Northwestel Inc.	GLEAM BC	573154	1211322	3-58	2344.3	2574.3
WESTCOAST ENERGY INC.	A4658 (D-13-G/93-I-9 BP1) BC	543547	1200921	3-58	2351	2581
WESTCOAST ENERGY INC.	A4256 (B-57-G/93-I-9 BP3) BC	543743	1201229	3-58	2351	2581
WESTCOAST ENERGY INC.	A4254 (A-65-E/93-I-9 BP2) BC	543805	1202539	3-58	2351	2581
WESTCOAST ENERGY INC.	AS 10 (MR50)	545158	1210725	3-58	2351	2581
WESTCOAST ENERGY INC.	LBV 53 BC	545640	1210857	3-58	2351	2581
WESTCOAST ENERGY INC.	AS 9 (MR49)	545651	1210930	3-58	2351	2581
WESTCOAST ENERGY INC.	SUKUNKA JUNCTION NORTH BC	552036	1213926	3-58	2351	2581
Northwestel Inc.	GERRY HEYER CAMP BC	562552	1222744	3-58	2351.3	2581.3
Northwestel Inc.	FEDERAL RANCH BC	562618	1222341	3-58	2351.3	2581.3
Northwestel Inc.	GRAHAM RIVER FARMS BC	562745	1222047	3-58	2351.3	2581.3
Northwestel Inc.	INDIAN UNION PECIFIC BC	562854	1221928	3-58	2351.3	2581.3
Northwestel Inc.	SAM CRAIK BC	562936	1221550	3-58	2351.3	2581.3
Northwestel Inc.	MONTEITH CREEK REPEATER BC	563000	1220357	3-58	2351.3	2581.3
Northwestel Inc.	CRYSTAL SPRING FARM (UDO) BC	563037	1221315	3-58	2351.3	2581.3
Northwestel Inc.	GEORGE GIENIE BC	563050	1220840	3-58	2351.3	2581.3
Northwestel Inc.	ART MCLEAN RANCH	563058	1221103	3-58	2351.3	2581.3
Northwestel Inc.	CRYSTAL SPRING FARM (WITZEL) BC	563102	1221740	3-58	2351.3	2581.3
Northwestel Inc.	GRAHAM HALFWAY RIVER SUBDIVISION BC	563112	1221532	3-58	2351.3	2581.3
Northwestel Inc.	DAVE SIMPSON BC	563539	1222605	3-58	2351.3	2581.3
Northwestel Inc.	BRUCE SIMPSON BC	563630	1222706	3-58	2351.3	2581.3
Northwestel Inc.	M MCLEOD, BC	563814	1222750	3-58	2351.3	2581.3
Northwestel Inc.	D MEGER, BC	563817	1222752	3-58	2351.3	2581.3
Northwestel Inc.	SIEMER, BC	563822	1204118	3-58	2351.3	2581.3
Northwestel Inc.	SCOBIE, BC	564159	1223128	3-58	2351.3	2581.3
Northwestel Inc.	STADLER, BC	564217	1203709	3-58	2351.3	2581.3
Northwestel Inc.	TRASK, BC	564337	1223257	3-58	2351.3	2581.3
Northwestel Inc.	RUTZ, BC	564811	1203545	3-58	2351.3	2581.3
Northwestel Inc.	PEE JAYS, BC	565307	1203321	3-58	2351.3	2581.3
Northwestel Inc.	MACCABE MILLIGAN, BC	565518	1204450	3-58	2351.3	2581.3
Northwestel Inc.	CNRL - MILLIGAN	570822	1203916	3-58	2351.3	2581.3
Northwestel Inc.	GLEAM BC	573154	1211322	3-58	2351.3	2581.3
WESTCOAST ENERGY INC.	LITTLE PRAIRIE BC	544022	1202904	3-58	2358	2588
WESTCOAST ENERGY INC.	AS22 (SOUTH GRZ CNRL) BC	544629	1203348	3-58	2358	2588
WESTCOAST ENERGY INC.	RED WILLOW BC (D-13-H/94-I-15)	545153	1203016	3-58	2358	2588
WESTCOAST ENERGY INC.	AS28 (BABCOCK CNRL) BC	545444	1205859	3-58	2358	2588
WESTCOAST ENERGY INC.	SUKUNKA JUNCTION NORTH BC	552036	1213926	3-58	2358	2588
WESTCOAST ENERGY INC.	KWOEN PLANT, BC	552302	1214159	3-58	2358	2588
WESTCOAST ENERGY INC.	COMMOTION CREEK BC	553102	1215414	3-58	2358	2588
Northwestel Inc.	BLUEBERRY BC	564307	1214554	3-58	2358.3	2588.3
Northwestel Inc.	TOWNSEND CREEK BC	565918	1221008	3-58	2553.3	2323.3

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
Northwestel Inc.	PRIME WEST ENERGY, BC	572031	1220208	3-58	2560.3	2330.3
WESTCOAST ENERGY INC.	THUNDER MOUNTAIN BC	545715	1203535	3-58	2567	2337
WESTCOAST ENERGY INC.	HERMAN MTN BC	545942	1210718	3-58	2567	2337
WESTCOAST ENERGY INC.	A5262 (D-66-D/93-P-2) BC	550320	1205644	3-58	2567	2337
WESTCOAST ENERGY INC.	HILL 4290 BC	551014	1205211	3-58	2567	2337
WESTCOAST ENERGY INC.	WEST SUKUNKA (MR48) BC	551311	1214018	3-58	2567	2337
Northwestel Inc.	BLUEBERRY FARM BC	564015	1212827	3-58	2567.3	2337.3
Northwestel Inc.	AMOCO, BC	564938	1222145	3-58	2567.3	2337.3
Northwestel Inc.	DUTCHIK, BC	565000	1223708	3-58	2567.3	2337.3
Northwestel Inc.	RILEY BURSETH, BC	565126	1223826	3-58	2567.3	2337.3
Northwestel Inc.	CAROL, BC	565347	1223931	3-58	2567.3	2337.3
Northwestel Inc.	WAYNE MILLS, BC	565410	1223844	3-58	2567.3	2337.3
Northwestel Inc.	DARRELL MILLS, BC	565413	1223934	3-58	2567.3	2337.3
Northwestel Inc.	MARSHALL MILLS, BC	565519	1224004	3-58	2567.3	2337.3
Northwestel Inc.	DUKE ENERGY BEG, BC	565607	1220455	3-58	2567.3	2337.3
Northwestel Inc.	BORING RANCH, BC	565726	1224152	3-58	2567.3	2337.3
Northwestel Inc.	KARL OSYMUELLER, BC	565813	1221914	3-58	2567.3	2337.3
Northwestel Inc.	HEADWATERS RANCH, BC	565926	1223713	3-58	2567.3	2337.3
Northwestel Inc.	LLOYD SIMPSON, BC	570053	1225327	3-58	2567.3	2337.3
Northwestel Inc.	BRIAN, BC	570107	1222125	3-58	2567.3	2337.3
Northwestel Inc.	GUTTNER, BC	570157	1224615	3-58	2567.3	2337.3
Northwestel Inc.	KENNEDY, BC	570221	1223102	3-58	2567.3	2337.3
Northwestel Inc.	PINK MOUNTAIN MOTOR INN, BC	570223	1223039	3-58	2567.3	2337.3
Northwestel Inc.	SIMPSON CAMP, BC	570407	1223912	3-58	2567.3	2337.3
Northwestel Inc.	ELLEN SIMPSON, BC	570413	1223827	3-58	2567.3	2337.3
Northwestel Inc.	SPORTSMAN INN, BC	570435	1223452	3-58	2567.3	2337.3
Northwestel Inc.	S AND S, BC	570438	1223334	3-58	2567.3	2337.3
Northwestel Inc.	MAE'S KITCHEN, BC	570452	1223516	3-58	2567.3	2337.3
Northwestel Inc.	WESTCOAST SIKANNI, BC	571207	1230042	3-58	2567.3	2337.3
Northwestel Inc.	ANADARKO, BC	572315	1222345	3-58	2567.3	2337.3
WESTCOAST ENERGY INC.	COMPASS HILL BC	542923	1200107	3-58	2574	2344
WESTCOAST ENERGY INC.	A4659 (D-78-B/93-I-9 BP4) BC	543359	1201302	3-58	2574	2344
WESTCOAST ENERGY INC.	AS20 (WAPITI BURLINGTON) BC	543931	1203531	3-58	2574	2344
WESTCOAST ENERGY INC.	AS32 (WAPITI AMOCO) BC	544011	1203039	3-58	2574	2344
WESTCOAST ENERGY INC.	AS21 (NORTH GRZ CNRL) BC	545339	1204004	3-58	2574	2344
WESTCOAST ENERGY INC.	BULLMOOSE CREEK BC	551335	1212406	3-58	2574	2344
WESTCOAST ENERGY INC.	BULLMOOSE CREEK BC	551335	1212406	3-58	2574	2344
WESTCOAST ENERGY INC.	BRAZION CREEK BC	552140	1215827	3-58	2574	2344
WESTCOAST ENERGY INC.	AS33 (SOUTH GRZ BURLINGTON) BC	544444	1204232	3-58	2574	2433
Northwestel Inc.	MACCABEE FARM BC	563030	1220000	3-58	2574.3	2344.3
Northwestel Inc.	FRIEDENS FARM BC	563049	1215148	3-58	2574.3	2344.3
Northwestel Inc.	NEW INDIAN RESERVE BC	563049	1215757	3-58	2574.3	2344.3
Northwestel Inc.	ALBERT SCHOLL BC	563144	1215555	3-58	2574.3	2344.3
Northwestel Inc.	DILLE, BC	570221	1223107	3-58	2574.3	2344.3
Northwestel Inc.	PINK MOTOR, BC	570223	1223039	3-58	2574.3	2344.3
Northwestel Inc.	DON GORDON, BC	571500	1224317	3-58	2574.3	2344.3
Northwestel Inc.	SHELLY CLARKE, BC	571740	1224745	3-58	2574.3	2344.3

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
Northwestel Inc.	NOVA GAS, BC	572012	1224020	3-58	2574.3	2344.3
Northwestel Inc.	COASTAL, BC	572020	1224029	3-58	2574.3	2344.3
Northwestel Inc.	LENNOX CAMP	572251	1212530	3-58	2574.3	2344.3
Northwestel Inc.	CRESTAR, BC	573108	1205219	3-58	2574.3	2344.3
Northwestel Inc.	KAHNTAH, BC	580114	1203224	3-58	2574.3	2344.3
WESTCOAST ENERGY INC.	COMPASS HILL BC	542923	1200107	3-58	2581	2351
WESTCOAST ENERGY INC.	HERMAN MTN BC	545942	1210718	3-58	2581	2351
WESTCOAST ENERGY INC.	CHAMBERLAIN BC (MR47)	550919	1213905	3-58	2581	2351
WESTCOAST ENERGY INC.	WEST SUKUNKA (MR48) BC	551311	1214018	3-58	2581	2351
WESTCOAST ENERGY INC.	BULLMOOSE CREEK BC	551335	1212406	3-58	2581	2351
WESTCOAST ENERGY INC.	BURNT RIVER BC	551858	1220207	3-58	2581	2351
WESTCOAST ENERGY INC.	BRAZION CREEK BC	552140	1215827	3-58	2581	2351
WESTCOAST ENERGY INC.	AS19 (D-49-F/93-P-5) BC	552222	1215103	3-58	2581	2351
Northwestel Inc.	COLT CREEK REPEATER BC	562931	1222322	3-58	2581.3	2351.3
Northwestel Inc.	ZEKE	565718	1212514	3-58	2581.3	2351.3
WESTCOAST ENERGY INC.	THUNDER MOUNTAIN BC	545715	1203535	3-58	2588	2358
WESTCOAST ENERGY INC.	THUNDER MOUNTAIN BC	545715	1203535	3-58	2588	2358
WESTCOAST ENERGY INC.	WABI BC	554006	1213459	3-58	2588	2358
Northwestel Inc.	COLT CREEK REPEATER BC	562931	1222322	3-58	2588.3	2358.3
Northwestel Inc.	NEWCAL ENERGY	562947	1213759	3-58	2588.3	2358.3
Northwestel Inc.	LENNOX, BC	563309	1211628	3-58	2588.3	2358.3
Northwestel Inc.	PURSUIT, BC	563336	1213548	3-58	2588.3	2358.3
Northwestel Inc.	LENNOX RES, BC	563340	1211629	3-58	2588.3	2358.3
Northwestel Inc.	NOVA, BC	563458	1211517	3-58	2588.3	2358.3
Northwestel Inc.	DEADHORSE CREEK BC	563516	1214601	3-58	2588.3	2358.3
Northwestel Inc.	DONALD KRUSE BC	563826	1214916	3-58	2588.3	2358.3
Northwestel Inc.	KOBES BC	563828	1213932	3-58	2588.3	2358.3
Northwestel Inc.	THEISSEN, BC	563915	1212551	3-58	2588.3	2358.3
Northwestel Inc.	BLUEBERRY FARM BC	564015	1212827	3-58	2588.3	2358.3
Northwestel Inc.	CHELLE, BC	564025	1211801	3-58	2588.3	2358.3
Northwestel Inc.	EVERGREEN, BC	564032	1212139	3-58	2588.3	2358.3
Northwestel Inc.	WEIBE RANCH	564054	1212201	3-58	2588.3	2358.3
Northwestel Inc.	EVERGREEN ACRES, BC	564219	1212306	3-58	2588.3	2358.3
Northwestel Inc.	TALISMAN, BC	564414	1213859	3-58	2588.3	2358.3
Northwestel Inc.	BABKIRK, BC	565407	1215430	3-58	2588.3	2358.3
Northwestel Inc.	ZEKE	565718	1212514	3-58	2588.3	2358.3
Northwestel Inc.	UNOCAL, BC	565721	1215503	3-58	2588.3	2358.3
Northwestel Inc.	TOWNSEND CREEK BC	565918	1221008	3-58	2588.3	2358.3

Annex C — 2500 MHz Band Site-specific Grandfathered Licences in Manitoba as of June 2012

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39		2502.25
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39		2503.75
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39		2505.25
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317	3-39		2509
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849	3-39		2509
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317	3-39		2515
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849	3-39		2515
Prairie Rose School Division	ELIE MB - WALDHEIM COLONY SCHOOL	495136	974949	3-39		2521
Prairie Rose School Division	ELIE MB - BON HOMME COLONY SCHOOL	495233	975330	3-39		2521
Prairie Rose School Division	ST.FRANCOIS MB - LAKESIDE COL. SCH.	495440	973355	3-39		2521
Prairie Rose School Division	ST.FRANCOIS MB-BARRICKMAN COL. SCH.	495609	973617	3-39		2521
Prairie Rose School Division	ST.FRANCOIS MB - MAXWELL COL. SCH.	495714	973848	3-39		2521
Prairie Rose School Division	ST.EUSTACHE MB -IBERVILLE COL. SCH.	495819	974118	3-39		2521
Prairie Rose School Division	POPLAR PT MB - POPLAR PT COL. SCH.	500227	975641	3-39		2521
Inukshuk Wireless Partnership	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821	3-39		2533
Inukshuk Wireless Partnership	ELIE AREA, MAN.-SUBSCRIBER STATIONS	495406	974532	3-39		2533
Inukshuk Wireless Partnership	SELKIRK AREA, MAN.-SUBSCRIBER STNS.	500837	965303	3-39		2533
Inukshuk Wireless Partnership	CHATFIELD AREA, MAN-SUBSCRIBER STNS	504702	973417	3-39		2533
Inukshuk Wireless Partnership	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821	3-39		2539
Prairie Spirit School Division #50	ST. CLAUDE, MANITOBA-ITV SYSTEM	493936	982050	3-39		2539.3
Prairie Rose School Division	ELIE MB - WALDHEIM COLONY SCHOOL	495136	974949	3-39		2545
Prairie Rose School Division	ELIE MB - BON HOMME COLONY SCHOOL	495233	975330	3-39		2545
Prairie Rose School Division	ST.FRANCOIS MB - LAKESIDE COL. SCH.	495440	973355	3-39		2545
Prairie Rose School Division	ST.FRANCOIS MB-BARRICKMAN COL. SCH.	495609	973617	3-39		2545
Prairie Rose School Division	ST.FRANCOIS MB - MAXWELL COL. SCH.	495714	973848	3-39		2545
Prairie Rose School Division	ST.EUSTACHE MB -IBERVILLE COL. SCH.	495819	974118	3-39		2545
Prairie Rose School Division	POPLAR PT MB - POPLAR PT COL. SCH.	500227	975641	3-39		2545
Inukshuk Wireless Partnership	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821	3-39		2551
Inukshuk Wireless Partnership	WINNIPEG, MAN.-SUBSCRIBER STATIONS	495345	970821	3-39		2557
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MAN.-ST JAMES COLLEGIATE	495239	971317	3-39		2563
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB-JOHN TAYLOR COLLEGIATE	495326	971849	3-39		2563
PRAIRIE ROSE SCHOOL DIVISION	MIAMI, MAN-MIAMI COLLEGIATE	492222	981414	3-39		2569

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
	(IITV)					
PRAIRIE ROSE SCHOOL DIVISION	ELM CREEK, MB-ELM CREEK COLL (IITV)	494027	980011	3-39		2569
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	3-39		2569.75
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	3-39		2569.75
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	3-39		2569.75
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	3-39		2571.25
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	3-39		2571.25
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	3-39		2571.25
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	3-39		2575
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	3-39		2575
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	3-39		2581
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	3-39		2581
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	3-39		2587
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	3-39		2587
HANOVER SCHOOL DIVISION #15	GRUNTHAL, MAN.-SCHOOL ITV SYSTEM	492409	965137	3-39	2502.25	
BORDER LAND SCHOOL DIVISION	DOMINION CITY, MB-SCHOOL ITV SYSTEM	490827	970957	3-39	2502.25	2563.75
PRAIRIE ROSE SCHOOL DIVISION	ELM CREEK, MB-ELM CREEK COLL (IITV)	494027	980011	3-39	2502.25	2577.25
HANOVER SCHOOL DIVISION #15	LANDMARK, MAN-COLLEGIATE ITV SYSTEM	494008	964913	3-39	2503.75	
BORDER LAND SCHOOL DIVISION	VITA, MANITOBA-SCHOOL ITV SYSTEM	490746	963347	3-39	2503.75	2562.25
HANOVER SCHOOL DIVISION #15	NIVERVILLE MB-COLLEGIATE ITV SYSTEM	493605	970218	3-39	2505.25	
PRAIRIE ROSE SCHOOL DIVISION	MIAMI, MAN-MIAMI COLLEGIATE (IITV)	492222	981414	3-39	2505.25	2574.25
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	3-39	2509	
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	3-39	2515	
Prairie Rose School Division	ELIE, MANITOBA-ST. PAUL COLLEGIATE	495427	974534	3-39	2521	
Inukshuk Wireless Partnership	ELIE, MANITOBA-CHMI TV TX SITE	495226	974427	3-39	2533	
Inukshuk Wireless Partnership	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	3-39	2533	
Inukshuk Wireless Partnership	SELKIRK, MANITOBA	500924	965839	3-39	2533	
Inukshuk Wireless Partnership	CHATFIELD, MANITOBA	504945	973333	3-39	2533	
Inukshuk Wireless Partnership	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	3-39	2539	
Prairie Rose School Division	ELIE, MANITOBA-ST. PAUL COLLEGIATE	495427	974534	3-39	2545	
Inukshuk Wireless Partnership	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	3-39	2551	
Inukshuk Wireless Partnership	WINNIPEG, MANITOBA-TD CENTRE	495344	970822	3-39	2557	
BORDER LAND SCHOOL DIVISION	WOODMORE, MANITOBA-ITV REPEATER	490804	965358	3-39	2562.25	2503.75
ST. JAMES ASSINIBOIA SCHOOL DIV. #2	WINNIPEG, MB.-STURGEON CREEK SCHOOL	495312	971607	3-39	2563	
BORDER LAND SCHOOL DIVISION	WOODMORE, MANITOBA-ITV REPEATER	490804	965358	3-39	2563.75	2502.25
Prairie Spirit School Division #50	ST. CLAUDE, MANITOBA-ITV SYSTEM	493936	982050	3-39	2564.15	

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	3-39	2569	
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	3-39	2569	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39	2569.75	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39	2571.25	
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	3-39	2574.25	2505.25
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39	2575	
PRAIRIE ROSE SCHOOL DIVISION	CARMAN, MB-CARMAN COLLEGIATE (IITV)	493011	975946	3-39	2577.25	2502.25
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39	2581	
HANOVER SCHOOL DIVISION #15	STEINBACH, MANITOBA-RSS ITV SYSTEM	493058	964113	3-39	2587	
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2501.05
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2503.15
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2505.25
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2507.35
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2510.5
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2513.65
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2516.28
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40		2518.9
Inukshuk Wireless Partnership	BRANDON AREA, MAN-SUBSCRIBER STNS.	495049	995710	3-40		2533
Inukshuk Wireless Partnership	MINNEDOSA/SHOAL LAKE, MB-SUBSC STNS	502106	1001214	3-40		2533
Inukshuk Wireless Partnership	FOXWARREN AREA, MAN-SUBSCRIBER STNS	503102	1010907	3-40		2533
Inukshuk Wireless Partnership	RIDING MTN AREA, MB-SUBSCIBER STNS.	503155	992800	3-40		2533
Inukshuk Wireless Partnership	DAUPHIN AREA, MAN.-SUBSCRIBER STNS.	510858	1000300	3-40		2533
Prairie Spirit School Division #50	BALDUR, MANITOBA-TRI LEAF COLONY	492014	991354	3-40		2539
Prairie Spirit School Division #50	PILOT MOUND, MAN.-WINDY BAY COLONY	492052	985400	3-40		2539
Prairie Spirit School Division #50	CYPRESS RIVER, MB-CYPRESS R COLONY	493447	990910	3-40		2539
Prairie Spirit School Division #50	HOLLAND, MANITOBA-OAKRIDGE COLONY	493558	984800	3-40		2539
Prairie Spirit School Division #50	GLENBORO, MANITOBA-MILLSHOF COLONY	493559	992029	3-40		2539
Prairie Spirit School Division #50	TREHERNE MANITOBA-SHADY LANE COLONY	494422	983908	3-40		2539
Inukshuk Wireless Partnership	BRANDON AREA, MAN-SUBSCRIBER STNS.	495049	995710	3-40		2539
Prairie Spirit School Division #50	CARTWRIGHT, MANITOBA-IITV SYSTEM	490553	992008	3-40		2539.3
Prairie Spirit School Division #50	TREHERNE, MANITOBA-IITV SYSTEM	493720	984154	3-40		2539.3
Prairie Spirit School Division #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	3-40		2564.15
Prairie Spirit School Division #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	3-40		2566.25
Prairie Spirit School Division #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	3-40		2568.35

Licensee	Location	Latitude	Longitude	Corresponding Tier 3 area	TX FREQ (MHz)	RX FREQ (MHz)
Prairie Spirit School Division #50	MANITOU, MANITOBA-IITV SYSTEM	491206	983234	3-40		2582.7
Prairie Spirit School Division #50	PILOT MOUND, MANITOBA-IITV SYSTEM	491209	985401	3-40		2582.7
Prairie Spirit School Division #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	3-40		2582.7
Prairie Spirit School Division #50	BALDUR, MANITOBA-IITV SYSTEM	492308	991418	3-40		2582.7
Prairie Spirit School Division #50	SOMERSET, MANITOBA-ITV SYSTEM	492427	983936	3-40		2582.7
Prairie Spirit School Division #50	SWAN LAKE, MANITOBA-ITV SYSTEM	492447	984733	3-40		2582.7
Prairie Spirit School Division #50	GLENBORO, MANITOBA-IITV SYSTEM	493330	991655	3-40		2582.7
Prairie Spirit School Division #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	3-40		2582.7
Prairie Spirit School Division #50	SOMERSET, MANITOBA-ITV SYSTEM	492427	983936	3-40	2501.05	
Prairie Spirit School Division #50	PILOT MOUND, MANITOBA-IITV SYSTEM	491209	985401	3-40	2503.15	
Prairie Spirit School Division #50	MANITOU, MANITOBA-IITV SYSTEM	491206	983234	3-40	2505.25	
Prairie Spirit School Division #50	GLENBORO, MANITOBA-IITV SYSTEM	493330	991655	3-40	2507.35	
Prairie Spirit School Division #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	3-40	2510.5	
Prairie Spirit School Division #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	3-40	2513.65	
Prairie Spirit School Division #50	BALDUR, MANITOBA-IITV SYSTEM	492308	991418	3-40	2516.28	
Prairie Spirit School Division #50	SWAN LAKE, MANITOBA-ITV SYSTEM	492447	984733	3-40	2518.9	
Inukshuk Wireless Partnership	HAYFIELD, MANITOBA-CKX TV TX SITE	494005	1000042	3-40	2533	
Inukshuk Wireless Partnership	NEWDALE, MANITOBA	502038	1001109	3-40	2533	
Inukshuk Wireless Partnership	RIDING MOUNTAIN, MANITOBA	502840	993450	3-40	2533	
Inukshuk Wireless Partnership	FOXWARREN, MANITOBA	503114	1010425	3-40	2533	
Inukshuk Wireless Partnership	BALDY MOUNTAIN, MANITOBA	512814	1004312	3-40	2533	
Inukshuk Wireless Partnership	HAYFIELD, MANITOBA-CKX TV TX SITE	494005	1000042	3-40	2539	
Prairie Spirit School Division #50	GLENORA, MANITOBA-IITV REPEATER	491507	990931	3-40	2539.3	
Prairie Spirit School Division #50	NOTRE DAME DE LOURDES, MB-IITV RPTR	493449	983756	3-40	2539.3	
Prairie Spirit School Division #50	CARTWRIGHT, MANITOBA-IITV SYSTEM	490553	992008	3-40	2566.25	
Prairie Spirit School Division #50	TREHERNE, MANITOBA-IITV SYSTEM	493720	984154	3-40	2568.35	
Prairie Spirit School Division #50	BRUXELLES, MANITOBA-IITV HUB SITE	492944	985200	3-40	2582.7	

Annex D — The Combinatorial Clock Auction (CCA) Format

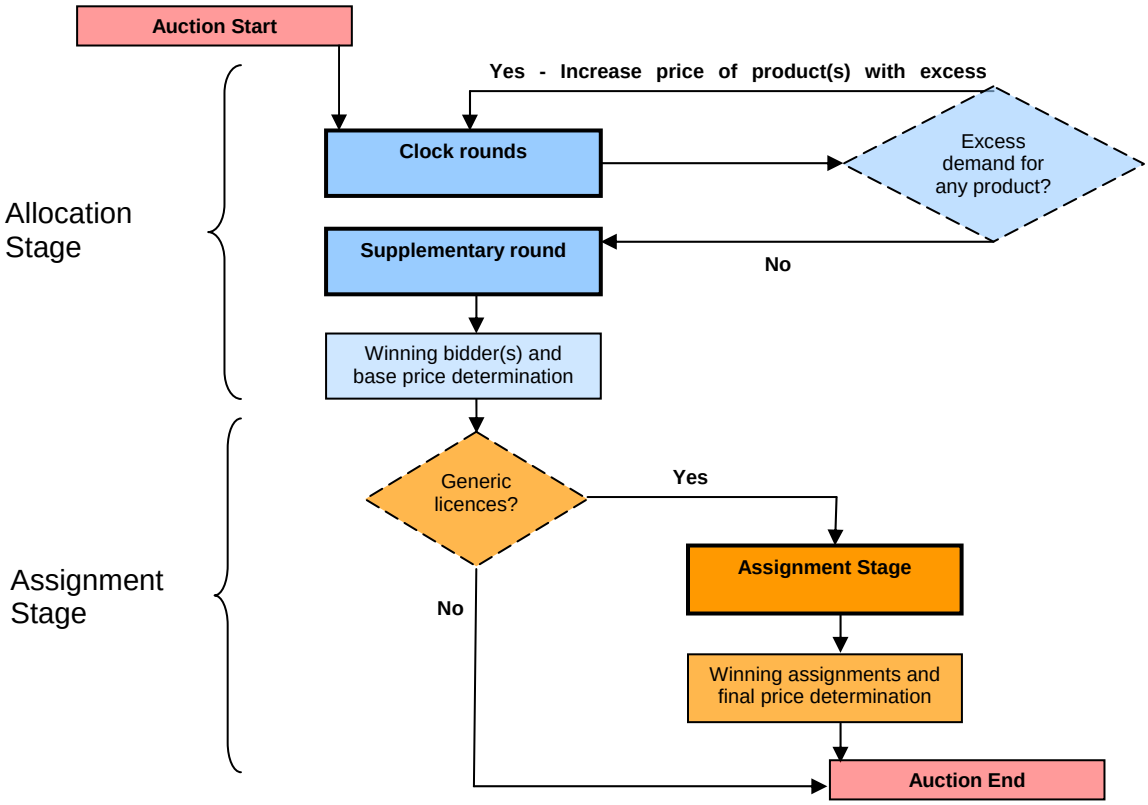
1. Industry Canada is proposing to use a combinatorial clock auction (CCA) format for the 2500 MHz band auction. A CCA is a bidding process that includes a price discovery stage, similar to the SMRA auction format. However, the CCA format also has attributes that remove or reduce some design concerns associated with the SMRA format. In particular, in a CCA, bidders are able to bid for packages of licences instead of individual ones, eliminating the risk that bidders may win some but not all of the licences that they desire. This is particularly important given the regional nature of the licences to be auctioned and the strong and varied complementarities that exist between these licences.

2. Other attributes are being proposed for the 2500 MHz auction, such as the use of generic licences and anonymous bidding. Generic licences are blocks of spectrum that are similar in terms of frequency location in the band, block size, technology and interference constraints and are of comparable value, such that they can be grouped together in a "single category" in each service area for bidding purposes in the auction. The use of generic licences will decrease bidding complexity by reducing the number of combinations on which bids may be placed, and will enhance the possibility of substitution among licences. The use of anonymous bidding will reduce the potential for gaming strategies. Pricing rules and activity rules that encourage truthful bidding throughout the auction process, i.e. bidding in a manner that is consistent with how a bidder truly values the package, will further improve the process.

1. Overview of the CCA

3. A CCA consists of two stages, the allocation stage and the assignment stage (Figure D1). In the allocation stage, the number of spectrum licences that a bidder will win in each service area is determined, as well as the base price to be paid by each winning bidder. Where generic licences are offered, an additional stage is needed to determine the specific frequencies that will be assigned to each winning bidder. This stage is referred to as the assignment stage.

Figure D1 — CCA Process



2. The Allocation Stage

4. The allocation stage of the auction determines the winning bidders and the number of licence blocks that they have won. The allocation stage is divided into two phases: the clock rounds and the supplementary round. All valid bids submitted during both phases of the allocation stage are used to determine the winning packages and base prices.

5. The clock rounds allow for price discovery, helping to reduce a bidder's uncertainty regarding the value of the licences. Bidders are able to respond to the changes in prices accordingly, shifting their bids to licences that continue to be consistent with their business objectives.

6. During each clock round, bidders are able to bid on only one package of licences; however, there may be other packages that they would be interested in winning. The supplementary round provides bidders with an opportunity to improve bids that they placed in the clock rounds and/or to submit bids that they were eligible to bid on but unable to submit in the clock rounds.

7. All bidders are subject to a spectrum aggregation limit of 40 MHz in each service area, with the exception of the Northwest Territories, Yukon and Nunavut, where no aggregation limit applies. The aggregation limit includes both the paired and the unpaired spectrum available for auction, along with any spectrum licence holdings that bidders already have, but excludes the restricted bands at 2570-2575 MHz and 2615-2620 MHz. Therefore, with the exception of the Northwest Territories, Yukon and Nunavut, bidders will not be permitted to bid on additional licences in a service area where their spectrum aggregation limit would be exceeded. The auction software will not allow bidders to submit a bid that exceeds their spectrum aggregation limit.

3. Clock Rounds

8. The allocation stage begins with the clock rounds. Licences or sets of generic licences (substitutable licences of comparable value) are separated into categories and are defined prior to the auction.

9. For the 2500 MHz auction, Industry Canada is proposing two categories of licences, paired and unpaired, with the following blocks available in each service area of the identified regions (Table D1):

Region A (43 service areas)
- blocks C/C’ to G/G’ (five paired generic licences of 10 + 10 MHz);
- block I (one unpaired licence of 25 MHz);

Region B (16 service areas)
- blocks E/E’ to G/G’(three paired generic licences of 10 + 10 MHz);

Region C (2 service areas)
- blocks A/A’ to B/B’ and E/E’ to G/G’ (five paired generic licences of 10 + 10 MHz); and
- block H (one unpaired licence of 25 MHz).

Table D1 — Proposed product configuration for 2500 MHz auction

	Paired							**Unpaired**		**Products**
	A/A’	B/B’	C/C’	D/D’	E/E’	F/F’	G/G’	H	I	
Region A (43 service areas)			**X**	**X**	**X**	**X**	**X**		**X**	86 (2 × 43)
Region B (16 service areas)					**X**	**X**	**X**			16 (1 × 16)
Region C (2 service areas)	**X**	**X**			**X**	**X**	**X**	**X**		4 (2 × 2)
Total										106

Note: Products available for auction are indicated by an “X.”

10. A category in a given service area is referred to as a product. Given the proposal of two categories in Region A (43 service areas), one category in Region B (16 service areas) and two categories in Region C (two service areas), 106 products are proposed for the 2500 MHz auction.

11. The licences are auctioned simultaneously over multiple clock rounds. In each round, bidders indicate the number of licences in each product on which they would like to bid given the prevailing prices. The bid could be for "0," "1" or "2" licences for a product in any category containing multiple generic licences except for products in the Northwest Territories, Yukon and Nunavut, where bids of "3," "4" or "5" licences are also permitted (since these service areas are not subject to the spectrum aggregation limit of 40 MHz in the 2500 MHz band). For a product in an unpaired block category, which contains only one licence, the bid could be for "0" or "1" licence. All of the individual bids placed by a bidder in a given round are considered to be a single package bid, creating an all-or-nothing bid. The price of the package bid is equal to the sum of the bids for individual products, evaluated at the prevailing clock prices.

12. When there is excess demand for a product, its price increases in the next round. There is excess demand for a product when the number of bids exceeds the number of licences available.

13. To remain in the auction, a bidder must submit a valid bid for at least one licence in the first clock round. This bid cannot be withdrawn and will be part of the bids considered in determining the assignment of licences at the end of the allocation stage. All valid bids submitted during the clock rounds are binding and will be considered in determining both winning packages and base prices after the supplementary round ends.

14. In the clock rounds, bidding remains open on all products until there is no excess demand for any of the products.

4. Conclusion of Bidding in the Clock Rounds

15. The clock rounds end when there is a round in which there is no excess demand for any of the products. This round is referred to as the final clock round. The package on which a bidder placed a bid in the final clock round is referred to as its final clock package. At this point, Industry Canada will announce that the clock rounds have ended and that the auction will proceed to the supplementary round (see Section 9).

16. In the final clock round, all licences may be tentatively allocated. Conversely, there may be some unallocated licences in the final clock round due to a licence never having received a bid, and/or bidders reducing or substituting their demands in any clock round, including the final clock round.

17. If all of the licences are tentatively allocated, then the bids placed in the final clock round are the provisional winning bids. If there are still some unallocated licences, a bidder can guarantee that it will win its final clock package by submitting a supplementary bid that increases the dollar amount of its final clock package bid by at least the final clock price of the unallocated licences minus the opening bid prices of the unallocated licences. This guarantee may be compromised if all other supplementary bids do not include, at a minimum, all licences contained in the bidder's final clock package.

5. Information in the Clock Rounds

18. At the beginning of each clock round, bidders have access to sufficient information to permit price discovery and inform their bidding strategy. This information includes their own bids from the previous round and the number of eligibility points that they will have in the next round, as well as the aggregate demand for each product from the previous round and the prices for each product in the next round. It is proposed that bidders would not be informed about the individual bids submitted by other bidders or the remaining eligibility of other bidders.

6. Bid Increments

19. Industry Canada is consulting on the opening bid amounts for each of the licences being auctioned. The opening bid amounts being proposed can be found in Table 5, Section 8.2 of the main document. In the first clock round, the price of each licence is equal to the opening bid price as stated in the final licensing document.

20. During subsequent clock rounds, if there is excess demand for a given product, the prices for the given product increase in the next round. Industry Canada will use activity-based increments as a mechanism to determine the bid increments. The increment for each product is based on the excess demand for the product during the previous round. Products that generate greater excess demand are subject to a larger bid increment than products that generate less excess demand, all other things being equal. Bid increments increase more quickly for products with higher demand, potentially shortening the length of the auction. If there is no excess demand, the price for the product does not increase in the next round.

21. Industry Canada will decide on the bid increments for the 2500 MHz auction. Details concerning the calculation of bid increments will be included in the final licensing framework.

7. Eligibility Points

22. Each of the 318 licences has been assigned a specific number of eligibility points that are related to the population covered by the licence and the estimated value of the spectrum. One eligibility point has been assigned per 50,000 in population for each 20 MHz block of spectrum (either paired or unpaired) in a service area. The eligibility points per spectrum block were then adjusted to reflect the estimated value of the spectrum licences as indicated by the opening bid price base rate. Section 8.3 of the main document lists the proposed eligibility points associated with the paired and unpaired blocks of spectrum being auctioned, as well as the population of their respective service areas.

23. In their applications, applicants must indicate the total number of “points” worth of licences on which they wish to bid. This number defines a bidder’s initial level of eligibility points and hence, the maximum number of licences a bidder is eligible to bid on at the start of the auction. Eligibility points are also used to determine the financial deposit that must be submitted with the application.

24. Bidder eligibility points cannot be increased once the auction has started.

8. Activity Rules in the Clock Rounds

25. Activity rules have been established to encourage truthful bidding throughout the clock rounds. This facilitates the price discovery process, allowing bidders to make changes to their bidding strategies dynamically throughout the auction, in response to increasing prices. The activity rules discourage a bidder from misrepresenting its preferred package, as doing so will limit the bidder's ability to bid on what it really wants later in the auction.

26. The activity rules in the clock rounds consist of an eligibility point rule and a revealed preference rule. The two rules work in combination to accommodate their relative shortcomings. The motivation for using both rules is to ensure that the activity rules do not prohibit bidders from bidding on their most preferred package.

27. Bidders begin each round with a set number of eligibility points and these determine the maximum activity level for that round. For example, a bidder with 100 eligibility points can bid on licences whose total sum of associated points is 100 or less.

28. The eligibility point rule considers the size of the package that the bidder is bidding on, where size is the sum of the eligibility points for each licence in the package. The eligibility point activity rule requires bidders to bid on packages of the same size or smaller as prices rise. When a bidder switches to a package that is smaller than the package it has previously bid on, (that is, with licences that are worth fewer eligibility points), its eligibility is reduced. A round in which a bidder's eligibility is reduced is called an *eligibility-reducing round*. These rounds play a special role in the proposed activity rules of the 2500 MHz auction.

29. In Round 1, a bidder's eligibility is established by its pre-auction financial deposit submitted at the time of application. In subsequent rounds, a bidder's eligibility is determined by its activity level in the previous round. Therefore, if a bidder wishes to maintain the same eligibility level as in the previous round, its activity level must correspond to the same number of eligibility points in each round. A bidder's eligibility points can never increase.

30. If a bidder falls short of the required activity level in any round, its eligibility point level is reduced accordingly, so that the total points worth of licences on which it can bid in the next round are limited in relation to its actual activity level in the current round. For example, consider an eligibility point rule where the activity level is 100%. If a bidder starts the round with 100 eligibility points but bids on licences worth only 80 eligibility points, in the subsequent round that bidder's eligibility will drop to 80 points. The bidder's eligibility remains at 80 points until a round in which it bids on a package worth fewer than 80 points, at which time its eligibility would be reduced accordingly.

31. However, there are some shortcomings with using only the eligibility point rule. Price discovery might be lessened, as there is an incentive for bidders to choose only larger packages when prices are low, rather than a package that may work better for them, so that they maintain a higher number of eligibility points for later in the auction. Furthermore, an eligibility point rule may prevent a bidder from making a desirable substitution to a package that is larger in terms of associated eligibility points, but which has become relatively less expensive. In such a case, the eligibility point rule would prevent the bidder from bidding on its most preferred package.

32. A revealed preference rule would lessen these problems, as it allows bidders to exceed their eligibility points in order to bid on packages that have become comparatively less expensive. Revealed preference refers to the information that a bidder discloses regarding its inclination toward one package versus another. In particular, if a bidder chooses one package over another given a certain price differential between the two packages, then the bidder should always choose the same package given the same price differential. This rule would afford bidders greater flexibility to fully express their preferences in the clock rounds of the auction, ensuring that activity rules do not prevent a bidder from bidding on its most preferred package.

33. For example, suppose that a bidder desires either a smaller package, X, or a larger package, Y, but not both. At the current prices, X is preferred, but in subsequent rounds, the prices for the licences in X increase much faster than the prices for the licences in Y. As a result, the bidder prefers Y to X at the new prices. The revealed preference rule allows the bidder to switch from X to Y because Y is now the better value. In contrast, the eligibility point rule would not allow the switch because Y is larger than X. This example illustrates the problem with using the eligibility point rule exclusively and the advantage of using the eligibility point rule in combination with the revealed preference rule.

Revealed Preference/Eligibility Point Hybrid Activity Rule

34. A revealed preference/eligibility point hybrid activity rule is being proposed for each clock round. It comprises both an eligibility point rule and a revealed preference rule.

35. The proposed eligibility point activity requirement for the 2500 MHz auction is 100%. Specifically, in each round, a bidder is required to bid on licences whose total sum of associated points is equal to 100% of its eligibility points if it wishes to maintain that eligibility level in the subsequent round.

36. The bidder can always place a bid for any package that is within its current eligibility. However, as prices increase, a bidder's eligibility is generally reduced. There may be a point in the auction where the bidder wishes to switch to another package that is larger, but is relatively less expensive. With the revealed preference rule, the bidder can bid on a larger package than would be permitted by the bidder's current eligibility provided that the package satisfies the revealed preference rule with respect to each prior eligibility-reducing round.

37. However, bidding on a larger package will not increase the bidder's eligibility in subsequent rounds. Furthermore, a bidder will be unable to bid on a package with associated eligibility points that exceeds its initial eligibility. For an algebraic description of the revealed preference rule in the clock rounds, see Annex F. For an example of the revealed preference rule in the clock rounds, refer to Annex E.

38. The combination of the two activity rules will allow a bidder to bid on its most preferred package in every clock round. A bidder can continue to bid just as it would under the eligibility point rule. The only difference is that the bidder is given some extra flexibility to bid on a larger package provided that the bid on the larger package satisfies revealed preference, i.e. the bid involves a switch to a package that has become relatively less expensive.

39. As a result, price discovery is improved and the final clock allocation becomes a better predictor of the auction outcome.

9. Supplementary Round

40. The second phase of the allocation stage is the supplementary round. The supplementary round is a single round process, in which bidders have the opportunity to place additional bids for packages, subject to constraints that are based on the bids that they placed in the clock rounds (Section 10 of Annex D). These additional bids could be used to improve bids on packages previously submitted in the clock rounds and/or to submit bids for which they were eligible to bid on, but unable to in the clock rounds.

41. In the clock rounds, a bidder is allowed to bid on only one package of licences per round. As there may be other packages that a bidder would be interested in winning, the supplementary round provides bidders with an opportunity to submit bids on multiple packages that they were willing and eligible to bid on in the clock rounds, but did not necessarily bid on.

42. If there are licences that remain unallocated at the end of the clock rounds, the supplementary round provides bidders with the opportunity to win some or all of the unallocated licences. Bidders also have the opportunity to guarantee that they win their final clock package by submitting a supplementary bid that increases the dollar amount of their final clock package by at least the value of the unallocated licences as evaluated at the final clock prices minus the opening bid prices of the unallocated licences. This guarantee may be compromised if all other supplementary bids do not include at a minimum, all licences contained in the bidder's final clock package.

43. If all of the licences are allocated at the end of the clock stage, then the supplementary round will not affect the final clock allocation. However, the supplementary round provides an opportunity for bidders to be reassured that they themselves were not prepared to pay more than the winning bidders for the licences in question.

10. Activity Rules in the Supplementary Round

44. Activity rules in the supplementary round encourage truthful bidding throughout the allocation stage of the auction, not just in the latter stages. The proposed activity rules ensure that supplementary bids are consistent with bids from the previous rounds.

45. Any bidder that placed at least one valid bid in the clock rounds may submit bids in the supplementary round. A bidder is not required to submit bids in the supplementary round if it does not so desire.

46. All licences are available for bidding in the supplementary round so that bidders can improve on bids submitted during the clock rounds, or submit bids for packages of licences not expressed in the clock rounds.

47. A bidder can only make one supplementary bid for a given package of licences. For the 2500 MHz auction, the limit on the number of different packages for which a bidder will be allowed to place supplementary bids will be no lower than 500 different packages and will be announced after the bidder qualification period.

48. The bid amount for a supplementary bid must be at least the sum of the opening bid prices for all the licences included in the package. Furthermore, if a bidder submitted a bid for a certain package in the clock rounds, the supplementary bid amount must be at least the bidder's highest bid for that package.

Revealed Preference Limit

49. Each bid in the supplementary round must satisfy the following revealed preference limit activity rule.

50. *Revealed Preference Limit*: There is no limit on the supplementary bid amount for the final clock package, which is the package that the bidder bid on in the final clock round. All other supplementary bids must satisfy revealed preference with respect to the final clock round, regardless of whether the supplementary bid package is larger or smaller than the final clock package.

51. In addition, supplementary bids for packages that are larger than the final clock package, as measured by eligibility points, must satisfy revealed preference with respect to each eligibility-reducing round, beginning with the last round in which the bidder had sufficient eligibility to bid on the package. The application of the revealed preference limit to limit bids on packages larger than the final clock package could have the effect of creating a chain of constraints on the dollar amount of a supplementary bid relative to the dollar amount of other supplementary bids submitted by the bidder.

52. There is an exception to the above. A supplementary bid for a package comprised solely of the bidder's final clock package plus some or all of the unallocated licences only needs to satisfy revealed preference with respect to the final clock round. This is to provide bidders with additional flexibility in bidding on licences that are unallocated as of the final clock round. By relaxing the constraints on bids for such packages, the probability of awarding unallocated licences can be improved without reducing the probability that any bidder receives its final clock package.

53. These activity rules guarantee that the final clock allocation will not change if there are no unallocated licences. Each winner is guaranteed to win its final clock package without making any supplementary bids. If there are unallocated licences, each winner is guaranteed to win at least its final clock package by submitting a supplementary bid that increases the dollar amount of its final clock package by at least the value of the unallocated licences as evaluated at the final clock prices minus the opening bid prices of the unallocated licences. This guarantee may be compromised if all other supplementary bids do not include at a minimum, all licences contained in the bidder's final clock package.

54. The revealed preference limit with respect to the final clock package provides the bidder with an incentive to bid on the most preferred package throughout the clock rounds. This is because supplementary bids are limited by bids submitted in the clock rounds. Given that the bidder does not know which round will be the final clock round, the bidder will be motivated to always bid truthfully to improve its chance of winning its most preferred package; otherwise the bidder will be constrained in

the supplementary round.

55. Industry Canada will decide on the process for submitting supplementary bids. Details concerning the process will be included in the final licensing framework.

11. Determining the Winning Packages in the Allocation Stage

56. All valid bids received from bidders in the clock rounds and the supplementary round are considered for the determination of winning packages. In addition, a reserve bid for every licence, at the opening bid price, will be included in the determination of winning bidders at the end of the allocation stage. This process will act as though Industry Canada is a bidder in the auction, placing a bid on every licence at the opening bid price. The inclusion of a reserve bid for every licence is to ensure that the incremental value that a bidder would be prepared to pay for an additional licence is at least the opening bid price of that licence. The reserve bids will not be treated as a package, but rather as having been placed by different bidders so that any number of reserve bids can be selected in the winning combination.

57. An algorithm will be used to identify the highest value combination of valid bids with each bidder winning at most one of its packages. If there is only one combination of bids that meets the criterion, this will be the winning outcome that determines the winning packages and winning bidders.

58. If there is more than one set of valid bids having the equal highest value, the tie will be resolved, first, by minimizing the number of "lost licences," where a lost licence is a licence that was included in the bidder's final clock package but is not included in an alternate package that could be assigned to the bidder. The rationale for selecting the combination of valid bids that minimizes the number of lost licences as the first tie-breaking rule is to select an assignment that is the most similar to the final clock allocation.

59. If there is still a tie, the second tie-breaking rule is to select the combination of valid bids which includes the greatest quantity of spectrum, measured in terms of eligibility points. **Note:** If reserve bids are part of the winning combination, the eligibility points associated with the reserve bids will not count towards the eligibility points of the winning combination. This is to maximize the quantity of spectrum that is allocated. If, subsequently, there is still a tied outcome, the tie will be broken by a pseudo-random number generator built into the auction software.

60. Industry Canada will decide how best to validate the results following the use of the algorithm. Further details will be included in the final licensing framework. This will include details of the algorithm to be used and also how Industry Canada intends to validate the results following the use of this applicable algorithm.

12. Determining the Base Price in the Allocation Stage

61. The base price is the minimum amount that the winning bidder will pay for its generic winning packages. It does not include the additional, incremental amount that the winning bidders may pay to be assigned specific licences in the assignment stage. The base price is determined using all valid bids submitted by all bidders during the allocation stage.

62. Industry Canada is proposing to use a second-price rule to calculate the base prices such that winning bidders, individually and collectively, will pay the lowest amount that they could have bid on their package of licences and still have won. In other words, a winning bidder will pay an amount that is sufficient to ensure that there is no other bidder or group of bidders prepared to pay more for the licences. This amount is typically less than the actual winning bid submitted in the allocation stage, either in the clock rounds or the supplementary round, and must be greater than or equal to the total sum of the opening bid prices for the combination of licences included in their winning package. The benefit of using a second-price rule is that it encourages bidders to bid truthfully, potentially leading to a more efficient outcome.

63. Industry Canada is proposing to apply bidder-optimal core prices and to use the "nearest Vickrey" approach to determine the base prices. Further information on the determination of base prices can be found in Annex G.

13. Information at the End of the Allocation Stage

64. At this point, bidders will know with certainty the number of licences that they have won; however, where there are generic licences, bidders will not necessarily know the specific licences that have been assigned to them.

65. At the end of the allocation stage, each bidder will be informed of its own winning package, along with the base price that it will pay for its package. All bidders will be informed of the number of winning bidders and the number of licences within each product that have been allocated.

14. The Assignment Stage

66. As there are generic licences, the auction will then advance to the assignment stage, where the specific assignment of the generic licences will be determined. Only bidders that have won one or more generic licences during the allocation stage will participate in the assignment stage.

67. The assignment stage will consist of a sequence of assignment rounds. In each assignment round, bidders will be presented with a set of frequency range options available to them for the products being assigned in the round. The options will comprise contiguous frequency ranges of a product, corresponding to the number of licences that the bidder won in the allocation stage and taking into consideration the number of licences allocated to other bidders.

68. Industry Canada is considering how best to structure the assignment rounds to enable winning bidders to bid effectively for their preferred frequency assignments across multiple service areas. Industry Canada is proposing to run product-by-product assignment rounds in descending order of the populations of the associated service areas, conducting a separate round for each product that requires an assignment round. This process would enable bidders to know which specific frequencies they have won in the most populated service areas before they participate in the assignment rounds for the adjacent, less populated service areas. However, two or more products would be aggregated into a single assignment round if all of the following criteria are met: the products are in the same region (i.e. Region A, Region B or Region C); their service areas form a contiguous geographic area; and the winners, and the number of generic licences they have won are sufficiently similar across service areas, according to predefined criteria.

69. Winning bidders will be allowed to submit top-up bids for the specific licence(s) that they most prefer in each service area. This bid reflects the incremental value that the bidders place on winning these particular frequency blocks.

70. Winning bidders do not have to place bids in the assignment stage if they do not have an assignment preference, as they are guaranteed the number of generic licences that they have already been allocated. Each winning bidder has both a right and an obligation to purchase one of the frequency range options presented to it in the assignment round.

71. An algorithm will be used to identify the combination of specific assignments of licences that result in the highest bid amount. In the event of a tied outcome with more than one specific assignment producing the same total value, the tie will be broken by a pseudo-random number generator built into the auction software.

72. Similar to the determination of base prices in the allocation stage, a second-price rule will be used to determine the assignment price to be paid for the assignment of specific licences such that winning bidders will pay an amount sufficient to ensure that there is no other bidder or group of bidders prepared to pay more for the licence(s).

73. The additional amount paid for the assignment of specific licences, known as the assignment price, is calculated for the package of licences assigned in a given assignment round and not for each individual licence. The assignment price for each winning assignment stage bid will be no greater than the corresponding winning bid amount; however, given the pricing rule, it is likely that the assignment price will be less than the winning bid amount and could even equal zero. As there will be multiple assignment rounds, an individual bidder may have multiple assignment prices. The final price paid by a bidder is equal to the bidder's base price plus the sum of all associated assignment prices. If the sum of a bidder's assignment prices is zero, then its final price will be equal to its base price, determined at the end of the allocation stage.

74. Industry Canada is proposing to apply bidder-optimal core prices and to use a "nearest Vickrey" approach to determine assignment prices. Further information on the determination of assignment prices can be found in Annex G.

15. Restrictions in the Assignment Stage

75. Industry Canada is proposing that the assignment options be limited such that if there is more than one unallocated licence in a product, the unallocated licences within the product will be retained as a contiguous block. This proposal may affect the specific frequency options available in the assignment rounds and the possibility of obtaining the same blocks of spectrum across service areas.

76. Industry Canada will decide on the process for submitting assignment bids. Details concerning the process for submitting bids in the assignment stage will be included in the final licensing framework.

16. Information After each Assignment Round

77. After each assignment round, Industry Canada will determine the winning assignment bids and the assignment prices for the given round. Each bidder in the assignment round will be informed of the specific licences it was assigned in the given round and the associated assignment price.

17. Final Price

78. At the end of the assignment stage, Industry Canada will determine the final price to be paid by each winning bidder. The final price to be paid by a winning bidder is equal to the bidder's base price for its generic licences plus the sum of the assignment price(s) associated with the bidder's specific licence assignments.

18. Information at the End of the Auction

79. Industry Canada is proposing to make the following information publicly available following the conclusion of the auction:

- the list of winning bidders, licences won and final prices to be paid;
- the bid submitted by each bidder in every clock round, including the bidder's identity;
- the supplementary bids submitted by each bidder, including the bidder's identity; and
- the assignment bids submitted by each bidder, including the bidder's identity.

Annex E — Example of the Proposed Activity Rules

1. For the purposes of this example, only two products will be considered: product X and product Y. Suppose that product X contains two generic licences in it, X1 and X2, each with an eligibility of 50 points, and that product Y contains two generic licences, Y1 and Y2, each with an eligibility of 25 points.

2. A single bidder, Bidder A, would like to obtain two licences of X1/X2. This package will be denoted as (2, 0). However, if the price of the package with two licences of X1/X2 exceeds the price of a package with one X1/X2 licence and one Y1/Y2 licence by more than $500,000, then Bidder A would prefer a package with one X1/X2 licence and one Y1/Y2 licence, denoted as package (1, 1).

3. Eventually, if the prices become too high, Bidder A will be unable to afford two licences and will need to reduce its demand to one licence. In this case, Bidder A again prefers one licence from X1/X2, but will switch to one Y1/Y2 licence if the price of one X1/X2 licence, denoted as package (1, 0), exceeds the price of one Y1/Y2 licence, denoted as package (0, 1) by more than $500,000.

4. Bidder A's total budget is $2,800,000. If the price of obtaining two licences becomes greater than this, Bidder A must reduce its demand to one licence.

Round 1

5. In Round 1, the opening bid prices are announced; the opening bid price for X1/X2 is $1,000,000 per licence, and for Y1/Y2, it is $600,000 per licence. The price of a package with two X1/X2 licences is $2,000,000, whereas the price of a package with one X1/X2 licence and one Y1/Y2 licence is $1,600,000 (a price difference of $400,000). As Bidder A prefers two X1/X2 licences unless the price difference is greater than $500,000, Bidder A will bid for two X1/X2 licences, package (2, 0):

Product	**Price**	**Bid**	**Eligibility Points**
X1/X2	$1,000,000	2	100
Y1/Y2	$600,000	0	0
Total Package	**$2,000,000**	**(2, 0)**	**100**

Round 2

6. In Round 1, several other bidders shared Bidder A's preference for X1/X2, whereas few bidders bid on Y1/Y2. As a result, the prices in Round 2 are $1,200,000 for X1/X2 and $650,000 for Y1/Y2. The price for a package with two X1/X2 licences is $2,400,000, whereas the price for a package with one X1/X2 licence and one Y1/Y2 licence is $1,850,000 (a price difference of $550,000). As Bidder A prefers one X1/X2 licence and one Y1/Y2 licence when the price difference is greater than $500,000, Bidder A now bids on one licence of each category, package (1, 1), thereby reducing eligibility from 100 to 75 points.

Product	Price	Bid	Eligibility Points
X1/X2	$1,200,000	1	50
Y1/Y2	$650,000	1	25
Total Package	**$1,850,000**	**(1, 1)**	**75**

Round 3

7. In Round 2, the low price of Y1/Y2 caused many bidders to switch demand to that category. As a result, the price of Y1/Y2 increased at a faster rate than the price of X1/X2. The Round 3 prices are $1,250,000 for X1/X2 and $800,000 for Y1/Y2. The price for a package with two X1/X2 licences is $2,500,000, whereas the price for a package with one X1/X2 licence and one Y1/Y2 licence is $2,050,000. This price difference is only $450,000, so Bidder A would prefer to switch back to bidding on two X1/X2 licences, package (2, 0).

8. Using only an eligibility point activity rule, switching back at this point would be impossible because Bidder A would no longer have enough eligibility to bid for a package worth 100 points. This limitation could have the effect of creating a disincentive for Bidder A to bid on its most favourable package in Round 2. Bidder A would have needed to bid on a less profitable package in order to maintain its eligibility for as many rounds of the auction as possible.

9. With a revealed preference/eligibility point hybrid activity rule, however, Bidder A is free to switch back as long as the package satisfies revealed preference with respect to each prior eligibility point reducing round:

Product	Price	Bid	Eligibility Points
X1/X2	$1,250,000	2	100
Y1/Y2	$800,000	0	0
Total Package	**$2,500,000**	**(2, 0)**	**100 (Eligibility is 75)**

10. In order to place a bid with eligibility points greater than its current eligibility (75 points), Bidder A must meet the revealed preference constraint with respect to each prior eligibility-reducing round. In this case, the only eligibility-reducing round is Round 2, where Bidder A decreased its eligibility from 100 points to 75 points. In other words, in order for Bidder A to be able to switch its bid from (1, 1) to (2, 0), the (2, 0) package had to become relatively cheaper than the (1, 1) package. Mathematically, the revealed preference constraint is stated as follows, where R refers to the round:

(Price of (2, 0) in R3) – (Price of (2, 0) in R2) ≤ (Price of (1, 1) in R3) – (Price of (1, 1) in R2)
($2,500,000 – $2,400,000) ≤ ($2,050,000 – $1,850,000)
$100,000 ≤ $200,000

11. The price of package (2, 0) increased by $100,000 from Round 2 to Round 3, whereas the price of package (1, 1) increased by $200,000. Therefore, the constraint is satisfied and Bidder A is permitted to place the bid for the package (2, 0).

Round 4

12. In Round 4, the price of X1/X2 increases to $1,400,000, whereas the price of Y1/Y2 increases to $1,000,000. The price for a package with two X1/X2 licences is $2,800,000, whereas the price for a package with one X1/X2 licence and one Y1/Y2 licence is $2,400,000. This price difference is only $400,000 so Bidder A prefers the same package as in Round 3:

Product	**Price**	**Bid**	**Eligibility Points**
X1/X2	$1,400,000	2	100
Y1/Y2	$1,000,000	0	0
Total Package	**$2,800,000**	**(2, 0)**	**100 (Eligibility is 75)**

13. Bidder A's eligibility is still only equal to 75, so it must meet the revealed preference constraint in order to place this bid. As before, the requirement is that the (2, 0) package needs to be relatively cheaper than the (1, 1) package (as compared to Round 2):

(Price of (2, 0) in R4) – (Price of (2, 0) in R2) ≤ (Price of (1, 1) in R4) – (Price of (1, 1) in R2)
($2,800,000 – $2,400,000) ≤ ($2,400,000 – $1,850,000)
$400,000 ≤ $550,000

14. This constraint continues to be satisfied, that is, the price of the package (2, 0) increased by $400,000 which is no more than the increase in the price of the package (1, 1) from Round 2 to the current round, Round 4, which is $550,000. Bidder A is permitted to place this bid for the package (2, 0).

Round 5

15. In Round 5, the price continues to increase on both products, with X1/X2 at $1,650,000 and Y1/Y2 at $1,200,000. As a result, both two-licence combinations, (2, 0) and (1,1) now exceed Bidder A's budget of $2,800,000. Bidder A must decrease its demand to one licence. As the price of X1/X2 ($1,650,000) is $450,000 greater than the price of Y1/Y2 ($1,200,000), Bidder A places a bid for one X1/X2 licence, package (1, 0), given that Bidder A prefers one X1/X2 licence when the price of one X1/X2 licence exceeds the price of one Y1/Y2 licence by less than $500,000.

16. This bid further reduces Bidder A's eligibility to 50 points. Bidder A is within its eligibility of 75 points, so there are no revealed preference constraints on this bid.

Product	**Price**	**Bid**	**Eligibility Points**
X1/X2	$1,650,000	1	50
Y1/Y2	$1,200,000	0	0
Total Package	**$1,650,000**	**(1, 0)**	**50**

Round 6

17. In Round 6, the price on X1/X2 increases at a faster rate, increasing the price difference to $550,000, which is greater than the $500,000 threshold. Bidder A thus switches its bid to one Y1/Y2 licence, package (0, 1) as Bidder A prefers one Y1/Y2 licence when the price of one X1/X2 licence exceeds the price of one Y1/Y2 licence by more than $500,000. This bid further reduces Bidder A's eligibility to 25 points:

Product	**Price**	**Bid**	**Eligibility Points**
X1/X2	$1,800,000	0	0
Y1/Y2	$1,250,000	1	25
Total Package	**$1,250,000**	**(0, 1)**	**25**

Round 7

18. In Round 7, the price on Y1/Y2 increases at a faster rate than X1/X2. At Round 7 prices, Bidder A prefers one X1/X2 licence, as the price of one X1/X2 licence exceeds the price of one Y1/Y2 licence by less than $500,000, causing Bidder A to again desire to switch:

Product	**Price**	**Bid**	**Eligibility Points**
X1/X2	$1,850,000	1	50
Y1/Y2	$1,400,000	0	0
Total Package	**$1,850,000**	**(1, 0)**	**50 (Eligibility is 25)**

19. In order to place this bid, Bidder A must satisfy revealed preference with respect to every round in which it has reduced its eligibility. Bidder A reduced its eligibility in Round 2, Round 5 and Round 6. It is helpful to summarize the prices and bids placed up to this point:

Product	**Price**						
	Round 1	**Round 2**	**Round 3**	**Round 4**	**Round 5**	**Round 6**	**Round 7**
X1/X2	$1,000,000	$1,200,000	$1,250,000	$1,400,000	$1,650,000	$1,800,000	$1,850,000
Y1/Y2	$600,000	$650,000	$800,000	$1,000,000	$1,200,000	$1,250,000	$1,400,000
Bid	(2, 0)	(1, 1)	(2, 0)	(2, 0)	(1, 0)	(0, 1)	

20. The constraints are as follows:

Constraint with respect to Round 2

(Price of (1, 0) in R7) – (Price of (1, 0) in R2) ≤ (Price of (1, 1) in R7) – (Price of (1, 1) in R2)
($1,850,000 – $1,200,000) ≤ ($3,250,000 – $1,850,000)
$650,000 ≤ $1,400,000

21. The price of the package (1, 0) increased by $650,000 from Round 2 to the current round, Round 7, which is no more than the increase in the price of package (1, 1), $1,400,000, where package (1, 1) is the package that Bidder A bid on in Round 2.

Constraint with respect to Round 5

(Price of (1, 0) in R7) – (Price of (1, 0) in R5) ≤ (Price of (1, 0) in R7) – (Price of (1, 0) in R5)
($1,850,000 – $1,650,000) ≤ ($1,850,000 – $1,650,000)
$200,000 ≤ $200,000

22. The price of the package (1, 0) increased by $200,000 from Round 5 to the current round, Round 7, which is no more than the increase in the price of the package (1, 0), where the package (1, 0) is the package that Bidder A bid on in Round 5.

Constraint with respect to Round 6

(Price of (1, 0) in R7) – (Price of (1, 0) in R6) ≤ (Price of (0, 1) in R7) – (Price of (0, 1) in R6)
($1,850,000 – $1,800,000) ≤ ($1,400,000 – $1,250,000)
$50,000 ≤ $150,000

23. The price of the package (1, 0) increased by $50,000 from Round 6 to the current round, Round 7, which is no more than the increase in the price of the package (0, 1), where the package (0, 1) is the package that Bidder A bid on in Round 6.

24. All three revealed preference constraints are satisfied, so Bidder A is permitted to place this bid.

Supplementary Round

25. In the bidding of Round 7, the aggregate demand drops sufficiently that the clock rounds conclude, making Round 7 the final clock round. Bidder A is in the position of having a final clock package of one X1/X2 licence. Note that if there had only been an eligibility point activity rule in the clock stage, Bidder A would likely have, instead, a final clock package of one Y1/Y2 licence, a less desirable package.

26. With the revealed preference limit, Bidder A is now guaranteed to win its final clock package if all licences are sold in the clock rounds of the auction. If there are some unallocated licences in the final clock round, Bidder A can still guarantee winning its final clock package by submitting a bid, increasing the dollar amount by at least the final clock price of those unallocated licences minus the opening bid prices of the unallocated licences. This guarantee may be compromised if all other supplementary bids do not include at a minimum, all licences contained in the bidder's final clock package.

27. Now, suppose that Bidder A wishes to increase its bid on the package (1, 1) (i.e. one X1/X2 licence and one Y1/Y2 licence) to its maximum budget of $2,800,000. This package is larger than Bidder A's final clock package in terms of eligibility points. Therefore, Bidder A must satisfy revealed preference with respect to its final clock package, as well as with respect to each eligibility-reducing round

beginning with the last round in which Bidder A had sufficient eligibility to bid on the package (1, 1), i.e. beginning with Round 5. Therefore, Bidder A's supplementary bid for the package (1, 1) must meet the revealed preference conditions with respect to Round 5, Round 6 and Round 7.

28. The revealed preference constraints are as follows, starting with the final clock package constraint:

Revealed preference with respect to the final clock package

(Sup Bid on (1, 1)) – (Price of (1, 1) in R7) ≤ (Highest Bid on (1, 0)) – (Price of (1, 0) in R7)
(Sup Bid on (1, 1)) ≤ (Highest Bid on (1, 0)) + (Price of (1, 1) in R7) – (Price of (1, 0) in R7)
(Sup Bid on (1, 1)) ≤ $1,850,000 + $3,250,000 – $1,850,000
(Sup Bid on (1, 1)) ≤ $3,250,000

Revealed preference with respect to Round 6

(Sup Bid on (1, 1)) – (Price of (1, 1) in R6) ≤ (Highest Bid on (0, 1)) – (Price of (0, 1) in R6)
(Sup Bid on (1, 1)) ≤ (Highest Bid on (0, 1)) + (Price of (1, 1) in R6) – (Price of (0, 1) in R6)
(Sup Bid on (1, 1)) ≤ $1,250,000 + $3,050,000 – $1,250,000
(Sup Bid on (1, 1)) ≤ $3,050,000

Revealed preference with respect to Round 5

(Sup Bid on (1, 1)) – (Price of (1, 1) in R5) ≤ (Highest Bid on (1, 0)) – (Price of (1, 0) in R5)
(Sup Bid on (1, 1)) ≤ (Highest Bid on (1, 0)) + (Price of (1, 1) in R5) – (Price of (1, 0) in R5)
(Sup Bid on (1, 1)) ≤ $1,850,000 + $2,850,000 – $1,650,000
(Sup Bid on (1, 1)) ≤ $3,050,000

29. Thus, Bidder A's supplementary bid on the (1, 1) package is most constrained by the revealed preference constraints relative to rounds 5 and 6. In this case, the constraining amount is $3,050,000, allowing Bidder A to place the $2,800,000 bid.

Revealed Preference Constraints for the (0, 1) Package

30. The (0, 1) package is also subject to revealed preference constraints. These are based on the packages in each eligibility-reducing round beginning with the last round in which Bidder A had sufficient eligibility to bid on the (0, 1) package, as well as in the final clock round. In this example, the last round in which Bidder A had sufficient eligibility to bid on the (0, 1) package was Round 7, which is also the final clock round. So, the only constraint on the bid for the (0, 1) package is:

(Sup Bid on (0, 1)) – (Price of (0, 1) in R7) ≤ (Highest Bid on (1, 0)) – (Price of (1, 0) in R7)
(Sup Bid on (0, 1)) ≤ (Highest Bid on (1, 0)) + (Price of (0, 1) in R7) – (Price of (1, 0) in R7)
(Sup Bid on (0, 1)) ≤ $1,850,000 + ($1,400,000 – $1,850,000)
(Sup Bid on (0, 1)) ≤ $1,400,000

31. So, without any supplementary bids placed on the final clock package, the highest supplementary bid that Bidder A can place on the (0, 1) package is $1,400,000 because Bidder A bid $1,850,000 for (1, 0) in the final clock round. However, if for example Bidder A places a supplementary bid on its final clock package of $2,300,000, then Bidder A may also place a supplementary bid on the (0, 1) package of up to $1,850,000.

Annex F — Algebraic Description of Proposed Revealed Preference Activity Rules in the Clock Rounds and the Supplementary Round

Revealed Preference in the Clock Rounds

1. The activity rule in the clock rounds allows for a bidder to always be able to place a bid on any package that is within the bidder's current eligibility. As well, in any round, the bidder can bid on a larger package than would be permitted by the bidder's current eligibility provided that the package satisfies revealed preference with respect to each prior eligibility-reducing round. However, bidding on a larger package does not increase the bidder's eligibility in subsequent rounds. A bidder will never be allowed to place a bid on a package that exceeds its initial eligibility.

2. A product refers to a particular category in a given service area. Industry Canada is proposing two categories of licences, paired and unpaired, with two categories in Region A (43 service areas), one category in Region B (16 service areas) and two categories in Region C (two service areas). In total 106 products will be available in the 2500 MHz auction.

Region A — 86 products
- blocks C/C' to G/G' (five generic licences of 10 + 10 MHz);
- block I (one licence of 25 MHz);

Region B — 16 products
- blocks E/E' to G/G'(three generic licences of 10 + 10 MHz);

Region C — 4 products
- blocks A/A' to B/B' and E/E' to G/G' (five generic licences of 10 + 10 MHz); and
- block H (one licence of 25 MHz).

3. A package in clock round t satisfies revealed preference with respect to an earlier clock round s for a given bidder if the bidder's package Q_t has become relatively less expensive than the package on which the bidder bid in clock round s, Q_s, as the clock prices have progressed from the clock prices in clock round s to the clock prices in clock round t. Algebraically, the revealed preference constraint is the condition that:

$$\sum_{i=1}^{m}\left(Q_{t,i}\times\left(P_{t,i}-P_{s,i}\right)\right)\leq\sum_{i=1}^{m}\left(Q_{s,i}\times\left(P_{t,i}-P_{s,i}\right)\right)$$

where:

"i" indexes the products;
"m" is the number of products, where the maximum number of products proposed for the 2500 MHz auction is 106;
$Q_{t,i}$ is the quantity of the i^{th} product bid in clock round t;

$Q_{s,i}$ is the quantity of the i^{th} product bid in clock round s;
$P_{t,i}$ is the clock price of the i^{th} product bid in clock round t; and
$P_{s,i}$ is the clock price of the i^{th} product bid in clock round s.

4. A bidder's package, Q_t, of clock round t is consistent with revealed preference in the clock rounds if it satisfies the revealed preference constraint with respect to all eligibility-reducing rounds prior to clock round t for the given bidder.

Revealed Preference in the Supplementary Round

5. There is no limit on the supplementary bid amount for the final clock package. The activity rule in the supplementary round states that all supplementary bids must satisfy the revealed preference limit with respect to the final clock round regardless of whether the supplementary bid package is larger or smaller than the final clock package.

6. In addition, supplementary bids on packages that are larger than the final clock package must satisfy the revealed preference limit with respect to each eligibility-reducing round, beginning with the last round in which the bidder had sufficient eligibility to bid on the package, unless the increase in package size is due to placing bids on unallocated licences, where unallocated licences are those licences where supply is greater than aggregate demand in the final clock round.

7. Let Q denote the package on which the bidder wishes to place a supplementary bid. Let Q_s denote the package on which the bidder bid in clock round s and let B_s denote the bidder's highest dollar amount bid in the auction for package Q_s, whether the highest dollar amount was placed in a clock round or a supplementary round.

8. A supplementary bid, B, for the package Q satisfies the revealed preference limit with respect to a clock round s, if B is less than or equal to the highest dollar amount bid on the package bid in clock rounds, that is, B_s plus the price difference in the respective packages, Q and Q_s, using the clock prices of clock round s. Algebraically, the revealed preference limit is the condition that:

$$B \leq B_s + \sum_{i=1}^{m} \left(P_{s,i} \times \left(Q_i - Q_{s,i} \right) \right)$$

where:

"i" indexes the products;
"m" is the number of products;
Q_i is the quantity of the i^{th} product in the package Q;
$Q_{s,i}$ is the quantity of the i^{th} product in the package Q_s of clock round s;
$P_{s,i}$ is the clock price of the i^{th} product in clock round s;
B is the dollar amount of the supplementary bid for the package Q; and
B_s is the highest dollar amount bid on package Q_s either in a clock round or in the supplementary round.

9. In addition, for supplementary bid package Q, let $T(Q)$ denote the last clock round in which the bidder's eligibility was at least the number of eligibility points associated with the package Q.

10. A given bidder's collection of supplementary bids is consistent with the revealed preference limit if the supplementary bid for the package Q, with a dollar amount, B, for the given bidder satisfies the following conditions:

(a) for a package Q, comprising the entire final clock package plus any or all licences that are provisionally unallocated to any bidder in the final clock round, the dollar amount, B, must satisfy the revealed preference limit, as specified in paragraph 8, with respect to the final clock round only; note that this places no constraint on the dollar amount of a supplementary bid for the final clock package;

(b) for any package Q, comprising other than the entire final clock package plus any or all licences that are provisionally unallocated to any bidder in the final clock round, the dollar amount B must satisfy the revealed preference limit, as specified in paragraph 8 with respect to the final clock round and with respect to every eligibility-reducing round equal to $T(Q)$ or later.

11. Note that, in the application of paragraph 8, the package Q_s may itself be subject to a revealed preference limit with respect to another package. Thus, the rule may have the effect of creating a chain of constraints on the dollar amount of a supplementary bid for a package Q relative to the dollar amounts of other clock bids or supplementary bids.

12. See Annex E for an example of the revealed preference activity rules.

Annex G — Proposed Pricing Rule

1. Prices are determined at two points in the auction: first at the end of the allocation stage to determine the base prices, which are the minimum that winning bidders will pay for their winning packages; and second, at the end of the assignment stage to determine the incremental payments for specific licences, known as assignment prices. Industry Canada is proposing to use a second-price rule to determine the prices to be paid by winning bidders. More specifically, Industry Canada proposes to apply bidder-optimal core prices and to use the "nearest Vickrey' approach in determining both the base prices and the assignment prices. The final price paid by a winning bidder is the sum of the base price and the assignment price(s).

Base Prices

2. Each winning allocation stage bid has an associated price for the package of licences contained within the bid, known as the base price. A separate base price is determined for each winning bidder.

3. Industry Canada is proposing the use of a second-price rule to calculate base prices such that the base price for a winning bidder will be at least the opening bid price, but no higher than the actual amount bid. Second prices are often referred to as Vickrey prices and represent the opportunity cost of the bidder winning the package.

4. The Vickrey price for each winning Bidder J is calculated as follows. First, from the value of the winning combination of packages (see paragraph 57, Annex D), subtract Bidder J's winning bid (value A). Next, recalculate the winning combination of packages in the hypothetical situation where all Bidder J's bids are excluded, as if Bidder J had not participated in the auction (value B). The Vickrey price for Bidder J is defined as the value of the winning combination of packages with all Bidder J's bids excluded (value B) minus the sum of the winning allocation stage bids for all bidders other than Bidder J (value A), that is, $B - A$.

5. An extra payment beyond the Vickrey prices is sometimes required as a result of complementarities. In the event that an extra payment is required, the payment to be made will be adjusted proportionate to the size of the bidder's package as measured by the bidder's winning package evaluated at the opening bid prices.

6. The set of base prices for the winning allocation stage bids must satisfy the following conditions:

(a) **First condition:** The base price for a winning allocation stage bid must be greater than or equal to the opening bid prices for the licences included in the package associated with the winning bid, but not more than the dollar amount of the winning bids.

(b) **Second condition:** The set of base prices must be sufficiently high that there is no alternative bidder, or group of bidders prepared to pay more than any winning bidder or group of winning bidders. If there is only one set of base prices that meet the first and second conditions, this determines the base prices for the allocation stage.

(c) **Third condition:** If there are many sets of base prices that fulfil the first and second condition, the set(s) of base prices that minimize(s) the sum of base prices across winning bidders is selected. If there is only one set of base prices satisfying these three conditions, this determines the base prices for the allocation stage.

(d) **Fourth condition:** If there is more than one set of base prices that satisfy the first three conditions, the set of base prices that minimize the weighted sum of squares of differences between the base prices and the Vickrey prices will be selected. The weighting is relative to the price of the bidder's package evaluated at the opening prices. This approach for selecting among sets of base prices that minimize the sum of base prices across winning bidders is referred to as the "nearest Vickrey" approach.

7. These conditions characterize a unique set of base prices such that each winning bidder pays no more than the dollar amount of its winning bid and pays at least the aggregate value of the opening bid prices for the package of licences.

8. A software algorithm will be used to determine the set of base prices that meets the conditions outlined above.

9. The following is an example of how base prices are calculated. This example is based on the 2012 *Spectrum Auction Design* paper by P. Cramton (http://www.cramton.umd.edu/papers2005-2009/cramton-spectrum-auction-design.pdf).

10. Suppose that there are five bidders, 1, 2, 3, 4, 5, bidding for two licences, A and B. The following bids are submitted ("b" designates the bidder):

$b_1\{A\} = \$28$

$b_2\{B\} = \$20$

$b_3\{AB\} = \$32$

$b_4\{A\} = \$14$

$b_5\{B\} = \$12$

11. The bids of the five bidders are represented in Figure G1.

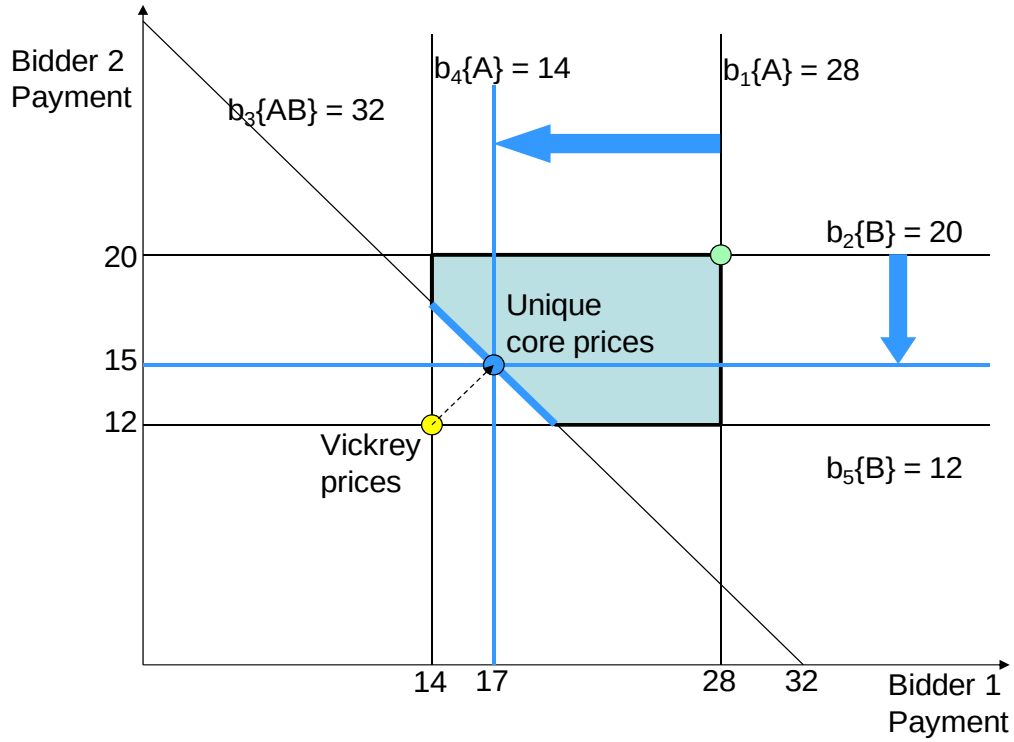
12. In this example, the highest value combination of bids would assign licence A to Bidder 1 and licence B to Bidder 2, generating $48 in value. There is no other assignment of the licences that yields a higher value.

13. To calculate the Vickrey price for Bidder 1, Bidder 1's bid is removed. The best assignment without Bidder 1 assigns licence A to Bidder 4 at $14 and licence B to Bidder 2 at $20, resulting in $34. The sum of the winning bids for all bidders other than Bidder 1 is $20 ($48 – $28). Thus, the Vickrey price for Bidder 1 is $14 ($34 – $20). Similarly, if Bidder 2's bid is removed, then the best assignment is to assign licence A to Bidder 1 and licence B to Bidder 5, resulting in a value of $40. The sum of the winning bids for all bidders other than Bidder 2 is $28 ($48 – $20). Thus, the Vickrey price for Bidder 2 winning B is $12 ($40 – $28).

14. Hence, the Vickrey outcome is for Bidder 1 to pay $14 for licence A and for Bidder 2 to pay $12 for licence B. Total revenues with these payments are $14 + $12 = $26. As shown in Figure G1, this means that Bidder 1 can reduce its bid to $14 before being displaced by Bidder 4. Similarly, Bidder 2 can reduce its bid to $12 before being displaced by Bidder 5.

15. The problem is that these payments sum to $26, which less than Bidder 3's bid of $32 for both licences A and B. Therefore, Bidder 1 and Bidder 2 must split an additional payment of $6 ($32 – $26), to ensure that their combined payment is greater than that of Bidder 3, satisfying the condition that no other bidder or group of bidders were prepared to pay more for the licences in question. That is, Bidder 1 and Bidder 2 must pay, collectively, at least $32.

Figure G1 — Example of Calculating Base Prices



16. If the opening bid prices for licence A and licence B are the same amount, the additional payment of $6 is split equally between the two bidders. Each bidder is therefore paying an additional $3 above its Vickrey price, with Bidder 1 paying $17 ($14 + $3) and Bidder 2 paying $15 ($12 + $3), as shown in Figure G1. However, if the opening bid prices for the two licences are different amounts, the two bidders must split the extra payment proportionately, in reference to the opening bid amounts (the fourth condition). For example, if the opening bid price for licence A is $8 and the opening bid price for licence B is $4, then the opening bid price of Bidder 1's package is twice as large as that of Bidder 2. Therefore, Bidder 1 would pay twice as much as Bidder 2 of the extra payment, with Bidder 1 paying an additional $4, for a total payment of $18 and Bidder 2 paying an additional $2, for a final payment of $14.

Assignment Prices

17. The assignment stage will consist of a sequence of assignment rounds. Industry Canada proposes to run product-by-product assignment rounds, in descending order of the populations of the associated service areas, conducting a separate assignment round for each product, where necessary. This process would enable bidders to know which specific frequencies they have won in the most populated service areas before they participate in the assignment rounds for the adjacent, less populated service areas. However, two or more products would be aggregated into a single assignment round if all of the following criteria are met: the products are in the same region (i.e. Region A, Region B or Region C); their service areas form a contiguous geographic area; and the winners, and the number of generic licences they have won are sufficiently similar across service areas, according to predefined criteria.

18. The assignment bid is a package bid for the specific frequency locations of all licences being assigned within the round. The assignment prices will be determined from the set of assignment stage bids for the products being assigned in that round.

19. Industry Canada is proposing to use a second-price rule to calculate assignment prices. The assignment price is attributable to the entire collection of licences assigned in a given assignment round and not to individual licences that comprise the package.

20. For the purpose of calculating assignment prices, the Vickrey price for each winning Bidder J is calculated as follows. First, from the value of the winning combination of assignment bids (see paragraph 71, Annex D), subtract Bidder J's winning bid (value A). Next, recalculate the winning combination of assignment bids in the hypothetical situation where all Bidder J's assignment bids are equal to zero, as if Bidder J did not have a preference for any of the assignment options it was presented in the round (value B). The Vickrey price for Bidder J is defined as the value of the winning combination of assignment bids with all Bidder J's bids set to equal zero (value B) minus the sum of the winning assignment bids for all bidders other than Bidder J (value A), that is, B − A.

21. The assignment stage prices for each winning assignment bid in a given assignment round must satisfy the following conditions:

(a) **First condition:** The assignment prices must be positive or zero and not more than the dollar amount of the winning assignment stage bid.

(b) **Second condition:** The set of assignment prices must be sufficiently high that there is no alternative combination of valid assignment bids that sum to more than the winning assignment bids. If there is only one set of assignment prices that satisfies the first two conditions, this determines the assignment prices.

(c) **Third condition:** If there are many sets of assignment prices that fulfil the first and second conditions, the set(s) of assignment prices that minimize(s) the sum of assignment prices across winning assignment stage bids is selected. If there is only one set of assignment prices that satisfies these three conditions, this determines the assignment prices.

(d) **Fourth condition:** If there are many sets of assignment prices that satisfy the first three conditions, the set of assignment prices that minimizes the weighted sum of squares of differences between the assignment prices and the Vickrey prices will be selected. The weighting is relative to the price of the bidder's package evaluated at the opening prices. This approach for selecting among sets of assignment prices that minimize the sum of assignment prices across winning assignment bids is referred to as the "nearest Vickrey" approach.

22. A software algorithm will be used to determine the set of assignment prices that meet the conditions outlined above.

Annex H — Glossary

Term	Definition
Activity rule	A rule that limits what bids a bidder can make in subsequent rounds of a multiple round auction. The activity rules are intended to avoid bid sniping and to encourage truthful bidding.
Aggregate demand	The total number of bids for a product.
Allocation stage	A stage of the auction in which the number of spectrum licences that a bidder wins in each service area, as well as the base price for these licences is determined.
Assignment price	The price for specific licences that a winning bidder has won in the assignment stage.
Assignment stage	A stage of the auction in which bidders that have won generic licences are assigned specific licences.
Base price	The price for a package of licences that a winning bidder has won in the allocation stage. The base price is calculated at the end of the allocation stage. It does not include the assignment price.
Bid amount	The price that a bidder bids for a particular licence or package of licences.
Bid shading	The strategy of bidding below one's valuation, typically as a way to improve profits in first-price auctions.
Bid sniping	The tendency for a bidder to wait until the last possible opportunity to place a serious bid. Auctions often have activity rules in place to prevent bid sniping.
Category	A spectrum block or group of spectrum blocks with similar properties. A category can include a single licence for each service area or a group of generic licences for each service area.
Clock price	A price for a product in a clock round.
Clock round	A round in the allocation stage of the auction in which bidders can submit a bid for a single package of licences in response to prices announced by Industry Canada.
Complementary goods	X and Y are complementary goods if the demand for X decreases when the price of Y increases. Complementary goods are typically purchased together and are more valuable together than they are apart (the sum is greater than the parts). The complementarity may be strong or weak. The level of complementarity between goods is important in designing an auction.
Demand reduction	A situation where a bidder reduces its demand to keep prices low.
Efficient assignment/outcome	The assignment of the licences to the bidders that value them the most.

Term	Definition
Eligibility-based activity rule	An activity rule based on eligibility points where a bidder cannot bid for a package of licences for which the sum of the eligibility points for these licences exceeds the bidder's current eligibility points. A bidder's initial level of eligibility is based on its pre-auction financial deposit. In subsequent rounds, its number of eligibility points is set by the bids placed in the previous round (and the activity percentage for that round).
Eligibility points	Each licence is assigned a certain number of eligibility points that are related to its population, bandwidth and estimated value. They are first used in the determination of the pre-auction deposit, and then for the eligibility-based activity rule. A bidder's initial eligibility points define the upper limit of licences for which the bidder can bid (based on the sum of bidding points associated with the licences in its bid).
Eligibility-reducing round	A clock round in which the number of eligibility points associated with a bid is less than the bidder's eligibility. In subsequent rounds, the bidder's eligibility is reduced.
Excess demand	The extent to which the aggregate demand exceeds the number of licences available.
Exposure risk	The risk of winning only some licences in a collection of licences that a bidder wants. This may occur when bids are treated individually instead of being treated as a package.
Final clock package	The package that the bidder bid on in the final clock round.
First-price rule	A pricing rule which requires winning bidders to pay the full amount of their winning bid.
Gaming or game playing	Bidding in an auction in a way that does not truthfully represent the bidder's true valuation of the spectrum, but may increase the bidder's chances of a favourable outcome. Examples of gaming include demand reduction, parking and tacit collusion.
Generic licences	Licences that are similar enough and of comparable value such that they can be offered together in a single category. Bidders may then express a demand for a number of generic licences at a particular price.
Lost licence	As part of a tie resolution mechanism in the allocation stage, a licence that was included in a bidder's final clock package, but that is not included in an alternate package that could be assigned to the bidder.
Opening bid prices	Opening bid prices are the starting prices for the spectrum licences in the auction, and the minimum that Industry Canada will accept for each licence.
Package bid	A package bid is a bid on a set of licences.
Parking	A strategy in which bidders bid on licences that they do not expect to win simply to maintain greater eligibility for later in the auction.

Term	Definition
Pre-auction financial deposit	A pre-auction financial deposit that Industry Canada requires all bidders to submit with their application to participate in the auction. The deposits are based on the licences on which the applicant wishes to be eligible to bid.
Price discovery	A feature of multiple-round auctions in which information about bidder demands and prices is reported to bidders, giving them the opportunity to adjust subsequent bids based on the information.
Pricing rule	The rule that determines the price paid by the bidder.
Product	A category in a given service area.
Revealed preference activity rule	An activity rule based on prices and bidding activity in previous rounds. The rule allows a bidder to shift toward larger packages, in terms of associated eligibility points that have become relatively less expensive.
Second-price rule	A pricing rule that requires winning bidders to pay an amount that is sufficient to ensure that no other bidder, or group of bidders, was prepared to pay more than the winning bidders for the licence(s) in question.
Service area	Industry Canada has established four tiers of service areas, which it uses for competitive licensing. These areas cover the entire geography of Canada and 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. See Service Areas for Competitive Licensing at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01627.html. For the 2500 MHz auction, licences will be auctioned using Tier 3 service areas (58 service areas), except in the Northwest Territories, Yukon and Nunavut, where three Tier 4 service areas will be used.
Specific licence	Licences that are treated individually, each with its own characteristics. Specific licences are appropriate when each licence has unique characteristics that determine its value.
Substitute goods	X and Y are substitute goods if the demand for X increases when the price of Y increases. Consequently, a bidder may wish to switch its bid from the more expensive good (Y) to the less expensive good (X) when the price of Y increases, as the two goods are deemed similar enough.
Substitution	The act of shifting demands across products or packages in response to price changes, increasing the demand of the product that has become relatively more attractive as a result of the price change.
Supplementary bid	A bid placed for a single package in the supplementary round.
Supplementary round	A single round that occurs after the clock rounds end in a combinatorial clock auction (CCA). Bidders are able to bid on multiple packages in the

Term	Definition
	supplementary round, either submitting bids for new packages or improving their bids for packages that they bid for in the clock rounds.
Tacit collusion	Cooperative behaviour among bidders whereby they do not engage in any explicit communication and do not enter into any explicit agreement, but in some manner attempt to coordinate on a better joint outcome than would be attained by purely competitive bidders.
Valid bid	A bid that is accepted by the auction system.
Winner determination	The process of determining winning bids and prices to be paid using an algorithm.

Annex I — Summary of the Proposals for Consideration

Proposals presented on a licensing framework for Broadband Radio Service (BRS) in the 2500 MHz band.

Proposals related to the service area for Lloydminster (Alberta/Saskatchewan)

3-1 Industry Canada is seeking comments on whether or not the service area boundary for licences in the 2500 MHz band should deviate from the provincial boundary around the City of Lloydminster, (Alberta/Saskatchewan).

Proposals related to the auction format and rules

4-1 Industry Canada is seeking comments on its proposal to use the CCA format, as well as the general attributes outlined above, including:

(a) the products available for auction, including the categorization of generic licences;
(b) the use of product-specific stages in the assignment round, ordered by population;
(c) the combined eligibility point and revealed preference activity rule in the clock rounds, and the revealed preference limit in the supplementary round;
(d) the use of a second-price rule;
(e) the information to be disclosed during, and post-auction;
(f) the guarantee of contiguity for generic licences won within a product; and
(g) the contiguity of blocks retained by Industry Canada.

Proposals related to bidder participation

5-1 Industry Canada is seeking comments on its proposed changes to the definition and rules related to associated entities. Specifically, comments are sought on:

(a) the types of agreements that should be captured under the definition of associated entities;
(b) the level of information to be disclosed to the public prior to the auction;
(c) the provision that typical roaming and tower sharing be specifically excluded from the revised definition of associated entities and whether other types of agreements such as the purchase of backhaul capacity should be deemed excluded;
(d) the proposal that entities that are deemed associated entities may apply to be treated as separate entities for participation in the auction;
(e) the proposal that associated entities may request to have the spectrum aggregation limit apply to them separately, based on an analysis of their association and of whether they intend to compete in the same licence service area;
(f) the criteria to be considered in determining whether the entities are competing; and
(g) the proposal that no changes be made to the affiliated entities rule.

5-2 Industry Canada is seeking comments on the rules prohibiting collusion that would apply to bidders in the 2500 MHz auction.

Proposals related to the conditions of licence for spectrum licences to be auctioned in the 2500 MHz band

6-1 Industry Canada is seeking comments on its proposal to issue spectrum licences in the 2500 MHz band with a 20-year licence term.

6-2 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the spectrum aggregation limit.

6-3 Industry Canada is seeking comments on the proposed wording of the condition of licence related to transferability and divisibility.

6-4 Industry Canada is seeking comments on the proposed wording of the condition of licence related to eligibility criteria.

6-5 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the treatment of existing spectrum users.

6-6 Industry Canada is seeking comments on the proposed wording of the condition of licence related to radio station installations.

6-7 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the provision of technical information.

6-8 Industry Canada is seeking comments on the proposed wording of the condition of licence related to compliance with legislation, regulation and other obligations.

6-9 Industry Canada is seeking comments on the proposed wording of the condition of licence related to technical considerations, and international and domestic coordination.

6-10 Industry Canada is seeking comments on the proposed wording of the condition of licence related to lawful intercept requirements.

6-11 Industry Canada is seeking comments on the proposed condition of licence related to the research and development requirement.

6-12 Industry Canada is seeking comments on the application of the general deployment condition of licence as stated above. Specifically, comments are sought on:

(a) the population coverage, as specified in Table 4, for each licence service area; and
(b) the time frame proposed.

6-13 Industry Canada is seeking comments only on the proposed wording of the condition of licence related to mandatory antenna tower and site sharing.

6-14 Industry Canada is seeking comments only on the proposed wording of the condition of licence related to mandatory roaming.

6-15 Industry Canada is seeking comments on the proposed condition of licence related to the requirement for annual reporting.

Proposals related to the conditions of licence for existing BRS licensees in the 2500 MHz band

7-1 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the treatment of existing spectrum users for the existing BRS licensees.

7-2 Industry Canada is seeking comments on the proposed wording of the condition of licence related to the spectrum aggregation limit for existing BRS licensees.

7-3 Industry Canada is seeking comments on the proposed wording of the condition of licence related to transferability and divisibility for existing BRS licensees.

7-4 Industry Canada is seeking comments on the proposed wording of the condition of licence related to eligibility criteria for existing BRS licensees.

7-5 Industry Canada is seeking comments on the proposed condition of licence related to technical considerations, and international and domestic coordination for existing BRS licensees.

7-6 Industry Canada is seeking comments on the proposed wording of the condition of licence related to lawful intercept requirements for existing BRS licensees.

Proposals related to the auction process

8-1 Industry Canada is seeking comments on the proposed opening bids as presented in Table 5.

8-2 Industry Canada is seeking comments on the proposed eligibility points for spectrum licences in the 2500 MHz band, as outlined in Table 6.

8-3 Industry Canada is seeking comments on the proposed pre-auction deposits as outlined above.

Proposals related to the licence renewal process

11-1 Industry Canada is seeking comments on the proposed renewal process for spectrum licences in the 2500 MHz band.