

THE CONSUMER INTEREST IN SPECTRUM AUCTIONS

Written by
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Researchers
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Table of Contents

Executive Summary	6
Introduction	6
What is spectrum and what is its importance	7
Spectrum Management	9
Canadian radio spectrum management	11
Early Auction Experience - United States of America.....	15
International Developments in Spectrum Auctions	26
Industry Canada Consultations 700 MHz band and 2500 Band.....	27
Postscript	31
Conclusion	32
APPENDIX 1	33
APPENDIX 11	46
Appendix 111	59
REFERENCES.....	79

Executive Summary

This report contains a review of the process of allocating wireless radio spectrum in Canada from the administrative comparative (“beauty contest”) model to the development and refinement of spectrum auctions. It provides the rationale for the migration to spectrum auctions and outlines some of the international experience as well as the efforts to use the format of auctions to address competitive, and public interest concerns associated with the use of spectrum. Finally, it touches upon the most recent consultation processes implemented by Industry Canada to provide for the auction of 700 MHz spectrum in 2013 and 2500 MHz spectrum in 2014.

In relation to the complaints concerning special attempts to encourage competition, it is the view of the author of this report that while the auction bidding process may select that player who values the spectrum the most, there is no assurance that the use or non-use of that spectrum may further the existence of a competitive wireless mobile interest or the public interest, apart from enriching the Consolidated Revenue Fund. Set-asides and caps are necessary to nurture that market as well as provision where possible for public uses from safety and emergency use to “commons” use that encourages research and innovation. The report concludes that the initial pessimism about spectrum auctions from public interest advocates may be dissipated by continued efforts to address market flaws and public opportunities through the auction process.

Introduction

This report is a product derived from the research and submissions of the Public Interest Advocacy Centre (PIAC) during 2011-2012 periods with the objective of achieving optimal results for ordinary Canadian consumers associated with spectrum auctions. This work enabled PIAC to provide input into both the Industry Canada consultation on the design of the auction of spectrum in the 700 MHz band and comments associated with the consultation process for the 2500-2690 MHz band. As well, PIAC reviewed the proposal and submissions concerning the proposed implementation of a combinatorial clock auction process and provided a supporting submission. All of these documents are on the public record and have been included as appendices to this report, as it was the funding for this report that enabled their submission for consideration in the various consultative processes. We will not recapitulate all of the contents of the appendices, but will attempt to distill from that work the central elements of the consumer concerns with spectrum auctions.

What is spectrum and what is its importance

Some basic understanding of the science behind the use of wireless spectrum may be helpful. Radiation is energy in the form of waves or particles that travel through some form of matter or through space. Light and heat, for example, are forms of radiation. The radiation that is important for the purposes of this report involves electromagnetic radiation that is the product of combined and reinforcing electric and magnetic fields. These fields produce an electromagnetic ripple that propagates in a wavelike fashion through space. Electromagnetic radiation is made when an atom absorbs energy. The absorbed energy causes one or more electrons to change their locale within the atom. When the electron returns to its original position, an electromagnetic wave is produced. Depending on the kind of atom and the amount of energy, this electromagnetic radiation can take the form of heat, light, ultraviolet, or other electromagnetic waves.¹

A common way to cause atoms to absorb energy is through the bombardment of electricity upon the atoms that attempt to put the electrons in a high energy state. The electrons then try to return to a lower energy state by emitting that energy in the form of a wave. This occurs in neon signs. The neon atoms will be excited by electricity. The neon atoms will fall back to a lower energy state giving off the electromagnetic radiation that we see as light.²

The energy of the electromagnetic wave that is produced is proportional to its frequency. The frequency of the radiation determines how it interacts with charged particles, especially with the electrons of atoms, which absorb and reemit the radiation. The energy of the electromagnetic wave is proportional to its frequency: such that the greater the frequency of the waves, the greater their energy.

Spectrum thus refers to the electromagnetic spectrum which consists of the entire range of electromagnetic communications frequencies, including those used for radio, radar, and television; the radio-frequency spectrum. It extends from electric power at the long wave-length end to gamma radiation at the shortwave end.³ This spectrum provides the essential building block for wireless communications services.

In simple terms, information is transferred in the form of signals on a particular frequency over a particular area. A frequency is the number of waves generated in a period of time and is expressed in hertz. One hertz means one wave per second.

¹ <http://www.qrg.northwestern.edu/projects/vss/docs/thermal/3-what-makes-em-radiation.html>

² Ibid

³ Laflin, N. and Dajka, B., "A simple guide to Radio Spectrum", Spectrum Management Magazine, January 2007

One kHz means one million waves per second and 1GHz means one billion waves per second. Wavelength is the distance between two waves. Higher frequencies have shorter wavelengths and the lower frequencies have long wavelengths.⁴ Lower frequencies can reach longer distances than a high frequency wave.

The frequency is associated with a carrier wave, analogous to a sine function. The information or signal is then transmitted by modulating the carrier wave, e.g. altering its amplitude slightly (amplitude modulation or AM), its frequency (frequency modulation or FM) or its phase (phase shift keying or PSK). More complicated schemes can transmit more information per cycle but are less robust to noise, e.g. quadrature amplitude modulation (QAM). Trade-offs between complexity and hence information per cycle, on one hand, and robustness to noise, on the other, are a key to design of wireless communications.

The radio frequency spectrum is the part of the electromagnetic spectrum that is engaged by the operation of wireless mobile services. The range of the spectrum extends from 3 Hz to 300GHz. Within these frequencies, transmitters generate radio waves that are then picked up by antennas. Radio spectrum can carry codified information in the form of signals and thus can support a relatively inexpensive infrastructure that provides mobility and portability for mobile phones, radio and television broadcasting, two way radios, broadband services, radar, and satellite communications.⁵

The radio spectrum is divided into different frequency bands that are for use by different types of signals. While in general terms, the more information that is carried by a signal the more bandwidth the signal will require, this is not always the case. . . Different systems have different spectral or coding efficiency, usually expressed in terms of bits per Herz. Bandwidth is the range of frequencies that a signal occupies. If another user broadcasts within the bandwidth of a user's signal, it can cause or receive interference. As part of the overall scheme of spectrum management, spectrum bands are divided into channels.⁶ The bandwidth of these channels can vary in each band. For example, the VHF band houses FM radio stations, each of

⁴ Laflin, p.2

⁵ Laflin, p.2

⁶ Spread spectrum systems, on the other hand such as were used for second generation CDMA, let all signals use all available bandwidth simultaneously and sort out the signals at the receiving end.

which requires 300 kHz of bandwidth⁷. The VHF spectrum bands are 100 MHz in size thus a station needs 3 channels of 100 kHz-wide channels.⁸

Radio waves can be made to carry information through a process known as "modulation". This is a way of coding the information to be transmitted and causing the radio wave to vibrate according to the coded pattern. The coded radio wave energy is then radiated in all directions by a transmitting antenna. In crowded urban systems, directional antennas are used to beam the signal in one particular direction. Some of these coded waves can be collected by a receiving antenna and the information is extracted by the process of demodulation, which simply involves separating the coded information from its carrier waves and decoding it.⁹

Higher frequencies can carry more information than lower frequencies because of greater bandwidth capacity so that it is preferable that signals that carry a significant amount of information will be generally allocated the higher frequency bands.¹⁰ This would include television, mobile phones or broadband. As well, a signal carried by emanating in the radio spectrum may have certain propagation characteristics that given it different abilities to bounce or penetrate walls, dependant on the frequency band.

Spectrum Management

Radio spectrum is a scarce resource and the management of spectrum involves more than a national government, as radio waves do not respect sovereign borders. Failure to establish appropriate rights means that the possibility of interference by users grows exponentially greater. As frequencies in the radio spectrum are used for public sector priorities such as defense, aviation and emergency services, this is not simply a matter of convenience. The management of spectrum involves both the maximizing of the value of spectrum to society, as well as ensuring that the spectrum allocation gives the user the ability to carry out the use intended without interference.

⁷ It should be noted that these are broadcasting channels, and are quite wasteful. The typical 2G GSM channel (i.e. one voice conversation over a dedicated channel) is between 16 and 8 Kbps. Even if the spectrum is one (very low), that only takes 8 to 16 KHz.

⁸ Laflin, p.3

⁹ Glass, M.C. and Rhodes, D.M., *Catching the Wave: Should Canada Follow the Global Trend Toward Spectrum Auctions?*, McGill Law Journal Vol. 44, 1999

¹⁰ Many assignments are based on history. That was the case for the TV channels formerly occupying the 700 MHz frequency that has been reclaimed. But over-the-air radios still very wastefully use low frequencies

As was noted earlier, spectrum management has to have national and international dimensions to avoid interference across borders. The international bodies usually attempt to set out high level principles and guidance while national entities provide specific rules and allocation.

The International Telecommunications Union, (ITU) a specialized agency of the United Nations allocates spectrum from 9 kHz to over 275 GHz for a range of different uses pursuant to its International Radio Regulations. The degree of flexibility of the regulations varies with the service with satellite regulations being very directive and mandatory while fixed and mobile regulations allowing for substantial national variation. This is because satellite signals have the potential for more interference given their larger footprint.

The Radio Regulations also set out the rules for coordination of countries' services with each other and for the assignment of rights to individual users.¹¹ Members are expected to bear in mind that countries should have equitable access to spectrum resources taking into account special needs of the developing countries and the geographical position of particular countries.¹² Member's states are bound by the constitution of the ITU which, in addition to detailing and establishing rules of operation of the ITU, also sets out certain fundamental legal principles governing international telecommunications.¹³ Because of the size of the country, these issues present less of a problem in Canada

In addition to ITU regulations, there are also circumstances where multi-national bodies coordinate the management of spectrum across a region. In Europe, the European Union (EU) and the Confederation of European Post and Telecommunication Agencies help to harmonize and coordinate services that are licensed nationally. This harmonization may extend down to the specific mobile standard or protocol for operation of the service.

¹¹ Cave, M., Doyle C. , Webb, W.,, *Essentials of Modern Spectrum Management*, Cambridge University Press, 2007, p.5

¹² 1973 ITU Convention Article 44 (2)

¹³ Walden, I and Angell, J., *Telecommunications Law and Regulation*, Oxford Press (2nd ed) 2005, p.480

Canadian radio spectrum management

Under the *Radio Telegraph Act* of 1913, a minister of the federal government was granted the authority to license radio stations and to charge \$1 on each receiving set. By 1928, there were over 60 radio stations operating in Canada, most operating with low frequencies and on an intermittent basis.¹⁴

The federal government- appointed Aird Commission issued its Report in 1929 that recommended that the federal government take control of broadcasting. Its jurisdiction to do so was confirmed by the Judicial Committee of the Privy Council in 1932.¹⁵ The Bennett government's attempts to regulate and foster public broadcasting through the three person Canadian Radio Broadcasting Commission proved a failure, and the subsequent government of Mackenzie King replaced the Commission with the Canadian Broadcasting Corporation through the 1936 *Canadian Broadcasting Act*. The CBC was effectively both the regulator of radio station licenses and the operator of its own service networks, two in English and one in French.

The advent of increased Canadian demands for television channels, and the Fowler Commission recommendations concerning regulatory independence in the 1950s led to the separation of the CBC from a new fifteen member authority, the Board of Broadcast Governors. The Board was empowered to recommend to the Minister the licensing of private and public (CBC) stations upon their application. The Minister (initially Communications, then Industry) exercised control over the allocation of spectrum to various uses within the international regulations and conventions and licensed entities to use that spectrum through the *Radiocommunications Act* and *Radiocommunications Regulations* while the regulatory control of the operations of the licensees in broadcasting and telecommunications passed to the Canadian Radio-Television Telecommunications Commission (CRTC) in 1976.

Since 1906, through the efforts of the ITU organized international conferences, the radio spectrum has been divided into wavelength and geographical bands, as different wavelengths of spectrum are regulated according to their atmospheric reach. The ITU efforts have principal importance for satellite management. Governments have some autonomy to allocate particular bands as they wish,

¹⁴ "Radio and Television Broadcasting", The Canadian Encyclopedia online at <http://www.thecanadianencyclopedia.com/articles/radio-and-television-broadcasting>

¹⁵ Ibid

within the bounds set by the International Telecommunications Union, and the tuning bounds set by particular technologies.¹⁶

The formation of national agencies around the world to license the use of spectrum in different frequency bands took shape, particularly after the United States passed enabling legislation for a national authority to oversee the licensing and operations of spectrum use. The range of wave frequencies that comprise the radio spectrum was more properly created, or articulated, as an ordered sequence of waves by the technological generation of radio waves at a range of frequencies. But the radio spectrum that allows frequencies to be allocated to specific uses by the state and by international bodies was invented as an apparatus of power, a structure invented to control the way in which radio transmissions are used and by whom. It was a necessary division that made radio useable, but reduced the ways in which it could be used.¹⁷

In Canada, a first come, first served approach was initially used to license users. When the demand for spectrum exceeded the availability of spectrum¹⁸, the Canadian government resorted to a staged comparative licensing process to determine the successful licensees. In the comparative process, there was effectively attention paid to the ability of the licensees to meet the objectives associated with the use of spectrum. A 1987 process commenced by the government through the Canada Gazette appeared to confirm support for the administrative comparative process of review and selection of successful applicants.¹⁹

As a result of a process commenced in 1989, the Department of Communications undertook a review of spectrum policy that included the release of discussion papers in 1990 and 1991, and resulted in the release of the policy document, *Spectrum Policy Framework for Canada in 1992*.

The discussion papers reviewed the policy preferences of the government that included favouring applications for spectrum use that provided greater public benefits, better spectrum utilization and overall efficiency. Market demand and competition were to be considered in relation to new services and overall, the

¹⁶ "The Invention of Radio Spectrum" Etherblog, October 18, 2008 at <http://www.etherblog.ethermap.org/?p=16>

¹⁷ Ibid

¹⁸ Spectrum at higher frequencies has never been in short supply but it has less reach and subject to more interference.

¹⁹ Melynk, M. *Inappropriateness of Spectrum Auctioning in a Canadian Context*, PIAC, December 1997, p.34

licensing system was proposed to be congruent with efficient development of broadcasting and telecommunications services in Canada.²⁰

To reach those objectives, particularly where issues of competition, socioeconomic benefits service provisioning, and industry structure, were in play meant that different options based on markets were considered including lotteries and auctions contrasted against the traditional administrative comparative approach, sometimes termed “beauty contests” of the bureaucracy. The advantages of decreased complexity of decision-making coupled with the possibility of greater government revenue had to be considered against other public interest and competitive considerations. In the end, the administrative comparative approach was continued with the support of the majority of stakeholders with a number of goals including the following:

- Meeting underlying telecommunications, broadcasting, industrial, and social objectives
- Fairness and consistency towards licensees
- Administrative efficiency
- Accommodation of as many users as possible without interference
- Minimum regulatory and technical requirements

Despite the rejection of market-based models in 1992, government fiscal constraints and restiveness about the allocation of spectrum use for new services provided the opportunity for another review of policy by the Chretien government in 1994. Coincident with these factors, the restructuring of the regulation of the telecommunications industry as a whole had begun for other services including the previously sacrosanct residential local telephone service. Theoretical support also began to line up behind an auction based model for spectrum allocation.

Central to the auction proposition, is that those who are prepared to bid the most for the rights to use the frequencies to be allocated will put them to the best use. When there are scarce resources, it is theorized that those resources are the most efficiently allocated when they flow to those that pay the highest amount.²¹ The auction process does away with the lengthy process of evaluation that may arise under comparative administrative method when there is insufficient spectrum to meet the demand of applicants. It was noted that the comparative process, also known as a “beauty contest”:

²⁰ Melynk. P.35

²¹ Cave, p.43

“Requires a great deal of information to make this decision-consequently, applications are long and detailed. They typically include engineering designs of communications equipment, construction plans for facilities, long term business and marketing plans, proof of sufficient financing to successfully operate the services in question, and proof of Canadian control and/or ownership if the service in question is subject to such restrictions. These applications can easily run up to a thousand pages in length and cost \$100,000 or more to prepare.”²²

Other drawbacks are that scoring systems tend to give greater weight to tried and true systems and are wary of new products and innovations. As well, the beauty contest model lends itself to the possibility of favouritism and regulatory capture.

However, the relative objectivity, ease of administration and capture of economic rents for a public resource offered by the spectrum auction model did not enthrall all stakeholders. The ability to effect social policy objectives in broadcasting and telecommunications was seen to be subservient to the almighty dollar and it was speculated that the licenses would go to the deepest pockets of current players serving the largest markets.²³ As well, while, the auction would bring greater government revenues, it was suspected that this simply added to the expense of licensed services used by consumers.

In 1996, the government released its findings on the consultation, noting that the new telecommunications environment demanded change and the current administrative consultative process was inadequate to meet these challenges.²⁴ Accordingly, it found that:

“Where mutually exclusive demand for the spectrum exists,(the introduction of competitive bidding procedures) represents a significant departure from past practice but evolving circumstances are such that this option is warranted and in the public interest.”²⁵

Notably, the majority of the responses filed in the consultation opposed this model. However, at the same time, pressure was growing through the release of the government’s Information Highway report and Budget Plan in 1996 for the conduct of spectrum auctions for new wireless services. As well, the possibility of

²² Glass at p. 151

²³ Melynk, p.40

²⁴ Canada Gazette Part 1, Industry Canada Notice No. DGRB-001-96 *Review of the Comparative Selection and Radio Licensing Process*- Findings February 24, 1996.

²⁵ Ibid at p.16

a successful financial result for government coffers based on the U.S. experience was undoubtedly instructive for the Industry Canada officials.

Early Auction Experience - United States of America

Spectrum management in the U.S. was being carried out by the Federal Communications Commission (FCC). Government and military uses of spectrum were administered by the National Telecommunications and Information Administration (NTIA). In the 90's, the government was faced with significant problems and delays involving the launching and licensing of cellular radio systems in hundreds of markets each requiring comparative administrative hearings. The delays first resulted in the FCC experimenting with a system of lotteries to assign cellular licenses. This proved unworkable principally because there was a deluge of participants and no assurance that the lottery winners could operate their licenses successfully.²⁶

In 1993, through legislation passed by the U.S. Congress, the FCC was authorized to use auctions to promote intensive and efficient spectrum use and the development of new technologies.²⁷ From July 1994 to February 2001, the Federal Communications Commission (FCC) conducted 33 spectrum auctions, raising over \$40 billion for the U.S. Treasury. The *Balanced Budget Act of 1997* expanded the FCC's jurisdiction and eliminated lotteries as an allocation mechanism.

However, not all auctions were successful. The initial auction for WCS services²⁸ was something of a fiasco as there was no equipment readily available to use with the band spectrum with resultant confusion and the auction bringing revenues that were only 5% of government expectations.

However, there was general satisfaction in the U.S. government with the use of the auctions and the conduct of the auctions through an open bidding rather than a sealed bid procedure. As one economist has noted:

²⁶ Cramton P., "Spectrum Auctions" Handbook of Telecommunications Economics, Martin Cave, Sumit Majumdar, and Ingo Vogelsang, eds., Amsterdam: Elsevier Science B.V., Chapter 14, 605-639, 2002, p.4

²⁷ Cave, p. 51

²⁸ The Wireless Communications Service (WCS) is in the 2305-2320 and 2345-2360 MHz spectrum range. The most common use of WCS spectrum is mobile voice and data services, including cell phone, text messaging, and Internet..

An essential advantage of open bidding is that the bidding process reveals information about valuations. This information promotes the efficient assignment of licenses, since bidders can condition their bids on more information.

The American PCS auctions, referenced earlier were conducted by way of simultaneous ascending auctions (SAA). Under SAA formats, the bidders bid up the price round by round until a round is reached where no new bids are received.²⁹ There is a minimum bid increment, and all active bidders must participate in every round. The success of the SAA format influenced other nations including Canada. By 2007, SAA auctions were being used globally for many different types of spectrum auctions with over \$200 billion being raised through their use.³⁰

Canadian early experience with wireless spectrum allocation

The earliest experience associated with mobile wireless service involved Mobile Telephone Systems (MTS) and, starting in the 1960s, Improved Mobile Telephone Systems (IMTS). These were city-wide systems and were monopolies of the incumbent telephone company, although pagers provided some competition (e.g. National Pageette).³¹ Cellular systems, i.e. dividing a city into cells and reusing frequencies in different cells, came in early 1980s, with licenses to Bell, B.C.Tel, AGT etc and Cantel. Those were analogue systems. The innovation in the 1990s was to move to digital, although analogue coexisted for many years.

Cellular service, terrestrial radio-based service providing two-way communications by dividing the serving area into a regular pattern of sub-areas or cells, each with a base station having a low-power transmitter and receiver started in the 1980s.³² In 1982, the federal department of Communications issued a notice that called for the allocation of two 20 MHz blocks of spectrum in the Cellular Band (830-890 MHz) one for telecommunications and the other for other applicants.³³ Two blocks of five (5) MHz of cellular spectrum were held in reserve for future use.³⁴ In 1983 Cantel (now Rogers Wireless Inc) became the successful applicant for one of the 20MHz

²⁹ Cave, p.57

³⁰ Cave, p. 60

³¹ <http://www.corp.att.com/attlabs/reputation/timeline/46mobile.html>

³² OECD Glossary of Statistical Terms at <http://stats.oecd.org/glossary/detail.asp?ID=4974>

³³ Gazette Notice DGTN-006-82/DGTR-017-82, *Cellular Mobile Radio Policy and Call for Licence Applications*

³⁴ "A Brief History of Cellular and PCS Licensing", Spectrum Management and Telecommunications, at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08408.html#Cellular>

spectrum blocks with an invitation by the federal government for applications from telecommunications common carriers for the other, subsequently granted to Mobility Canada and its eleven telephone company shareholders. Both services were to become operational in 1985. The reserve cellular spectrum was later allocated to the existing holders of spectrum. The allocation had been done largely on a first come first serve basis.

By 1995, Canada was prepared to license services operating in the spectrum around 1900 MHz known as the PCS (Personal Communications Services). PCS services would provide two way digital voice, data and messaging services designed for second generation (2G) cellular use. Competitive concerns, as well as potential dominance by wire line telephone service providers resulted in the adoption of policies designed to promote both use and competition of the PCS spectrum. In the result, two national carriers independent of incumbent holders of spectrum were to be granted 30 MHz of spectrum.

In December 1995, the then Minister of Industry, John Manley, awarded PCS licenses to 14 companies: two national 30 MHz PCS licenses were awarded to Clearnet PCS Inc. and Microcell Networks Inc.; a national 10 MHz PCS license was awarded to Rogers Cantel Mobile Inc.; and a 10 MHz PCS license was awarded to the 11 regional shareholders of Mobility Personacom Canada Ltd. for their operating territories.³⁵ Spectrum caps of 40 MHz were imposed for any one player and its affiliates.

At this juncture, some in Canada were extolling the process of allocation of license to use spectrum by PCS carriers – a process that was driven by administrative comparative selection from a significant number of applicants. It was noted that the comparative selection process had resulted in a rollout of services twice as fast as that in the USA. The contrast with the WCS auction problems in the United States was also drawn.³⁶ Nonetheless, the financial returns from the US experience had been substantial, compared with the costs to license holders in the Canadian process.

The vision of competition in the wireless market driven by the creation of the two new wireless carriers, Clearnet and Microcell became clouded by a number of developments. In 1999, the federal government was faced with demands for increased spectrum. Industry Canada announced that the spectrum aggregation

³⁵ Ibid

³⁶ Melynk p. 45

limit applying to PCS would be raised from 40 MHz to 55 MHz. In addition, 40 MHz of additional spectrum for PCS would be licensed by auction.

For the two new national carriers additional spectrum for the dominant players would not be commercially advantageous. The bursting of the dot.com bubble also had a chilling effect on the financing of telecom investment in this period, and many market players engaged in amalgamations and mergers to ensure access to the right content and applications to compete or dominate.

In this environment, both Clearnet and Microcell were swallowed by one of the major common carriers. TELUS in 2000 concluded what was then the largest telecommunications deal in Canada's history by purchasing Clearnet for \$6.6 billion. TELUS itself had been formed in 1998 primarily by a merger of existing B.C. and Alberta incumbent telephone companies, purchase of what was to become TELUS Quebec, coupled with a withdrawal from the Mobility Canada Alliance. As part of the Clearnet deal, TELUS was obliged to return 20MHz of spectrum throughout Canada to comply with the spectrum cap.

Microcell was purchased by Rogers in September 2004, a transaction cleared of anticompetitive effect by the Competition Bureau in 2005, essentially on the basis of competition between the "Big Three" providers, TELUS Mobility, Bell Mobility and Rogers. The Bureau's Technical Backgrounder to the Microcell transaction approval noted:

There were a number of factors behind the Bureau's finding that there would continue to be vigorous and effective competition remaining following the merger, some of which included the introduction of a variety of new plans that combine minutes of use, handsets, service features and prices; the ability of competitors to add new customers, and; the willingness of Bell Mobility, Rogers and TELUS Mobility to respond to price changes by others and to go after each others' territories.³⁷

In the interim, the 2001 auction of remaining PCS spectrum, took place including that returned by TELUS in the Clearnet deal. While the auction netted 1.48 billion, 44 of the 52 licenses were snapped up by the Big Three.³⁸ In the government's revised policy framework "A Spectrum Policy Framework for Canada 2002" the government announced its intention to collect "spectrum management costs where

³⁷ "Acquisition of Microcell Telecommunications Inc. by Rogers Wireless Communications Inc". Competition Bureau, Technical Backgrounder, April 2005 at <http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/00257.html>

³⁸ A Brief History at footnote 28

resource rents do not exist”, and where they do, “fees will ensure fair economic return to the public as well as recovering spectrum management costs”.³⁹ The market concentration associated with the ownership of spectrum licenses had not dented the government’s enthusiasm for the auction process.

But while spectrum auctions continued to take place, there was a growing sentiment in the wireless market that the results were not matching the rhetoric of competition and efficient development of wireless technology. The Telecommunications Policy Review Panel Report, commissioned by the Martin government, reported to the Harper Government in 2006 that:

“After reviewing this evidence, the Panel concludes that Canada’s mobile wireless industry lags behind its major trading partners on a number of key measures. This finding reinforces the Panel’s belief that because of the growing importance of this segment, Canada should develop a more efficient and vibrant wireless industry.”⁴⁰

The CRTC’s Communications Monitoring Report of 2008 reported that in 2007:

“Market share of the three largest wireless service providers did not change significantly in 2007 and continues to account for over 94% of the wireless market in Canada”⁴¹

In September 2006, the Office of Consumer Affairs (OCA) of Industry Canada, put out an update to its 2004 *Consumer Trends Report* entitled “The Expansion of Cellphone Services”. It noted that:

On a global scale, however, Canada’s rate of adoption of wireless telecommunications is lagging, with just under 52 subscribers per 100 inhabitants at the end of the first quarter of 2006, a level reached by the United States in the second half of 2003 (Statistics Canada 2006) ... Canada also lags in terms of the number of wireless carriers where, although 94 percent of the Canadian population has access to three or more wireless service providers, the maximum number of wireless carriers in any given area is three”⁴²

³⁹ “A Spectrum Policy Framework for Canada”, Industry Canada, 2(2002 Revised Edition) p. 15

⁴⁰ , The Telecommunications Review Panel Report, Industry Canada , 2006 Page I-21

⁴¹ CRTC Communications Monitoring Report 2007 section 5.5

⁴² The Expansion of Cellphone Services, Office of Consumer Affairs, Industry Canada, Fall 2006 , p.2

The OCA report also noted consumer price and service dissatisfaction with a number of aspects of the business of mobile service:

“According to a 2005 study, the average Canadian wireless user was paying 60% more than what plans offer in the U.S., and 19% more than with European carriers⁴³ in Canada.”⁴⁴

“Various reports suggest a number of other issues arising from Canadians’ increasing interactions with the cell phone market. Cellphone information, in the form of both advertising and contracts, can be difficult to compare and decipher, leading to consumer confusion”.⁴⁵

Thus, as wireless services had been forborne from regulation in the previous decade, the auction process became a focus for effecting change to the existing state of affairs in the wireless industry, preferably by creation of a more competitive consumer friendly market.

In consultations with stakeholders, Industry Canada had also been made aware of the range of needs and expectations concerning the use of spectrum involving public interest uses including public safety and scientific uses and the availability of license exempt spectrum for addressing issues of the digital divide with linguistic minorities and rural communities. In its 2007 Spectrum Policy Framework Document, Industry Canada tried to bridge the gap between a straight ahead market forces approach - spectrum auction to the highest bidder – with more social and economic tinkering to reach an appropriate result. It adopted as a policy objective for spectrum policy, “To maximize the economic and social benefits that Canadians derive from the use of the radio spectrum frequency resource”⁴⁶

While the Guidelines in the aforesaid document emphasized the reliance on market forces, it also noted that, notwithstanding that reliance, “ spectrum should be made available for a range of services that are in the public interest”.⁴⁷

⁴³ SeaBoard Group, The. 2005. *Key Highlights From Lessons For Canada: Wireless Pricing- A Cross-National Survey: U.S. Canada, and Europe*, available at

<http://www.seaboardgroup.com/main/index.php?option=content&task=view&id=290&Itemid=123>

⁴⁴ Office of Consumer Affairs at p.5

⁴⁵ Ibid at p.6

⁴⁶ “Spectrum Policy Framework for Canada”, Spectrum Management and Telecommunications, Industry Canada, June 2007 p.8

⁴⁷ Ibid, p.9

The revised approach was also reflected in the results of the public consultation concerning the spectrum auction framework for the 2 GHz Range also held in 2007. The spectrum was to accommodate Advanced Wireless Services for a wide range of applications, such as cellular telephony, data, multimedia, Internet Protocol (IP)-based applications and broadband Internet access using third generation (3G) cellular and other technologies. Gazette Notice No. DGTP-007-07 Policy Framework for the Auction for Spectrum Licenses for Advanced Wireless Services and other Spectrum in the 2 GHz Range released at the same time as the policy document tried to adapt the existing market forces auction model to accommodate the burgeoning public interest in competition and non-commercial usage. It was noted by Industry Canada on the first page of the document that:

“In considering the opening of this part of the radio spectrum to commercial applications through this auction, it was important for the department to examine whether measures should be taken to increase access to spectrum and foster greater competition in the wireless market.”⁴⁸

The Notice articulated the attempt to achieve multiple goals this way:

The department is committed to government policies which seek to rely on market forces to the maximum extent feasible for the provision of telecommunications services to Canadians. This policy approach can only be pursued in an environment where market forces can be expected to deliver, now and in the future, a level of competition sufficient to protect the interests of users. Accordingly, in making this resource available, a critical consideration has been to implement an auction framework that will help ensure that market forces support a telecommunications infrastructure that delivers innovation and consumer choice at competitive prices⁴⁹

It was clear that Industry Canada saw the stakes as more than enhancing the government’s Consolidated Revenue:

“Radio frequency spectrum is a finite public resource essential to entry into wireless markets, and that resource is not readily available on the open market. Access to spectrum is a barrier to entry that only government can lift, and the amount and type of spectrum that can be made available at any given time are dependent on a range of international and domestic factors. In this instance, the spectrum being made available for auction has

⁴⁸ Canada Gazette Notice DGTP=007-07. P. 1

⁴⁹ Idem at p.2

characteristics and is of sufficient amount to make potential new entry feasible.”⁵⁰

After noting special measures put in place in the United States and the United Kingdom, Industry Canada further visited the special characteristics of the telecommunications market that make entry and competition difficult with incumbents. In focusing on spectrum auctions the Notice stated:

“...submissions received in the AWS consultation have shown how incumbents have an incentive to pay a premium for spectrum to prevent market entry. The ability of incumbents to effectively act on these incentives and opportunities depends on a number of factors. These include how competitive the market is, notably ease of entry, and the prevailing policy and regulatory framework. In the case of the forthcoming auction, the policy framework can serve to constrain such behavior, thereby promoting competition.

In the result, 40 GHz of AWS Spectrum (or 40%) of the new spectrum was set aside for new entrants only in three frequency blocks with rules restricting the share of spectrum that could be owned by a successful bidder or its affiliate or associated entity (10% Of the national wireless revenue market).

The department also recognized the importance of roaming in maintaining a competitive wireless market:

- “Recognizing that one or more regionally based new entrants may emerge from this auction, the department is mandating roaming outside of licensees’ territories for at least the 10-year term of AWS licenses. Roaming is to be made available at commercial rates. As well, to facilitate new entry, incumbents will be required to make roaming available to new entrants within their licensed service areas, also at commercial rates, for a period of 5 years while the licensee builds out its network”.

The obligation for provision of roaming was immediately subject to scrutiny, other requirements including mandated antenna sharing were put in place as well an obligation to roll out services that would figure into any renewal of the 10 year licenses. Industry Canada would use its existing simultaneous multiple-round ascending auction software for this auction.

⁵⁰ Idem p.3

The results of the 2008 auction were as follows:

Auction Summary 2008⁵¹

Date	May 27, 2008
Licenses	292 spectrum licenses in Tier 2 and 3 service areas across the country
Bandwidth	Three blocks of 10 + 10 MHz and 3 blocks of 5 + 5 MHz - 1710-1755 MHz and 2110-2155MHz for Advanced Wireless Services (AWS)
	One block of 5 + 5 MHz - 1910-1915 MHz and 1990-1995 MHz for Personal Communications Services (PCS)
	One block of 5 MHz - 1670-1675 MHz
Rounds	331
Licenses Won	282
Winning Bids	\$4,254,710,327

Four tiers of service areas have been established. [Tier 1](#) is a single national service area. [Tier 2](#) consists of 14 large service areas covering all of Canada. There are 8 Tier 2 service areas that have provincial boundaries, and 6 that are within Ontario and Quebec. [Tier 3](#) contains 59 smaller regional service areas and [Tier 4](#) comprises 172 localized service areas.

The results are perhaps better understood when looking at the ownership of the companies who successfully engaged in the process:

⁵¹ Reprinted from Auction of Spectrum Licenses for Advanced Wireless Services and Other Spectrum in the 2 GHz Range Auction of Spectrum Management and Telecommunications, Industry Canada at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf08891.html

Top Bidders:

Rogers		\$ 999,367,000
TELUS		\$ 879,889,000
Bell Mobility		\$ 740,928,000
Quebecor		\$ 554,549,000
Globalive		\$ 442,099,000
DAVE (Mobicity)		\$ 243,159,000
Shaw		\$ 189,519,000
SaskTel		\$ 65,690,000

While Shaw never launched services for the Northern Ontario and western Canada licenses that it acquired, as a result of the AWS auction, several new facilities-based wireless service providers were launched across Canada. Wind Mobile owned by Globalive was quick off the mark with new service offerings in 2009 becoming the fifth largest mobile service in September 2012 with 500,000 customers⁵². Public Mobile acquired spectrum in G Block for offering wireless services using the CDMA protocol shunned by other bidders. It now has 200,000 subscribers attracted by its appeal as a barebones discount carrier. A key advantage for Public Mobile is that unlike WIND and Mobicity, it possesses spectrum in Quebec.⁵³ Videotron owned by Quebecor launched in 2010 again with aggressive marketing of new products and services. Mobicity offering services in Toronto, Ottawa, Calgary and Edmonton, is said to have acquired 187,000 subscribers by the close of 2011.⁵⁴

⁵² <http://www.newswire.ca/en/story/1037899/wind-mobile-surpasses-500-000-canadian-subscribers>

⁵³ Hardy, Ian, "Public Mobile CEO on new entrant consolidation", *mobilesyrup*, August 14, 2012

⁵⁴ Trichur, Rita, "Mobicity dubs itself 'fastest growing wireless upstart'", *Globe and Mail*, September 5, 2012

However, the dominance of the Big Three still exists with respect to both the share of the customer market and subscriber revenue. The CRTC 2012 Communication Monitoring Report reported the following:

Source: CRTC data collection

Table 5.5.5 Wireless subscriber market share, by province(2011)

Province	Bell Group ²	TCC	Rogers	New entrants ³	Other ¹
British Columbia	17%	39%	42%	2%	0%
Alberta	22%	49%	26%	2%	0%
Saskatchewan	8%	8%	13%	0%	72%
Manitoba	6%	9%	32%	0%	53%
Ontario	28%	19%	47%	5%	1%
Quebec	34%	28%	31%	7%	0%
New Brunswick	59%	20%	21%	0%	0%
Prince Edward Island	63%	20%	18%	0%	0%
Nova Scotia	53%	28%	19%	0%	0%
Newfoundland and Labrador	73%	24%	2%	0%	0%
The North ⁴	84%	0%	0%	0%	16%

1. “Other” includes MTS Allstream, SaskTel, and smaller WSPs.
2. “Bell Group” includes Bell Canada, Northwestel Mobility, Bell Mobility, Télébec, NorthernTel, SkyTerra, Virgin, and Latitude Wireless.
3. “New entrants” refers to the new wireless entities that acquired spectrum in Industry Canada’s 2008 AWS spectrum auction.
4. The North includes Yukon, the Northwest Territories, and Nunavut.

The percentage of total wireless revenues for the market enjoyed by the new entrants amounted to about half the percentage of subscriber share⁵⁵. And complaints about service and billing continue to proliferate – in 2012, the Commissioner of Complaints for Telecommunications Services (CCTS) reported that complaints about telecommunications services had jumped about three fold since 2009 and over 60% of the recent complaints concerned wireless services.

The response of the Big Three to the tinkering with the auction format to set aside spectrum for new entrants was less than enthusiastic. Lawson Hunter, executive vice-president and chief corporate officer of Bell, said the spectrum could go for

⁵⁵ CRTC 2012 Communications Monitoring Report, Figure 5.5.4

up to 40 per cent less than it would have if the auction were open to the highest bidder claiming an asset of Canada had been sold for well under the market price.⁵⁶

Industry Canada's efforts at using the spectrum auction format to achieve economic and social objectives were not yet transformative and still resisted by the Big Three by the time of the consultations associated with the auction of 700 MHz and 2300 MHz spectrum took place in 2011.

International Developments in Spectrum Auctions

The complaints from Canada's incumbents that the set asides and other techniques for achieving objectives inside the spectrum auction format were subversive of the principles of using market forces did not find resonance in other countries that dealt with similar concerns in spectrum management. For example, in the U.K., the determination to ensure the establishment of a 4th national wireless network led to set asides of 15 MHz of paired spectrum and 5 MHz of unpaired spectrum. (Wireless spectrum can be paired or unpaired. Paired spectrum allocates two distinct and equal frequency bands, one assigned to "downlink" from the base station to mobile devices, and the other to "uplink". In contrast, unpaired spectrum provides a single band used for both downlink and uplink. Unpaired spectrum is not suitable for broadband service.)⁵⁷

Even strong proponents of auctions as efficient mechanisms for achieving value have recognized that spectrum auctions cannot address all societal needs:

“Despite their virtues, standard auctions at best ensure that the bidder with the highest private value wins, rather than the bidder with the highest social value. Private and social values can diverge in these auctions because the winners will be competing in a marketplace. One collection of winners may lead to a more collusive industry structure. For example, a license may be worth more to an incumbent than a new entrant, simply because of the greater market power the incumbent would enjoy without the new entrant.”⁵⁸

⁵⁶ “Spectrum auction at 2B and counting”, June 2, 2008 CBC News at <http://www.cbc.ca/news/technology/story/2008/06/02/tech-spectrum.html>

⁵⁷ “Background on 700 MHz, “The Broadband Home”, at http://www.broadbandhomecentral.com/report/backissues/Report0704_5.html

⁵⁸ Cramton, p.4

As well, the benefits associated with post auction competition in the wireless market justify an approach that has been taken by the FCC and in the UK to the state of the market ahead of potential revenues. Such benefits have also included benefits to the economy as a whole.⁵⁹

At the same time, that part of the spectrum known as “commons” has become a subject of study and proposals, particularly in the USA. Commons refers to part of the spectrum where one can transmit without a license. Deployments of new technologies, particularly of Wi-Fi in the 2400 MHz band as well the development of ultra-wideband UWB, a radio technology that may be used at a very low energy level for short-range, high-bandwidth communications using a large portion of the radio spectrum has stirred up interest in its use. In particular, commons supporters note the suitability of this frequency range for innovation and creation of new technologies.⁶⁰ The regulation and control of potential congestion in the unlicensed commons are ongoing topics of discussion.

It was in this world of evolving thinking about the best methods to both achieve an efficient result and to allocate spectrum to achieve public interest goals that the Canadian spectrum auction framework consultations for 700 MHz and 2500 MHz spectrum took place in 2011.

Industry Canada Consultations 700 MHz band and 2500 Band

Industry Canada’s public consultation on the licensing of spectrum in the 700 MHz had particular significance for most industry stakeholders. The spectrum availability arose as a result of the discontinuance of analogue television broadcasting. The 700 MHz spectrum was highly sought after because of its ability to penetrate buildings and reach greater distances with less base equipment. In its consultation document, Industry Canada noted the growth of the wireless services and the increasing demand for deployment of wireless technology that would keep pace with international developments.⁶¹ And there were limits on the useful spectrum that could be allocated based both on handset availability from U.S.-based suppliers for U.S. networks and the need to acquire paired spectrum in a larger frequency blocks putting limits as to what is available.

⁵⁹ Cramton, P. et al. “Using Spectrum Auctions to Enhance Competition in Wireless Services”, *Journal of Law and Economics* Volume 54, (2011) at p.2

⁶⁰ Cave, p.203

⁶¹ “Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum”, Industry Canada, November 30, 2010,

The Public Interest Advocacy Centre attempted to discern the range of public interests and their representation associated with the spectrum uses both in the consultation associated with 700 MHz spectrum and that associated with the 2500 MHz spectrum. The following issues were engaged in our submissions.

Competition

PIAC recommended a 25% set aside for new entrants including those awarded spectrum in the 2008 process. It was felt that this was vital to allow at least some of these entities to grow and become Tier One spectrum users.⁶² As well, the new entrants brought the possibility of a market with 4 or 5 robust competitors. PIAC noted the following:

However, that being said, the wireless market in Canada is still less competitive than in other countries, indicating a continued need to protect and foster the ability of new entrants to compete in the current market oligopoly. The average monthly price of wireless services is less competitive than in the United Kingdom, Australia and Japan.⁶³ In comparing international cell phone plans and prices for post-paid voice services and pre-paid voice services, Canada is consistently less competitive than the US and the UK.⁶⁴

However, the case for enhancement of competitive markets received short shrift from incumbents both with respect to the 700 MHz and the 2500 MHz spectrum. The specter of the major players being unable to accommodate demand particularly for rural communities and expansion of 4G LTE (Long Term Evolution) was directly raised. As well, there was yet another effort to divorce set asides and caps from market reality and instead to characterize such efforts as subsidies. Rogers noted, for example, ““The 2500 MHz auction policy should allow those who value the spectrum the most to put it to its most productive use.”” Bell Mobility Inc. ominously stated: “However, there is a worrisome trend of Industry Canada becoming more interventionist in the wireless sector,”

⁶² Comments of the Public Interest Advocacy Centre, February 28, 2011 on Notice No. SMSE-018-10 Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum, p.4

⁶³ CRTC 2010, *supra*, note 3, section 6.1 at p. 164.

⁶⁴ Chieh-yu Li and Bincy Ninan-Moses, “An International Comparison of Cell Phone Plans and Prices,” New America Foundation, 2010, available at http://newamerica.net/publications/policy/an_international_comparison_of_cell_phone_plans_and_prices.

This was largely old wine in new bottles. In its reply argument, for the 2500 MHz spectrum, PIAC took on the market extremist view:

In PIAC's view, the auction process should be more than an exercise to inflate the Consolidated Revenue Account of the Government of Canada. Obtaining the highest bids for wireless spectrum is one way for the public to benefit in an indirect fashion through having increased monies at the disposal of their elected government. There is competition, of course in the bidding process, but the end result might reflect strategic and resource concerns rather than the most efficient and competitive allocation of spectrum.

It was further noted that incumbent players might be prepared to pay a higher price to maintain market hegemony. In that case, those that "value the spectrum the most" may not be using spectrum in the most efficient way possible by simply aligning the use with its own business strategy.⁶⁵

Countering the argument of the large incumbents that they need large blocks of spectrum to service future demand, PIAC quoted the research director of OFCOM who noted in a related issue in the UK:

"The research that we commissioned indicates that early 4G mobile networks with standard configurations will be 3.3 times (230%) more spectrally efficient than today's standard 3G networks. To put this in context, a user on an early 4G network will be able to download a video in around a third of the time it takes today on a 3G network. It is anticipated that this efficiency will increase to approximately 5.5 times (450%) by 2020."

Other Public Interest Considerations

PIAC joined other public interest interveners in commending proposals in both the 700 MHz and 2500 MHz auction process:

⁶⁵ PIAC Reply Comments, SMSEoo5 May 13, 2011

- for the set aside of 25MHz of the 700 MHz spectrum for public uses to meet the needs of the public in areas such as national sovereignty and defense, law enforcement, public safety and emergency services ⁶⁶
- 10 MHz of 700 MHz spectrum for commons type use by colleges, universities, community initiatives and research
- The set-aside of all available broadcast radio spectrum BRS spectrum to new entrants in the 2500 MHz
- As block sizing directly effects competition or the ability to maintain effective competition PIAC urged the Department in the 2500 MHz auction process to provide the market the flexibility to accommodate all bidders – not merely those bidders capable of purchasing and concentrating the largest contiguous blocks
- In the event it was thought appropriate to cap the amount of spectrum each player can acquire in the 2500 MHz auction, relative to the amount of spectrum each has already acquired in that band, no entity should hold over 50 MHz within the 2500 MHz band
- Funding for unresourced public interest concerns -While spectrum auctions cannot address all decrements in meeting national telecommunications goals, PIAC notes the wisdom in setting aside some small portion of funds derived from the auction process to addressing public interest issues that are directly related to the use of spectrum. This may include funding independent research on issues associated with digital literacy, community and consumer access, and programming for national needs and innovation or implementing programs to accomplish the same.
- “Use or lose it” approach Spectrum obtained in the auction process must be brought into service use within a reasonable period of time or otherwise be forfeit. The use it or lose it rule would still necessitate an accompanying prohibition on the transfer or sale of spectrum in order to ensure that no party could circumvent the rule, or skirt potential caps should those

⁶⁶ This recommendation largely mirrored the request of these agencies. Some stakeholders surmise that more efficiencies might lower the same

be introduced.

- Recognition of the realities of the handset market place and the necessity to allocate paired spectrum in sufficient quantities to new entrants in the 700 MHz spectrum

Attached as appendices to this report are the submissions of PIAC concerning these consultations. The submissions represent a reasonably comprehensive brief touching upon the continued consumer interest in spectrum auctions. As well, the PIAC submission on the auction format is included as an appendix.

In March 2011, Industry Canada published the Framework for Spectrum Auctions in Canada. In that document explicit approval was given to measures promoting a competitive post-auction marketplace. These included measures available to the government to promote a competitive post-auction marketplace and include restricting the participation of certain entities in an auction and/or placing limits on the amount of spectrum that any one entity may hold by using spectrum set-asides or spectrum aggregation limits.⁶⁷ The guiding principles for the use of these tools were based on principles of market power and possible anti-competitive effects in the market.

Postscript

Following the consultation concerning the planned 2013 auction of 700 MHz spectrum, Industry Minister Paradis announced in March 2012:

-The Telecommunications Act will be amended to lift foreign investment restrictions for telecom companies that hold less than a 10-percent share of the total Canadian telecommunications market. This will help telecom companies with a small market share access the capital they need to grow and compete.

-The government will be applying caps in the upcoming spectrum auctions to guarantee that both new wireless competitors and incumbent carriers have access to the spectrum up for auction.

-The government will apply specific measures in the 700 MHz auction to see that rural Canadians will have access to the same advanced services as everyone else in a timely manner.

⁶⁷ Framework for Spectrum Auctions in Canada, Spectrum Management and Telecommunications, March 2011, p.4

-The government will improve and extend the existing policy on roaming and tower sharing to further support competition and will improve transparency and information sharing to facilitate agreements between companies to slow the proliferation of new cellphone towers.

-A portion of the 700 MHz spectrum will be reserved for public safety users such as police and firefighters across Canada.⁶⁸

Conclusion

As we have noted in this report, the use of auctions over “beauty contest” to allocate spectrum was not a choice that was universally supported to say the least. Former communications bureaucrat, the late Max Melynk was intensely critical of proposals to auction spectrum by the federal government in his 1997 PIAC report ‘The Inappropriateness of Spectrum Auctioning in a Canadian Context’. Melynk felt that it was the public, not the government that owned spectrum and the job of the government was not to sell it but ensure its wise use.⁶⁹ His recommended approach of continuing a comparative administrative approach to licensing was not followed of course. However, it seems clear that many of the public interest concerns that Melynk was concerned would be lost in the dash for cash have appeared in the ongoing auction process. These include government attention in the process with compulsory roaming and mechanisms like tower sharing to promote sensible competition and bring efficiencies into the process. While the end result of these measures are still unclear, it is possible to say that qualitative and competitive concerns as well as overarching national objectives can still be addressed in the auction process. This report has laid out the current consumer concerns at this juncture and how they have been addressed in two recent Industry Canada consultations with resources provided by the Office of Consumer Affairs.

⁶⁸ Hardy, Ian, “Ottawa:700 MHz auction will start first half of 2013 plus we’re loosening foreign ownership rules”, Mobile Syrup, March 14, 2012.

⁶⁹ Melynk, p.3

APPENDIX 1



PUBLIC INTEREST ADVOCACY CENTRE
LE CENTRE POUR LA DEFENSE DE L'INTERET PUBLIC
ONE Nicholas Street. Suite 1204. Ottawa. Ontario. Canada K1N 7B7

February 28, 2011

VIA E-Mail: Spectrum.Engineering@ic.gc.ca

Manager
Mobile Technology and Services
DGEPS
Industry Canada
Room 1612A
300 Slater Street
Ottawa, ON
K1A 0C8

Dear Sir:

Re: Notice No. SMSE-018-10 – Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum

We are writing to provide comments of the Public Interest Advocacy centre with respect to the above noted consultation document. We understand that there will be an opportunity to reply to any comments received from other parties in the consultation process. We will review the submissions and submit any such reply comments within the timeline specified.

Thank you.

Yours truly,

Original Signed

Michael Janigan
Executive Director / General Counsel

Canada Gazette

Part I

Publication Date: November 30, 2010

Title: Consultation on a Policy and Technical Framework for the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum

Comments of

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Executive Summary

PIAC submits that the auction process associated with the 700 MHz Band must address more than simply the goal of obtaining the highest price for the use of the spectrum. Policy makers must be cognizant of the current deficiencies associated with the mobile wireless market in Canada and the necessity to ensure that the spectrum is also used in a fashion that is optimal for meeting all the national telecommunications and broadcasting goals. This includes the use of set-asides to encourage new entrant competition, as well as to meet other public safety demands and spur innovative community based broadcasting initiatives. Finally, PIAC also urges that a fund be established to meet needs not addressed by commercial providers, through independent research and implementation of access-oriented policies.

I. Introduction

The Public Interest Advocacy Centre, (PIAC), a non-profit organization with its head office in Ottawa, has for over thirty years been engaged in representing the interests of consumers and, in particular, vulnerable consumers concerning the delivery of important public services. This engagement has included both participating in proceedings of importance in the Canadian Radio-Television and Telecommunications Commission (CRTC), and research and advocacy on telecommunications and broadcasting issues.

PIAC has previously been involved in making submissions on the spectrum auction process. In December 1997, PIAC produced the report “The Inappropriateness of Spectrum Auctioning in a Canadian Context.”⁷⁰ The report’s conclusions were that the auctioning process was not in the public interest as the bid process alone would likely cause less competition and higher consumer prices and would not relieve spectrum scarcity. When the auction process proceeded, PIAC’s concerns turned to the need for due structures, safeguards, and processes by which the auction could operate to best achieve the public interest and the policy objectives of the *Telecommunications Act*.⁷¹

In May 2007, PIAC submitted comments to Industry Canada with respect to the Consultation on a Framework to Auction Spectrum in the 2 GHz Range Including Advanced Wireless Services. PIAC advised that Industry Canada would not obtain sufficient benefits for Canada in its spectrum auctioning process by reliance on the bid process alone. PIAC advocated for the creation of effective and minimally intrusive conditions for market optimization that would provide a safety net to prevent one-sided use of public resources in the form of spectrum.

In 2008, Industry Canada recognized that a bid process alone would not promote competition, as it would not allow new entrants into the market. As such, the auction was structured to include a set aside for competitive bids by new entrants only. The same is true today: maintaining a competitive wireless sector cannot be achieved by an auction process in which only the highest bidders can compete. A set aside must be structured into the auction process for competitive bids by new entrants and smaller players only.

⁷⁰ Max E. Melnyk, “The Inappropriateness of Spectrum Auctioning in a Canadian Context,” PIAC, December 1997.

⁷¹ *Telecommunications Act*, S.C. 1993, c. 38 [The Act].

PIAC proposes a set aside of 25% for new entrants and smaller players to meet the objective of maintaining and continuing market competition. PIAC also echoes other parties' proposals that the auction be structured to include a "use it or lose it" rule, to ensure the 700 band is not merely bought up by larger competitors to prevent smaller competitors from accessing it. Additionally, because the market alone cannot provide for all needs of Canadians, PIAC recommends further measures to protect and promote public uses of spectrum. These measures include a set aside of 25 MHz for public and priority uses and a reservation of 10 MHz for innovation. Finally, PIAC advocates for the consideration of open access spectrum and the apropos funding of public and consumer interest work from the proceeds of the spectrum auction. These recommendations will be addressed in turn.

II. Maintaining and Continuing Market Competition

In 2008, a full 92% of the wireless TSP's subscriber market share was held by Rogers, Telus and Bell. In 2009, that market share increased to 95%. Similarly, in 2008, a weighty 94% of the wireless TSP's revenue market share was held by Rogers, Telus and Bell. In 2009, that market share increased to 95%.⁷²

As a result of the 2008 set aside, competition in the wireless market is beginning to increase with WIND, Public Mobile, and Mobilicity rolling out wireless services in 2009 - 2010. The benefits to the public, while only very recent, are noteworthy. Wireless plans and service offerings are increasing and diversifying and now provide choices for consumers to avoid burdensome long-term contracts and

⁷² CRTC, "Communications Monitoring Report," 2010, section 5.5 at page 158 [CRTC 2010].

hefty cancellation fees. Correspondingly, prices for consumers are decreasing.⁷³ In the past year, Canada has reached the important feat of having five or more competitors in the market, a recognized industry benchmark of more effective market competition.⁷⁴

However, that being said, the wireless market in Canada is still less competitive than in other countries, indicating a continued need to protect and foster the ability of new entrants to compete in the current market oligarchy. The average monthly price of wireless services is less competitive than in the United Kingdom, Australia and Japan.⁷⁵ In comparing international cell phone plans and prices for post-paid voice services and pre-paid voice services, Canada is consistently less competitive than the US and the UK.⁷⁶

While new entrants are beginning to challenge subscriber and revenue market strongholds, they are still in their infancy and face considerable threats of being bought out⁷⁷ or pushed out⁷⁸ of the market. In order to maintain any competitiveness in the wireless market now and in the future, these new entrants must be able to access the 700 MHz band spectrum. It is necessary to structure an

⁷³ To compete with the arrival of the new entrants, Rogers launched Chatr and Bell relaunched Solo Mobile, both with unlimited talk and text plans with prices similar to those offered by the new entrants. Rogers and Bell have not offered unlimited talk and text plans except recently through their discount brands Chatr and Solo Mobile.

⁷⁴ Johannes M. Bauer, Statement on Behalf of the Consumer Groups, June 22, 2005, CRTC PN 2005-2 at para. 77.

⁷⁵ CRTC 2010, *supra*, note 3, section 6.1 at p. 164.

⁷⁶ Chieh-yu Li and Bincy Ninan-Moses, "An International Comparison of Cell Phone Plans and Prices," New America Foundation, 2010, available at

http://newamerica.net/publications/policy/an_international_comparison_of_cell_phone_plans_and_prices.

⁷⁷ As a recent example in Canadian telecom history, Microcell hit financial difficulties as a new entrant and was bought out by Rogers. There is speculation that Wind may face the same threat, not because of financial difficulties, but because of difficulties surrounding Canadian ownership and control requirements.

⁷⁸ The Competition Bureau has recently begun legal proceedings against Rogers to stop what the Bureau has concluded is misleading advertising of Rogers' Chatr discount cell phone and text service. Melanie Aitken, Commissioner of Competition is quoted as saying "The [2008] spectrum auction was intended to enhance competition in the wireless sector...New entrants attempting to gain a foothold in the market should not be discredited by misleading claims made by their competitors," see

<http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03316.html>.

auction process whereby all stakeholders are able to participate in acquiring this fundamentally public resource, in order to allow new entrants to survive and stabilize in the wireless market.

It is trite to point out that no auction process is neutral. The structure of the auction will either facilitate the participation of only the highest bidders, or it will facilitate the participation of all important stakeholders. Because structuring the auction process is itself a value-laden exercise, the structure of the auction itself must be carefully chosen to reflect the values of all stakeholders - the public, the government, and large and small players - and must provide all stakeholders the ability to access this important public resource.

Set aside for new entrants and smaller players

As such, PIAC requests a minimum set aside of 25% for new entrants and smaller players to be structured into the auction. This would encourage competitive bidding because these integral players could bid aggressively against each other, without the impossible hurdle of bidding against “the big three.” Other salient benefits include the following:

First, structuring the auction to include the 25% set aside would allow new entrants who are currently only in certain major cities the capacity to grow into tier 1 spectrum users, promoting competition and promoting more efficient use of spectrum.

Second, promoting wireless competition in this way would help alleviate strain on wireline and could alleviate the need for usage based billing. As more people are subscribing to wireless services, and as competition brings more data and service

offerings for consumers, fewer people retain wireline services.⁷⁹ The transition to wireless will mean less “congestion” on wireline and may allow wireline services to provide what consumers are demanding – freedom from data caps and usage based billing.

PIAC recommends adoption of auction and post-auction rules that ensure the effectiveness of the 25% set aside and prevent parties from undermining the goals of the auction process. Anti-competitive post-auction market behaviours that would undermine the competitive and efficient use of spectrum should be prohibited by all necessary measures, including the following:

Restrictions on Dealing

Successful bidders on the set-aside spectrum should not be allowed to lease, transfer, exchange, or share this spectrum with an incumbent carrier during the term of its lease.

“Use it or lose it” rule

PIAC advocates for the adoption of a “use it or lose it rule.” This rule is key to enforcing competition and efficiency in the post-auction market. While not a customary measure imposed by Industry Canada, the “use it or lose it” rule is essential for the 700 MHz band. First, the 700 band is prime spectrum uniquely suited for wireless technology, the largest growing market in telecommunications. Second, the efficient and competitive use of the 700 band will determine the competitiveness of the wireless market in the immediate future. The use it or lose

⁷⁹ Organization for Economic Co-operation and Development, “Communications Outlook 2009,” at http://www.oecd.org/document/44/0,3343,en_2649_34225_43435308_1_1_1_1,00.html. The OECD reports “a significant substitution from fixed-line to wireless networks, resulting in a decline in the number of fixed-line subscribers” at pp 29-30.

it rule would still necessitate an accompanying prohibition on the transfer or sale of spectrum in order to ensure that no party could circumvent the rule, or skirt potential caps should those be introduced.

III. Public Uses

Public Uses set aside

Because the market alone cannot provide for various needs of Canadians, minimally intrusive measures are necessary to protect and promote public uses of spectrum. PIAC requests that a minimum 25 MHz of spectrum be set aside for public uses in order to meet the needs of the public and the objectives of the *Telecommunications Act*.⁸⁰

This request is in keeping with Industry Canada's own recognition of the importance of protecting public uses from the impossible burden of competing in the commercial market to acquire spectrum. As per Industry Canada's Framework for Spectrum Auction in Canada, at guideline 2.2.2, "priority users will not have to participate in an auction to acquire the frequencies...that they require for carrying out their operations. These users include those whose radiocommunications systems are vital to national sovereignty and defence, law enforcement, public safety, and emergency services."⁸¹ Public spectrum must be preserved for the public.

It is well known that the 700 MHz spectrum is highly sought-after for its ability to penetrate buildings and reach greater distances with less base equipment. This makes the 700 MHz band ideal for public uses, as public uses require the most

⁸⁰ *Supra* note 2.

⁸¹ Industry Canada, "Spectrum Management and Telecommunications Policy: Framework for Spectrum Auctions in Canada," October 2001 [the Framework].

economical, most efficient, and most reliable spectrum to protect the Canadian public.

While the Framework mentions priority uses including, *inter alia*, law enforcement, public safety, and emergency services, there are multiple other public uses which are vital to Canadians and which must fall under the rubric of “priority users.”

Specifically, the market alone cannot provide for public uses such as by libraries, school bus systems, snow removal, and similar non-emergency priority community needs. These priority users must also be able to access to spectrum outside the auction process by means of the 25 MHz set aside.

While the Act emphasizes the importance of making services accessible in rural areas, in all regions, and responding to the social requirements of users,⁸² certain obstacles block the ability of rural, smaller and cultural communities and municipalities from accessing telecommunications. As has been said, the public cannot afford to compete for a market share of spectrum. These priority users must also be able to access to spectrum outside the auction process by means of the 25 MHz set-aside.

In addition to leaving behind rural and cultural communities, the market can also fail urban communities. The City of Fredericton’s need to design and administer its free wireless internet infrastructure demonstrates the necessity of communities being able to provide an alternative for the public when the market has failed them.

⁸² *Supra* note 2 at s. 7(b),(h).

The *Telecommunications Act* also emphasizes the role of telecommunications in maintaining Canadian identity and sovereignty.⁸³ Like water, public parks, and other natural resources, spectrum is central to Canadian identity and sovereignty. Spectrum, as a public resource, cannot and should not be reduced to a mere commodity, sold to the highest bidder. The U.S. has recognized the need to protect prime 700 band spectrum, setting aside 24 MHz for public uses. Similarly, Canada must protect public spectrum by setting aside as much spectrum as necessary. At a minimum, this is 25 MHz.

Innovation reservation

In addition to the 25 MHz set-aside for public and priority uses, PIAC supports other parties' requests for a reservation of 10 MHz of spectrum for the stimulation of research, development and innovation in telecommunications and other industries in Canada.⁸⁴ The reservation would be used by those proving innovative purposes and uses including colleges, universities, community initiatives, and research programs among others. It must be kept in mind that the market cannot provide for non-commercial innovations and that current commercial applications are not necessarily representative of the full possibilities of using spectrum in accordance with national objectives. Thus, the government must not be short-sighted in auctioning off public resources when there are technologies, innovations and uses not presently anticipated, from which Canadians should not be precluded.

⁸³ *Ibid.*

⁸⁴ *Ibid.* at s.7(g).

IV. Other considerations

Open Access

PIAC notes the interest in some quarters in open access spectrum and believes that the concept presents opportunities for innovation and achievement of the objectives of the *Telecommunications Act* and the *Broadcasting Act*. PIAC submits that Industry Canada should consider steps that would consider the desirability of a transition toward an open access spectrum in the future.

Funding for public interest concerns

While spectrum auctions cannot address all decrements in meeting national telecommunications goals, PIAC notes the wisdom in setting aside some small portion of funds derived from the auction process to addressing public interest issues that are directly related to the use of spectrum. This may include funding independent research on issues associated with digital literacy, community and consumer access, and programming for national needs and innovation or implementing programs to accomplish the same.

In this way, the government may gain an invaluable resource that would assist in the iterative development of ways to meet the digital economic strategy. The public revenues from the auction provide a crucial opportunity to resource this potentially important work that might otherwise go unfunded and likely not accomplished. The industries most directly involved in the spectrum auction (wireless and internet providers) are largely forborne, making it essential that sufficient independent assistance is available to protect and advocate for the public interest in the formulation of public policy for these industries.

V. Conclusion:

The objectives of increasing, maintaining, and continuing market competition are best met by structuring the auction to provide for all players to participate.

Additionally, maintaining post-market competition is best met by structuring a “use it or lose it” and restraints on dealing in set aside spectrum rule.

Further, certain needs of Canadians can best be met outside the commercial market by way of a set aside of 25 MHz for public and priority uses and a reservation of 10 Mhz for innovation. PIAC urges that Industry Canada consider the advisability of open access spectrum. Finally, PIAC advocates the consideration of the creation of a fund to address unmet needs associated with matters of public interest in the use of spectrum. This would include independent research and implementation of programs that address gaps not being met by commercial service providers. These measures will help to ensure continued balancing of the rights of all participants in the wireless market, and assist the government in determining public policy.

*****End of Document*****

APPENDIX 11



Public Interest Advocacy Centre
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Tel: 613-562-4002 Fax: 613-0007 email: piac@piac.ca

May 16, 2011

Manager

Mobile Technology and Services
DGEPS
Industry Canada
Room 1612A
300 Slater Street
Ottawa, ON
K1A 0C8

Dear Sir:

**Re: Notice No. SMSE-005-11- Consultation on a Policy and Technical
Framework to License Spectrum in the Band 2500-2690 MHz**

We are writing to provide reply comments of the Public Interest Advocacy Centre with respect to the above noted consultation document. Thank you.

Yours truly,

Original signed

Michael Janigan
Executive Director / General Counsel

Part I

Publication Date: February 12, 2011

**Title: Notice No. SMSE-005-11- Consultation on a Policy and
Technical Framework to License Spectrum in the Band 2500-
2690 MHz**

Comments of

**The Public Interest Advocacy Centre
(PIAC)**

1204 – ONE Nicholas Street

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mjanigan@piac.ca

I. Introduction

1. The Public Interest Advocacy Centre, (PIAC), a non-profit organization with its head office in Ottawa, has for over thirty years been engaged in representing the interests of consumers and, in particular, vulnerable consumers concerning the delivery of important public services. This engagement has included both participating in proceedings of importance in the Canadian Radio-Television and Telecommunications Commission (CRTC), and research and advocacy on telecommunications and broadcasting issues.

II. Background

2. This reply is guided by our comments in the SMSE-018-10 (700 MHz band auction) consultation. In the 700 MHz Band consultation process, PIAC advocated for an auction structure that would allow all players to participate, particularly through a set aside for smaller players. Additionally, PIAC advocated for “use it or lose it,” “restraints on dealing,” and limited license term rules. Further, because certain needs of Canadians can only be met outside the commercial market, PIAC urged Industry Canada to structure a set aside of 25 MHz for public and priority uses.
3. PIAC has had the opportunity to review the comments filed in the initial round of comments concerning the licensing of spectrum in this band, and believes that there are additional concerns that should be reviewed that are directly relevant to the this current consultation. Accordingly, PIAC wished to raise these matters in reply.

III. Process

4. PIAC notes that a number of statements have been made in the received comments attempting to link the goal of rigorous competition and the use of market forces with the auction process itself. Rogers Communications (“Rogers”) notes, for example, “

“The 2500 MHz auction policy should allow those who value the spectrum the most to put it to its most productive use.”

Bell Mobility Inc. (Bell) notes ominously:

“However, there is a worrisome trend of Industry Canada becoming more interventionist in the wireless sector,”

5. In PIAC’s view, the auction process should be more than an exercise to inflate the Consolidated Revenue Account of the Government of Canada. Obtaining the highest bids for wireless spectrum is one way for the public to benefit in an indirect fashion through having increased monies at the disposal of their elected government. There is competition, of course in the bidding process, but the end result might reflect strategic and resource concerns rather than the most efficient and competitive allocation of spectrum.
6. Industry Canada’s role is to achieve the public interest objectives that go beyond public revenue enhancement. Of course, incumbent players might be prepared to pay a higher price to maintain market hegemony. In that case, those that “value the spectrum the most” may not be using spectrum in the most efficient way possible by simply aligning the use with its own business strategy.

7. Put in another fashion, structuring the auction through the use of spectrum caps or set asides, is no more interventionist than the determination to structure the auction so that the highest bid wins. It is simply shifts the components of a winning hand to considerations like the state of the market and the welfare of consumers and away from the strongest suit of the incumbents, namely existing resources and spectrum. Bell’s own experts, Drs. Waverman and Dasgupta note:

“In short, the spectrum allocation process should give low weight to government revenue considerations and much higher weight to allocations that lead to timely deployment of wireless services and to efficient wireless competition”⁸⁵

IV .Reply Argument

A. Block sizes:

8. PIAC recognizes that block sizing directly effects competition or the ability to maintain effective competition. As such, PIAC urges the Department to provide the market the flexibility to accommodate all bidders – not merely those bidders capable of purchasing and concentrating the largest contiguous blocks. In other words, incumbency in the 2500 MHz spectrum should not simply be given the greatest weight because of the ability to immediately fashion blocks of a sufficient size to be sustainable.

9. The incumbent carriers seek to walk between the raindrops by extolling the current state of wireless competition while maintaining that spectrum made available through spectrum caps and set asides to the new entrant drivers of existing competition would be risky and unsustainable. As well, the economic

⁸⁵ Waverman, Leonard, and Dasgupta, Kaylan, “Time to Set Aside Caps that Don’t Fit: The Limits of Spectrum Policy in Canada”, February 26, 2011, Para 36, (filed as Appendix 1 to Bell submissions April 19, 2011

consequences of the incumbents being shut out by a cap from acquiring spectrum in this band are alluded to in their submissions. Bell states that that it is “quickly using up its available spectrum”⁸⁶. Rogers warns that while it will have access to the bare minimum amount of contiguous spectrum required to provide LTE data speeds in certain geographic areas, in other areas it won’t without more spectrum.

10. It is to be noted that the United Kingdom’s national telecom regulator, Ofcom, seems to be approaching the question of ensuring economic and sustainable competition in a different fashion than simply let “the big dogs eat”. In its assessment of mobile competition released March 22, 2011, Ofcom proposed that national competition would be threatened if it didn’t ensure that at least four competitors had enough spectrum of the right kind to be able to run a national network of their own. This is to be ensured by a system of “floors” and “caps”. Any auction outcome that doesn’t meet the minimum requirements of 4 competitors with enough spectrum to run a national network would be disregarded.⁸⁷ There is some reason to believe the blandishments of the incumbents in this consultation urging laissez-faire would be given short shrift by Ofcom.

11. Ofcom has also sponsored research concerning the effect on spectrum efficiency and resultant capacity of improvements in 4G technologies. The research results show that forecast capacity improvements have been significantly underestimated previous studies.⁸⁸

⁸⁶ Comments of Bell Mobility, Canada Gazette Notice No. SMSE-005-11, p. 18

⁸⁷ “Assessment of future mobile competition and proposals for the award of 800 and 2.6 GHz spectrum and related issues”, Ofcom, March 22, 2011, p. 3

⁸⁸ “Report for Ofcom 4G Capacity Gains, Real Wireless27, January 2011

12. In releasing the research report described in paragraph 12, herein, Ofcom's Director of Research stated:

“The research that we commissioned indicates that early 4G mobile networks with standard configurations will be 3.3 times (230%) more spectrally efficient than today's standard 3G networks. To put this in context, a user on an early 4G network will be able to download a video in around a third of the time it takes today on a 3G network. It is anticipated that this efficiency will increase to approximately 5.5 times (450%) by 2020.”⁸⁹

13. At a minimum, Ofcom's new research counsels caution in relation to the acceptance of predictions of dire economic and efficiency consequences if the incumbents are capped at current levels of spectrum in this band.

14. PIAC echoes Public Mobile's statement that “[t]he creation of block sizes that encourage and foster sustainable competition is critical for the evolution of a dynamic wireless services market in the face of dominant incumbent carriers with vast spectrum reserves.”⁹⁰ Sustainable competition requires the entrance of newer, smaller competitors at the critical junctures of the 700 and 2500 MHz band auctions. In the 2500 MHz band auction in particular, sustained competition for the future is best accomplished by auctioning smaller blocks and allowing aggregation of blocks post-auction.

⁸⁹ “4G set to deliver capacity gains of more than 200% over 3G”, News Release, Ofcom, May 12, 2011 <http://media.ofcom.org.uk/2011/05/12/4g-set-to-deliver-capacity-gains-of-more-than-200-over-3g/>

⁹⁰ Public Mobile at page 4.

15. PIAC also supports the post-auction measure proposed by Telus and others, whereby parties can aggregate smaller blocks.⁹¹ PIAC also supports a post-auction mechanism for assigning or organizing blocks contiguously for those players who acquire multiple blocks.⁹² This way, auctioning smaller blocks would accommodate both smaller and larger players. The need for a process for coherent assemblage of spectrum should not automatically cede an advantage to the existing incumbents.

B. Tier Sizes:

16. PIAC stresses the importance of adopting tier sizes that allow the greatest competition in all markets. Regional differences must be accounted for, such that tier sizes do not preclude competitors from entering the market or maintaining a competitive presence in any region. This is best accomplished through a mixture of tier sizes.

C. Competitive Measures:

17. PIAC's underlying concerns about competition were put forth in the 700 MHz consultation. To reiterate, competition is not achieved by merely holding an auction for bidders to "compete" for resources; true competition requires that all parties have the opportunity to participate in the auction. Measures to promote real competition include ensuring block sizes and tier preferences do not eliminate, but rather encourage the participation of, smaller competitors. In addition to block sizes and tier preferences, caps and set asides provide opportunities to increase competitive presence in the 2500 MHz band currently dominated by Bell, Rogers and their jointly owned affiliate, Inukshuk.

⁹¹ Telus at para. 39.

⁹² Proposed by Research in Motion at para. 13.

18. Bell and Rogers vigorously assert in their comments of April 19, 2011 that the market is currently working competitively to the benefit of Canadians. Their credibility is not enhanced by the fact that similar claims were advanced by them when the framework spectrum auction consultation was initiated in 2007 by Canada Gazette Notice DGTP-001-07.
19. Bell's experts make heroic efforts to try to show there is no need for competition concerns with this important industry that is producing EBITDA levels of 45% and 43% in 2008 and 2009 respectively, and is dominated by three large players.⁹³ PIAC disagrees, and suggests that we cannot return to the wireless market complacency that was altered by Industry Canada's efforts in the last spectrum auction to build the groundwork for a competitive market.
20. PIAC stresses the importance of the Department's role in structuring competitive measures into the auction process. PIAC challenges Rogers' assertion that mechanisms such as set-asides and caps "distort auctions and handcuff carriers."⁹⁴ Rogers' assertion is erroneously based on the underlying premise that an "open" auction is free from structural biases. An open auction is not value-neutral; it will favour the participation of only the highest bidders. PIAC points out that the advantage the Big Three have going into the auctions holding 85% of the total available spectrum "does not promote a healthy competitive market and will only lead to further industry consolidation."⁹⁵ PIAC agrees that "maintaining or worse increasing the disparity of spectrum assets" would destroy sustainable competition.⁹⁶ Set-asides and caps are critical structural measures to promote sustainable competition. While they might come with a cost of reduced government revenue, in PIAC's view, this

⁹³ CRTC Communications Monitoring Report 2010

⁹⁴ Rogers at para. 38.

⁹⁵ Niagra Networks at para.7.

⁹⁶ *Ibid.*

does not constitute a subsidy but rather establishing the appropriate conditions for the operation of market forces.

i. Set-asides:

21. PIAC is concerned that “the combined population-weighted percentage of Bell and Rogers’ holdings of licensed spectrum in the 2500 MHz band is...98 percent.”⁹⁷ PIAC is also aware that Telus holds has access to a significant amount of spectrum via network sharing agreements with Bell, and that Telus may have “more spectrum than all new entrants combined.”⁹⁸ Therefore, PIAC asserts that because spectrum is already excessively concentrated by the Big Three, all available BRS spectrum should be set aside for smaller entrants only.⁹⁹

22. Failing that, PIAC supports set-asides of a sufficient amount of spectrum to allow new entrants into each of Regions A, B, and C. This could mean set-asides for participants holding less than 10% of the national wireless market, as this threshold was successful at promoting competition in the 2008 AWS auction.

23.PIAC supports the guideline proposed by Public Mobile, that an entity with more than 20 MHz of fallow PCS, Cellular, or AWS spectrum should be precluded from bidding in the 2500 MHz band auction.¹⁰⁰ This measure will prevent entities from buying up spectrum without plans to use it efficiently and promptly.

⁹⁷ MTS Allstream at para. 15

⁹⁸ Niagra Networks at para. 7.

⁹⁹ Niagra Networks at para. 11.0.

¹⁰⁰ Public mobile at page 11.

24. PIAC stresses the importance of restrictions on transferring set-aside spectrum to non-new entrants, or to entities with more than 20 MHz fallow spectrum, for period of 5 years.

ii. Spectrum Cap:

25. Just as a cap was useful in the 2001 PSC auction to allow smaller licensees to acquire spectrum, a cap is an important tool to promote competition in the 2500 MHz band, where the market is already dominated by three main entities.

26. Bell Mobility states that intervention in the auction process, such as through set asides or spectrum caps, significantly conflicts with the intent and spirit of the Policy Framework.¹⁰¹ However, PIAC submits that promoting competition and promoting the ability of smaller entities to participate in the market is a key to the objectives of the industry and the overall Canadian economy.¹⁰² The 2500 MHz auction is a critical juncture at which the Department can promote competition by preventing excessive future concentration of spectrum by the largest three service providers.

27. PIAC is concerned that no cap, or a cap set too high, would fail to prevent spectrum concentration. PIAC is not concerned that a spectrum cap could be set too low, thereby preventing the largest of the companies from acquiring sufficient spectrum to satisfy business needs. This apprehension

¹⁰¹ Bell Mobility at para. 71.

¹⁰² *Competition Act*, R.S. 1985, c. C-34, s. 1.1; See also *Telecommunications Act*, S.C. 1993, c. 38 which states that Canadian telecommunications policy has as one of its objectives to enhance the efficiency and competitiveness of Canadian telecommunications and to use regulation where required.

must be viewed in the context that the Big Three already dominate spectrum holdings, and have more spectrum than they are using.¹⁰³

28. PIAC submits that it is appropriate to cap the amount of spectrum each player can acquire in the 2500 MHz auction, relative to the amount of spectrum each has already acquired in that band. In other words, post-auction, no entity should hold over 50 MHz within the 2500 MHz band.

PIAC considers a cap per entity of 50 MHz within the 2500 MHz band to be a critically important measure to ensure future and sustained competition in the market.

29. PIAC submits that the cap should be in place for a minimum of five years to allow sufficient time for newer, smaller entrants to become better established in the market.

Changes to Foreign Investment Restrictions:

30. Changes to foreign investment restrictions would not affect PIAC's responses.

V. Conclusion:

31. For the reasons given above, Industry Canada should:

1. Set aside all available BRS spectrum for newer, smaller players; and failing that
2. Restrict participation in the set aside to players with less than 10% of the wireless market, or in the alternative, less than 20 MHz of fallow PCS, Cellular or AWS spectrum;

¹⁰³ As per MTS Allstream at para. 15 "the combined population-weighted percentage of Bell and Rogers' holdings of licensed spectrum in the 2500 MHz band is actually 98 percent". As per Eastlink at para. 9, Bell and Rogers through Inukshuk own 33% of available 2500 MHz spectrum in Region A and 67% of spectrum in Region B.

3. Prohibit the transfer of set-aside spectrum to the Big Three for a period of five years;

4. Cap the amount of spectrum each entity can hold to 50 MHz within the 2500 MHz band, for a period of five years.

32. PIAC urges to the Department to institute only those measures that promote equitable access to spectrum for new entrants and smaller players, to support the goal of increased competition in the market.

*****End of Document*****

Appendix 111

Introduction

This report is the product derived from the research and submissions of the Public Interest Advocacy Centre (PIAC) during 2011-2012 concerning the optimal results for ordinary Canadian consumers associated with spectrum auctions. This work enabled PIAC to provide input into both the Industry Canada consultation on the design of the auction of spectrum in the 700 MHz band and comments associated with the consultation process for the 2500-2690 MHz band. As well, PIAC reviewed the file and submissions concerning the proposed implementation of a combinatorial clock auction process and provided a supporting submission to that effect. All of these documents, are on the public record and have been included as appendices to this report as it was funding for this report that enabled their submission for consideration in the various consultative processes. We will not recapitulate all of the contents of the appendices, but will attempt to distill from that work the central elements of the consumer concerns with spectrum auctions.

What is spectrum and what is its importance

Some basic understanding of the science behind the use of wireless spectrum may be helpful. Radiation is energy in the form of waves or particles that travel through some form of matter or through space. Light and heat, for example, are forms of radiation. The radiation that is important for the purposes of this report involves electromagnetic radiation that is the product of combined and reinforcing electric and magnetic fields. These fields produce an electromagnetic ripple that propagates in a wavelike fashion through space. Electromagnetic radiation is made when an atom absorbs energy. The absorbed energy causes one or more electrons to change their locale within the atom. When the electron returns to its original position, an electromagnetic wave is produced. Depending on the kind of atom and the amount of energy, this electromagnetic radiation can take the form of heat, light, ultraviolet, or other electromagnetic waves.¹⁰⁴

A common way to cause atoms to absorb energy is through the bombardment of electricity upon the atoms that attempt to put the electrons in a high energy state. The electrons then try to return to a lower energy state by emitting that energy in the form of a wave. This occurs in neon signs. The neon atoms will be excited by

¹⁰⁴ <http://www.qrg.northwestern.edu/projects/vss/docs/thermal/3-what-makes-em-radiation.html>

electricity. The neon atoms will fall back to a lower energy state giving off the electromagnetic radiation that we see as light.¹⁰⁵

The energy of the electromagnetic wave that is produced is proportional to its frequency. The frequency of the radiation determines how it interacts with charged particles, especially with the electrons of atoms, which absorb and reemit the radiation. The energy of the electromagnetic wave is proportional to its frequency: such that the greater the frequency of the waves, the greater their energy.

Spectrum thus refers to the electromagnetic spectrum which consists of the entire range of electromagnetic communications frequencies, including those used for radio, radar, and television; the radio-frequency spectrum. It extends from electric power at the long wave-length end to gamma radiation at the shortwave end.¹⁰⁶ This spectrum provides the essential building block for wireless communications services.

In simple terms, information is transferred in the form of signals on a particular frequency over a particular area. A frequency is the number of waves generated in a period of time and is expressed in Hertz. One hertz means one wave per second. One kHz means one million waves per second and 1GHz means one billion waves per second. Wavelength is the distance between two waves. Higher frequencies have shorter wavelengths and the lower frequencies have long wavelengths.¹⁰⁷ Lower frequencies can reach longer distances than a high frequency wave.

The radio frequency spectrum is the part of the electromagnetic spectrum that is engaged by the operation of wireless mobile services. The range of the spectrum extends from 3 Hz to 300GHz. Within these frequencies, transmitters generate radio waves that are then picked up by antennas. Radio spectrum can carry codified information in the form of signals and thus can support a relatively inexpensive infrastructure that provide mobility and portability for mobile phones, radio and television broadcasting, two way radios, broadband services, radar , and satellite communications.¹⁰⁸

The radio spectrum is divided into different frequency bands that are for use by different types of signals. The more information is carried by a signal the more bandwidth the signal will require. Bandwidth is the range of frequencies that a signal occupies. If another user broadcasts within the bandwidth of a user's signal,

¹⁰⁵

¹⁰⁶ Laffin, N. and Dajka, B., "A simple guide to Radio Spectrum", Spectrum Management Magazine, January 2007

¹⁰⁷ Laffin, p.2

¹⁰⁸ Laffin, p.2

it can cause or receive interference. As part of the overall scheme of spectrum management, spectrum bands are divided into channels. The bandwidth of these channels can vary in each band. For example, the VHF band houses FM radio stations, each of which requires 300 kHz of bandwidth. The VHF spectrum bands are 100 MHz in size thus a station needs 3 channels of 100 kHz-wide channels.¹⁰⁹

Radio waves can be made to carry information through a process known as "modulation". This is a way of coding the information to be transmitted and causing the radio wave to vibrate according to the coded pattern. The coded radio wave energy is then radiated in all directions by a transmitting antenna. Some of these coded waves can be collected by a receiving antenna and the information is extracted by the process of demodulation, which simply involves separating the coded information from its carrier waves and decoding it.¹¹⁰

Higher frequencies can carry more information than lower frequencies because of greater bandwidth capacity so that signals that carry a significant amount of information will be generally allocated the higher frequency bands. This would include television, mobile phones or broadband. As well, a signal carried by emanating in the radio spectrum may have certain propagation characteristics that given it different abilities to bounce or penetrate walls, dependant on the frequency band.

Spectrum Management

Radio spectrum is a scarce resource and the management of spectrum involves more than national governments as radio waves do not respect sovereign borders. Failure to establish appropriate rights means that the possibility of interference by users grows exponentially greater. As frequencies in the radio spectrum are used for public sector priorities such as defense, aviation and emergency services, this is not simply a matter of convenience. The management of spectrum involves both the maximizing of the value of spectrum to society, as well as ensuring that the spectrum allocation gives the user the ability to carry out the use intended without interference.

¹⁰⁹ Laflin, p.3

¹¹⁰ Glass, M.C. and Rhodes, D.M., Catching the Wave: Should Canada Follow the Global Trend Toward Spectrum Auctions?, McGill Law Journal Vol. 44, 1999

As was noted earlier, spectrum management has to have national and international dimensions to avoid interference across borders. The international bodies usually attempt to set out high level principles and guidance while national entities provide specific rules and allocation.

The International Telecommunications Union, (ITU) a specialized agency of the United Nations allocates spectrum from 9 kHz to over 275 GHz for a range of different uses pursuant to its International Radio Regulations. The degree of flexibility of the regulations varies with the service with satellite regulations being very directive and mandatory while fixed and mobile regulations allowing for substantial national variation. The radio Regulations also set out the rules for coordination of countries' services with each other and for the assignment of rights to individual users.¹¹¹ Members are expected to bear in mind that countries should have equitable access to spectrum resources taking into account special needs of the developing countries and the geographical position of particular countries.¹¹² Members states are bound by the constitution of the ITU which, in addition to detailing and establishing rules of operation of the ITU also sets out certain fundamental legal principles governing international telecommunications.¹¹³

In addition to ITU regulations, there are also circumstances where multi-national bodies coordinate the management of spectrum across a region. In Europe , the European Union (EU) and the Confederation of European Post and Telecommunication Agencies help to harmonize and coordinate services that are licensed nationally . This harmonization may extend down to the specific mobile standard or protocol for operation of the service.

Canadian radio spectrum management

Under the *Radio Telegraph Act* of 1913, a minister of the federal government was granted the authority to license radio stations and to charge \$1 on each receiving set. By 1928, there were over 60 radio stations operating in Canada, most operating with low frequencies and on an intermittent basis.¹¹⁴

¹¹¹ Cave, M.,Doyle C. , Webb, W,, *Essentials of Modern Spectrum Management*, Cambridge University Press, 2007, p.5

¹¹² 1973 ITU Convention Article 44 (2)

¹¹³ Walden, I and Angell, J., *Telecommunications Law and Regulation*, Oxford Press (2nd ed) 2005, p.480

¹¹⁴ "Radio and Television Broadcasting", The Canadian Encyclopedia online at <http://www.thecanadianencyclopedia.com/articles/radio-and-television-broadcasting>

The federal government appointed Aird Commission Report of 1929 recommended that the federal government take control of broadcasting and the jurisdiction to do so was confirmed by the Judicial Committee of the Privy Council in 1932.¹¹⁵ The Bennett government's attempts to regulate and foster public broadcasting through the three person Canadian Radio Broadcasting Commission proved a failure and the subsequent government of Mackenzie King replaced the Commission with the Canadian Broadcasting Corporation through the 1936 Canadian Broadcasting Act. The CBC was effectively both the regulator of radio station licenses and the operator of its own service networks, two in English and one in French.

The advent of increased Canadian demands for television channels, and the Fowler Commission recommendations concerning regulatory independence in the 1950s led to the separation of the CBC from a new fifteen member authority, the Board of Broadcast Governors. The Board was empowered to recommend to the Minister the licensing of private and public (CBC) stations upon their application. The Minister (initially Communications, then Industry) exercised control over the allocation of spectrum to various uses within the international regulations and conventions and licensed entities to use that spectrum through the *Radiocommunications Act* and *Radiocommunications Regulations* while the regulatory control of the operations of the licensees in broadcasting and telecommunications passed to the Canadian Radio-Television Telecommunications Commission in 1976.

Since 1906, through the efforts of the ITU organized international conferences, the radio spectrum has been divided into wavelength and geographical bands, as different wavelengths of spectrum are regulated according to their atmospheric reach. Governments have some autonomy to allocate particular bands as they wish, within the bounds set by the International Telecommunications Union, and the tuning bounds set by particular technologies.¹¹⁶

The formation of national agencies around the world to license the use spectrum in different frequency bands took shape, particularly after the United States passed enabling legislation for a national authority to oversee the licensing and operations of spectrum use. The range of wave frequencies that comprise the radio spectrum was more properly created, or articulated, as an ordered sequence of waves by the technological generation of radio waves at a range of frequencies. But the radio spectrum that allows frequencies to be allocated to specific uses by the state and by international bodies was invented as an apparatus of power, a structure invented to

¹¹⁵

¹¹⁶ "The Invention of Radio Spectrum" Etherblog, October 18, 2008 at <http://www.etherblog.ethermap.org/?p=16>

control the way in which radio transmissions are used and by whom. It was a necessary division that made radio useable, but reduced the ways in which it could be used.¹¹⁷

In Canada, a first come, first served approach was initially used to license users. When the demand for spectrum exceeded the availability of spectrum, the Canadian government resorted to a staged comparative licensing process to determine the successful licensees. In the comparative process, there was effectively attention paid to the ability of the licensees to meet the objectives associated with the use of spectrum. A 1987 process commenced by the government through the Canada Gazette appeared to confirm support for the administrative comparative process of review and selection of successful applicants.¹¹⁸

As a result of a process commenced in 1989, the Department of Communications undertook a review of spectrum policy that included the release of a discussion papers in 1990 and 1991, and resulted in the release of the policy document, *Spectrum Policy Framework for Canada in 1992*.

The discussion papers reviewed the policy preferences of the government that included favouring applications for spectrum use that provided greater public benefits, better spectrum utilization and overall efficiency. Market demand and competition were to be considered in relation to new services and overall, the licensing system was proposed to be congruent with efficient development of broadcasting and telecommunications services in Canada.¹¹⁹

To reach those objectives, particularly where issues of competition, socioeconomic benefits service provisioning, and industry structure, were in play meant that different options based on markets were considered including lotteries and auctions contrasted against the traditional administrative comparative approach of the bureaucracy. The advantages of decreased complexity of decision-making coupled with the possibility of greater government revenue had to be considered against other public interest and competitive considerations. In the end, the administrative comparative approach was continued with the support of the majority of stakeholders with a number of goals including the following:

¹¹⁷ Ibid

¹¹⁸ Melynk, M. *Inappropriateness of Spectrum Auctioning in a Canadian Context*, PIAC, December 1997, p.34

¹¹⁹ Melynk. P.35

- Meeting underlying telecommunications, broadcasting, industrial, and social objectives
- Fairness and consistency towards licensees
- Administrative efficiency
- Accommodation of as many users as possible without interference
- Minimum regulatory and technical requirements

Despite the rejection of a market-based models in 1992, government fiscal constraints and restiveness about the allocation of spectrum use for new services provided another review of policy by the Chretien government in 1994. Coincident with the these factors, the restructuring of the regulation of the telecommunications industry as a whole had begun for other services including the previously sacrosanct residential local telephone service. Theoretical support also began to line up behind an auction based model for spectrum allocation.

Central to the auction proposition, is that those who are prepared to bid the most for the rights to use the frequencies to be allocated will put them to the best use. When there are scarce resources, it is theorized that those resources are the most efficiently allocated when they flow to those that pay the highest amount.¹²⁰ The auction process does away with the lengthy process of evaluation that may arise under comparative administrative method when there is insufficient spectrum to meet the demand of applicants. It was noted that the comparative process also known as a “beauty contest”:

“requires a great deal of information to make this decision-consequently, applications are long and detailed. They typically include engineering designs of communications equipment, construction plans for facilities, long term business and marketing plans, proof of sufficient financing to successfully operate the services in question, and proof of Canadian control and/or ownership if the service in question is subject to such restrictions. These applications can easily run up to a thousand pages in length and cost \$100,000 or more to prepare.”¹²¹

Other drawbacks are that scoring systems tend to give greater weight to tried and true systems and are wary of new products and innovations. As well, the beauty contest model lends itself to the possibility of favouritism and regulatory capture.

¹²⁰ Cave, p.43

¹²¹ Glass at p. 151

However, the relative objectivity, ease of administration and capture of economic rents for a public resource offered by the spectrum auction model did not enthrall all stakeholders. The ability to effect social policy objectives in broadcasting and telecommunications was seen to be subservient to the almighty dollar and it was speculated that the licenses would go to the deepest pockets of current players serving the largest markets.¹²² As well, while, the auction would bring greater government revenues, it was suspected that this simply added to the expense of licensed services used by consumers.

In 1996, the government released its findings on the consultation, noting that the new telecommunications environment demanded change and the current administrative consultative process was inadequate to meet these challenges.¹²³ Accordingly, it found that:

“Where mutually exclusive demand for the spectrum exists,(the introduction of competitive bidding procedures) represents a significant departure from past practice but evolving circumstances are such that this option is warranted and in the public interest.¹²⁴

Notably the majority of the responses filed in the consultation opposed this model. However, at the same time pressure was growing through the release of the government’s Information Highway report and Budget Plan in 1996 for the conduct of spectrum auctions for new wireless services. As well, the possibility of a successful financial result for government coffers based on the U.S. experience was undoubtedly instructive for the Industry Canada officials.

Early Auction Experience- United States of America

Spectrum management was being carried out by the Federal Communications Commission (FCC).Government and military uses of spectrum was administered by the National Telecommunications and Information Administration (NTIA). In the 90s, the government was faced with significant problems and delays involving the launching and licensing of cellular radio systems in hundreds of markets requiring comparative administrative hearings. The delays first resulted in the FCC experimenting with a system of lotteries to assign cellular licenses. This proved

¹²² Melynk, p.40

¹²³ Canada Gazette Part 1, Industry Canada Notice No. DGRB-001-96 *Review of the Comparative Selection and Radio Licensing Process*- Findings February 24, 1996.

¹²⁴ Ibid at p.16

unworkable principally because there was a deluge of participants and no assurance that the lottery winners could operate their licenses successfully.¹²⁵

In 1993, legislation passed by the U.S. Congress, the FCC was authorized to use auctions to promote intensive and efficient spectrum use and the development of new technologies.¹²⁶ From July 1994 to February 2001, the Federal Communications Commission (FCC) conducted 33 spectrum auctions, raising over \$40 billion for the U.S. Treasury. The *Balanced Budget Act of 1997* expanded the FCC's jurisdiction and eliminated lotteries as an allocation mechanism.

However, not all auctions were successful. The initial auction for WCS services¹²⁷ was something of a fiasco as there was no equipment readily available to use with the band spectrum with resultant confusion and auction revenues bringing auction revenues that were less than 5% of government expectations.

However, there was general satisfaction in the U.S. government with the use of the auctions and the conduct of the auctions through an open bidding rather than a sealed bid procedure. As one economist has noted, :

An essential advantage of open bidding is that the bidding process reveals information about valuations. This information promotes the efficient assignment of licenses, since bidders can condition their bids on more information.

The American PCS auctions, referenced earlier were conducted by way of simultaneous ascending auctions (SAA). Under SAA formats, the bidders bid up the price round by round until a round is reached where no new bids are received.¹²⁸ There is a minimum bid increment, and all active bidders must participate in every round. The success of the SAA format influenced other nations including Canada.

¹²⁵ Cramton P., "Spectrum Auctions" Handbook of Telecommunications Economics, Martin Cave, Sumit Majumdar, and Ingo Vogelsang, eds., Amsterdam: Elsevier Science B.V., Chapter 14, 605-639, 2002, p.4

¹²⁶ Cave, p. 51

¹²⁷ The Wireless Communications Service (WCS) is in the 2305-2320 and 2345-2360 MHz spectrum range. The most common use of WCS spectrum is mobile voice and data services, including cell phone, text messaging, and Internet..

¹²⁸ Cve, p.57

Canadian early experience with wireless spectrum allocation

The earliest experience associated with mobile wireless service involved radio spectrum involved with cellular service . Cellular service is terrestrial radio-based service providing two-way communications by dividing the serving area into a regular pattern of sub-areas or cells, each with a base station having a low-power transmitter and receiver.¹²⁹ In 1982, the federal department of Communications issued a notice that called for the allocation of two 20 MHz blocks of spectrum in the Cellular Band (830-890 MHz) one for telecommunications and the other for other applicants.¹³⁰ Two blocks of five (5) MHz of cellular spectrum were held in reserve for future use.¹³¹ In 1983 Cantel (now Rogers Wireless Inc) became the successful applicant for one of the 20MHz spectrum blocks with an invitation by the federal government for applications from telecommunications common carriers subsequently granted to Mobility Canada and its eleven telephone company shareholders. Both services were to become operational in 1985. The reserve cellular spectrum was later allocated to the existing holders of spectrum. The allocation had been done largely on a first come first serve basis.

By 1995, Canada was prepared to license services operating in the spectrum around 1900 MHz known as the PCS (Personal Communications Services). PCS services would provide two way digital voice, data and messaging services designed for second generation (2G) cellular use. Competitive concerns, as well as potential dominance by wire line telephone service providers resulted in the adoption of policies designed to promote both use and competition of the PCS spectrum. In the result, two national carriers independent of incumbent holders of spectrum were to be granted 30 MHz of spectrum.

In December 1995, the then Minister of Industry, John Manley, awarded PCS licences to 14 companies: two national 30 MHz PCS licences were awarded to Clearnet PCS Inc. and Microcell Networks Inc.; a national 10 MHz PCS licence was awarded to Rogers Cantel Mobile Inc.; and a 10 MHz PCS licence was awarded to the 11 regional shareholders of Mobility Personacom Canada Ltd. for their operating territories. Spectrum caps of 40 MHz were imposed for any one player and its affiliates.

¹²⁹ OECD Glossary of Statistical Terms at <http://stats.oecd.org/glossary/detail.asp?ID=4974>

¹³⁰ Gazette Notice DGTN-006-82/DGTR-017-82, *Cellular Mobile Radio Policy and Call for Licence Applications*

¹³¹¹³¹ “A Brief History of Cellular and PCS Licensing”, Spectrum Management and Telecommunications, at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08408.html#Cellular>

At this juncture, some in Canada were extolling the process of allocation of license to use spectrum by PCS carriers – a process that was driven by administrative comparative selection from a significant number of applicants. It was noted that the comparative selection process had resulted in a rollout of services that twice as fast as that in the USA. The contrast with the WCS auction problems in the United States was also drawn.¹³² Nonetheless, the financial returns from the US experience had been substantial compared with the costs to license holders in the Canadian process.

The vision of competition in the wireless market driven by the creation of two new wireless carriers, Clearnet and Microcell became clouded by a number of developments. In 1999, the federal government faced with demands for increased spectrum Industry announced that the spectrum aggregation limit applying to PCS would be raised from 40 MHz to 55 MHz. In addition, 40 MHz of additional spectrum for PCS would be licensed by auction.

For the two new national carriers additional spectrum for the dominant players would not be commercially advantageous. The bursting of the dot.com bubble had a chilling effect on the financing of telecom investment in this period, and many market players engaged in amalgamations and mergers to ensure access to the right content and applications to compete or dominate. In this environment, both Clearnet and Microcell were swallowed by one of the major common carriers. TELUS in 2000 concluded what was then the largest telecommunications deal in Canada's history by purchasing Clearnet for \$6.6 billion. TELUS itself had been formed in 1998 primarily by a merger of existing B.C. and Alberta incumbent telephone companies, purchase of what was to become TELUS Quebec, coupled with a withdrawal from the Mobility Canada Alliance. As part of the Clearnet deal, TELUS was obliged to return 20MHz of spectrum throughout Canada to comply with the spectrum cap.

Microcell was purchased by Rogers in September 2004, a transaction cleared of anticompetitive effect by the Competition Bureau in 2005, essentially on the basis of competition between the “Big Three” providers, TELUS Mobility, Bell Mobility and Rogers. The Bureau's Technical Backgrounder to the Microcell transaction approval noted:

There were a number of factors behind the Bureau's finding that there would continue to be vigorous and effective competition remaining following the merger, some of which included the introduction of a variety of new plans

¹³² Melynk p. 45

that combine minutes of use, handsets, service features and prices; the ability of competitors to add new customers, and; the willingness of Bell Mobility, Rogers and Telus Mobility to respond to price changes by others and to go after each others' territories.¹³³

In the interim, the 2001 auction of remaining PCS spectrum, took place including that returned by TELUS in the Clearnet deal. While the auction netted 1.48 billion, 44 of the 52 licenses were snapped up by the Big Three.¹³⁴ In the government's revised policy framework "A Spectrum Policy Framework for Canada 2002" the government announced its intention to collect "spectrum management costs where resource rents do not exist", and where they do, "fees will ensure fair economic return to the public as well as recovering spectrum management costs".¹³⁵ The market concentration associated with the ownership of spectrum licenses had not dented the government's enthusiasm for the auction process.

But while spectrum auctions continued to take place, there was a growing sentiment in the wireless market that the results were not matching the rhetoric of competition and efficient development of wireless technology. The Telecommunications Review Panel Report, commissioned by the Martin government, reported to the Harper Government in 2006 that:

"After reviewing this evidence, the Panel concludes that Canada's mobile wireless industry lags behind its major trading partners on a number of key measures. This finding reinforces the Panel's belief that because of the growing importance of this segment, Canada should develop a more efficient and vibrant wireless industry."¹³⁶

The CRTC's Communications Monitoring Report of 2008 reported that in 2007:

"Market share of the three largest wireless service providers did not change significantly in 2007 and continues to account for over 94% of the wireless market in Canada"¹³⁷

¹³³ "Acquisition of Microcell Telecommunications Inc. by Rogers Wireless Communications Inc". Competition Bureau, Technical Backgrounder, April 2005 at <http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/00257.html>

¹³⁴ A Brief History at footnote 28

¹³⁵ "A Spectrum Policy Framework for Canada", Industry Canada, 2(2002 Revised Edition) p. 15

¹³⁶ , The Telecommunications Review Panel Report, Industry Canada , 2006 Page I-21

¹³⁷ CRTC Communications Monitoring Report 2007 section 5.5

In September 2006, the Office of Consumer Affairs (OCA) of Industry Canada, put out an update to its 2004 *Consumer Trends Report* entitled “The Expansion of Cellphone Services”. It noted that:

On a global scale, however, Canada’s rate of adoption of wireless telecommunications is lagging, with just under 52 subscribers per 100 inhabitants at the end of the first quarter of 2006, a level reached by the United States in the second half of 2003 (Statistics Canada 2006) ... Canada also lags in terms of the number of wireless carriers where, although 94 percent of the Canadian population has access to three or more wireless service providers, the maximum number of wireless carriers in any given area is three”¹³⁸

The OCA report also noted consumer price and service dissatisfaction with a number of aspects of the business of mobile service:

“According to a 2005 study, the average Canadian wireless user was paying 60% more than what plans offer in the U.S., and 19% more than with European carriers (The SeaBoard Group 2005).s in Canada.”¹³⁹

“Various reports suggest a number of other issues arising from Canadians’ increasing interactions with the cellphone market. Cellphone information, in the form of both advertising and contracts, can be difficult to compare and decipher, leading to consumer confusion”.¹⁴⁰

Thus, as wireless services had been forborne from regulation in the previous decade, the auction process became a focus for effecting change to the exsiting state of affairs in the wireless industry, preferably by creation of a more competitive consumer friendly market.

In consultations with stakeholders, Industry Canada had also been made aware of the range of needs and expectations concerning the use of spectrum involving public interest uses including public safety and scientific uses and the availability of license exempt spectrum for addressing issues of the digital divide with linguistic minorities and rural communities. In its 2007 Spectrum Policy Framework Document, Industry Canada tried to bridge the gap between a straight ahead market forces approach - spectrum auction to the highest bidder – with more

¹³⁸ The Expansion of Cellphone Services, Office of Consumert Affairs, Industry Canada, Fall 2006 , p.2

¹³⁹ Ibid at p.5

¹⁴⁰ Ibid at p.6

social and economic tinkering to reach an appropriate result. It adopted as a policy objective for spectrum policy, “To maximize the economic and social benefits that Canadians derive from the use of the radio spectrum frequency resource”¹⁴¹

While the Guidelines in the aforesaid document emphasized the reliance on market forces, it also noted that notwithstanding that reliance, “ spectrum should be made available for a range of services that are in the public interest”.¹⁴²

The revised approach was also reflected in the results of the public consultation concerning the spectrum auction framework for the 2GHz Range also held in 2007. The spectrum was to accommodate Advanced Wireless Services for a wide range of applications, such as cellular telephony, data, multimedia, Internet Protocol (IP)-based applications and broadband Internet access using third generation (3G) cellular and other technologies. Gazette Notice No. DGTP-007-07 Policy Framework for the Auction for Spectrum Licences for Advanced Wireless Services and other Spectrum in the 2 GHz Range released at the same time as the policy document tried to adapt the existing market forces auction model to accommodate burgeoning public interest in competition and non-commercial usage. It was noted by Industry Canada on the first page of the document that:

“In considering the opening of this part of the radio spectrum to commercial applications through this auction, it was important for the department to examine whether measures should be taken to increase access to spectrum and foster greater competition in the wireless market.”¹⁴³

The Notice articulated the attempt to achieve multiple goals this way:

The department is committed to government policies which seek to rely on market forces to the maximum extent feasible for the provision of telecommunications services to Canadians. This policy approach can only be pursued in an environment where market forces can be expected to deliver, now and in the future, a level of competition sufficient to protect the interests of users. Accordingly, in making this resource available, a critical consideration has been to implement an auction framework that will help

¹⁴¹ “Spectrum Policy Framework for Canada”, Spectrum Management and Telecommunications, Industry Canada, June 2007 p.8

¹⁴² Ibid, p.9

¹⁴³ Canada Gazette Notice DGTP=007-07. P. 1

ensure that market forces support a telecommunications infrastructure that delivers innovation and consumer choice at competitive prices ¹⁴⁴

It was clear that Industry Canada saw the stakes as more than enhancing the government's Consolidated Revenue:

“Radio frequency spectrum is a finite public resource essential to entry into wireless markets, and that resource is not readily available on the open market. Access to spectrum is a barrier to entry that only government can lift, and the amount and type of spectrum that can be made available at any given time are dependent on a range of international and domestic factors. In this instance, the spectrum being made available for auction has characteristics and is of sufficient amount to make potential new entry feasible.”¹⁴⁵

After noting special measures put in place in the United States and the United Kingdom, Industry Canada further visited the special characteristics of the telecommunications market that make entry and competition difficult with incumbents. In focusing on spectrum auctions the Notice stated:

“...submissions received in the AWS consultation have shown how incumbents have an incentive to pay a premium for spectrum to prevent market entry. The ability of incumbents to effectively act on these incentives and opportunities depends on a number of factors. These include how competitive the market is, notably ease of entry, and the prevailing policy and regulatory framework. In the case of the forthcoming auction, the policy framework can serve to constrain such behaviour, thereby promoting competition.

In the result, 40 GHz of AWS Spectrum (or 40%) of the new spectrum was set aside for new entrants only in three frequency blocks with rules restricting the share of spectrum that could be owned by a successful bidder or its affiliate or associated entity (10% Of the national wireless revenue market).

The department also recognized the importance of roaming in maintaining a competitive wireless market:

¹⁴⁴ Idem at p.2

¹⁴⁵ Idem p.3

- “Recognizing that one or more regionally based new entrants may emerge from this auction, the department is mandating roaming outside of licensees’ territories for at least the 10-year term of AWS licences. Roaming is to be made available at commercial rates. As well, to facilitate new entry, incumbents will be required to make roaming available to new entrants within their licensed service areas, also at commercial rates, for a period of 5 years while the licensee builds out its network”.

The obligation for provision of roaming was immediately subject to scrutiny, Other requirements including mandated antenna sharing were put in place as well an obligation to roll out services that would figure into any renewal of the 10 year licenses. Industry Canada would use its existing simultaneous multiple-round ascending auction software for this auction.

The results of the 2008 auction were as follows:

Auction Summary 2008¹⁴⁶

Date	May 27, 2008
Licences	292 spectrum licences in Tier 2 and 3 service areas across the country
Bandwidth	Three blocks of 10 + 10 MHz and 3 blocks of 5 + 5 MHz - 1710-1755 MHz and 2110-2155MHz for Advanced Wireless Services (AWS)
	One block of 5 + 5 MHz - 1910-1915 MHz and 1990-1995 MHz for Personal Communications Services (PCS)
	One block of 5 MHz - 1670-1675 MHz
Rounds	331
Licences Won	282
Winning Bids	\$4,254,710,327

¹⁴⁶ Reprinted from Auction of Spectrum Licences for Advanced Wireless Services and Other Spectrum in the 2 GHz Range Auction of Spectrum Management and Telecommunications, Industry Canada at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf08891.html

Four tiers of service areas have been established. Tier 1 is a single national service area. Tier 2 consists of 14 large service areas covering all of Canada. There are 8 Tier 2 service areas that have provincial boundaries, and 6 that are within Ontario and Quebec. Tier 3 contains 59 smaller regional service areas and Tier 4 comprises 172 localized service areas.

The results are perhaps better understood when looking at the ownership of the companies who successfully engaged in the process:

Top Bidders:

Rogers	\$ 999,367,000
TELUS	\$ 879,889,000
Bell Mobility	\$ 740,928,000
Quebecor	\$ 554,549,000
Globalive	\$ 442,099,000
DAVE (Mobicity)	\$ 243,159,000
Shaw	\$ 189,519,000
SaskTel	\$ 65,690,000

While Shaw never launched services for the Northern Ontario and western Canada licenses that it acquired, as a result of the AWS auction, several new facilities-based wireless service providers were launched across Canada. Wind Mobile owned by Globalalive was quick off the mark with new service offerings in 2009 becoming the fifth largest mobile service in September 2012 with 500,000 customers¹⁴⁷. Public Mobile acquired spectrum in G Block for offering wireless services using the CDMA protocol shunned by other bidders. It now has 200,000 subscribers attracted by its appeal as a barebones discount carrier. A key advantage for Public Mobile is that unlike WIND and Mobicity, they possess spectrum in Quebec.¹⁴⁸ Videotron owned by Quebecor launched in 2010 again with aggressive marketing of unique products and services. Mobicity offering services in Toronto, Ottawa, Calgary and Edmonton, is said to have acquired 187,000 subscribers by the close of 2011.¹⁴⁹

¹⁴⁷ <http://www.newswire.ca/en/story/1037899/wind-mobile-surpasses-500-000-canadian-subscribers>

¹⁴⁸ Hardy, Ian, "Public Mobile CEO on new entrant consolidation", mobilesyrup, August 14, 2012

¹⁴⁹ Trichur, Rita, "Mobicity dubs itself 'fastest growing wireless upstart'", Globe and Mail, September 5, 2012

However, the dominance of the Big Three still exists with respect to both the share of the customer market and subscriber revenue. The CRTC 2012 Communication Monitoring Report reported the following:

Source: CRTC data collection

Province	Bell Group²	TCC	Rogers	New entrants³	Other¹
British Columbia	17%	39%	42%	2%	0%
Alberta	22%	49%	26%	2%	0%
Saskatchewan	8%	8%	13%	0%	72%
Manitoba	6%	9%	32%	0%	53%
Ontario	28%	19%	47%	5%	1%
Quebec	34%	28%	31%	7%	0%
New Brunswick	59%	20%	21%	0%	0%
Prince Edward Island	63%	20%	18%	0%	0%
Nova Scotia	53%	28%	19%	0%	0%
Newfoundland and Labrador	73%	24%	2%	0%	0%
The North ⁴	84%	0%	0%	0%	16%

5. “Other” includes MTS Allstream, SaskTel, and smaller WSPs.
6. “Bell Group” includes Bell Canada, Northwestel Mobility, Bell Mobility, Télébec, NorthernTel, SkyTerra, Virgin, and Latitude Wireless.
7. “New entrants” refers to the new wireless entities that acquired spectrum in Industry Canada’s 2008 AWS spectrum auction.
8. The North includes Yukon, the Northwest Territories, and Nunavut.

Wireless revenues for the new entrants amounted to about half the percentage of subscriber share¹⁵⁰. And complaints about service and billing continue to proliferate – in 2012, the Commissioner of Complaints for Telecommunications Services (CCTS) reported that complaints about telecommunications services had jumped about three fold since 2009 and over 60% of the recent complaints concerned wireless services.

¹⁵⁰ CRTC 2012 Communications Monitoring Report, Figure 5.5.4

The response of the Big Three to the tinkering with the auction format to set aside spectrum for new entrants was less than enthusiastic. Lawson Hunter , executive vice-president and chief corporate officer of Bell, said the spectrum could go for up to 40 per cent less than it would have if the auction were open to the highest bidder claiming an asset of Canada had been sold for well under the market price.¹⁵¹

Industry Canada's efforts at using the spectrum auction format to achieve economic and social objectives were not yet transformative and still resisted by the Big Three by the time of the consultations associated with the auction of 700 MHz and 2300 MHz spectrum in 2011.

International Developments in Spectrum Auctions

The complaints from Canada's incumbents that the set asides and other techniques for achieving objectives inside the spectrum auction format were subversive of the principles of using market forces

Even proponents of auctions have recognized that spectrum auctions cannot address all societal needs:

“Despite their virtues, standard auctions at best ensure that the bidder with the highest private value wins, rather than the bidder with the highest social value. Private and social values can diverge in these auctions because the winners will be competing in a marketplace. One collection of winners may lead to a more collusive industry structure. For example, a license may be worth more to an incumbent than a new entrant, simply because of the greater market power the incumbent would enjoy without the new entrant.”¹⁵²

The wireless network covers approximately 20% of Canada's geographic area and is available to 99% of Canadians. The advanced wireless network which supports handsets such as smartphones and turbo sticks, is available to 99% of Canadians. The LTE network is available to approximately 45% of Canadians. Wireless market sector revenues are the largest component (45%) of total telecommunications revenues. The wireless market sector consists of three large facilities-based national WSPs, a number of smaller regional facilities-based WSPs, and a small number of MVNOs. As of the first quarter 2012, there are three

¹⁵¹ “Spectrum auction at 2B and counting”, June 2, 2008 CBC News at <http://www.cbc.ca/news/technology/story/2008/06/02/tech-spectrum.html>

¹⁵² Cramton, p.4

carriers that have deployed the LTE network, mainly in Canada's urban centres. A number of new facilities-based WSPs have recently entered the wireless market sector. Mobile services provided by these new facilities-based WSPs are accessible to 55% of Canadians.¹⁵³

End of Document

¹⁵³ CRTC Communications Monitoring Report 2012, p. 165

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