



TELUS

Floor 16
200 Consilium Place
Scarborough, Ontario
Canada M1H 3J3

Ed Prior
Director
Government & Regulatory Affairs

416 279 7523 Telephone
416 279 3166 Facsimile
ed.prior@telus.com

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Peter Hill
Director, Spectrum Management Operations
Radiocommunications and
Broadcasting Regulatory Branch
Industry Canada
300 Slater Street
Ottawa, Ontario
K1A 0C8

Dear Mr. Hill:

Subject: Canada Gazette, Part I, April 2009, Consultation on Revisions to the Framework for Spectrum Auctions in Canada, Notice DGRB-001-09

TELUS Communications Company (TELUS) appreciates the opportunity to respond to the issues and questions raised by Industry Canada (the Department) in Canada Gazette Notice DGRB-001-09 (Consultation Paper). Our response is ordered first by our overarching policy position on fairness in whatever auction process is selected and then by the issues raised in the Consultation Paper.

General Position on a fair and open auction process

TELUS submits that it is less important as to what auction design is chosen than it is to choose a framework that does not undermine the very objectives that government seeks to achieve by holding an auction in the first place. These objectives should remain reliance on market forces to the greatest extent possible and the promotion of facilities-based competition. This was not the case in the recent AWS auction where interventionist and badly implemented policy so severely distorted a normal market-based auction that according to research we have undertaken, Canadian carriers overpaid by over \$2 billion due to poor auction design. While some may argue that the intent of the AWS auction was to ensure new entry in the wireless market, entry, which was likely to have occurred in any event, came at too high a price and as a result the ultimate \$4.3 billion return to the Treasury cannot be considered either a success or fair, particularly to incumbents whose prices were substantially and artificially inflated.

In essence, by creating a set aside and then not fixing the subsequent flaws in design that were a consequence of overlaying an extremely interventionist measure on a design created for a market driven auction, the government caused an overpayment of over \$2 billion. This was an abnormal

and economically irrational approach to facilitate the entry of cable companies that are able to generate hundreds of millions of dollars in free cash flow without any assistance and entry by a company primarily funded by an Egyptian multi-national wireless carrier with over 40 million subscribers from Pakistan to North Korea.

Put another way, by diverting over \$2 billion dollars to facilitate entry by corporations that were well able to finance their own bids, government has almost certainly assured that less capital will now be spent on network builds, particularly in rural and remote areas where returns are lowest. One cannot argue that the \$4.3 billion is in any way a fair return when prices are so clearly distorted, particularly by overcharging incumbents, in order to guarantee entry by companies well able to support their own entry strategy. It is not a fair return to anyone when capital for wireless expansion outside of core urban markets will be reduced significantly as a result of such unnecessary intervention.

Put in perspective, government has set aside a paltry \$225 million for wireline and wireless broadband expansion or 10 percent of just the overpayment, while virtually flushing the rest of the \$4 billion and more down the Windsor-Quebec corridor to prop up an old economy model that remains clearly broken. That is not even a return to the public, let alone fair

Efficiency and Transparency

While Industry Canada is mainly seeking comment in the Consultation paper on alternative forms of auctions (see our comments below), TELUS asserts that auctions are neither efficient nor optimal economically where government intervenes to skew the result. We submit that the auction of spectrum for AWS, a band where incumbents held not a MHz and where 45% of the total AWS spectrum being auctioned was set-aside such that only new entrants could bid on it was very destructive of value as a result of the overlay of non-economic intervention on an open auction design.

The auction lasted 331 rounds generating total revenue of CAD 4.26 billion.¹ These results far surpassed the CAD 1-1.5 billion forecasted by analysts. The reason for both the overpayment and what we believe is a global record for auction length is nothing less than a terribly flawed design that permitted competitors to exploit the process in order to harm incumbents. No more. No less.

Compared to other spectrum auctions, particularly in the US, we estimate that the overall auction revenue exceeded the average predicted value by an average of 138 percent with unrestricted and restricted licenses commanding an average premium of 174 and 94 percent, respectively, over comparable licenses. The average prices paid for the Canadian AWS spectrum also were also much higher than the average prices paid for the same spectrum in the U.S., even though

¹ To the best of our knowledge, the 331 rounds in a global record for spectrum auctions.

historically Canadian prices per MHz-pop were well below U.S. prices for identical spectrum.² As expected, although prices for the Canadian AWS spectrum far exceeded comparable licenses, they were determined by the same variables as in the U.S and elsewhere, namely bandwidth and the size of the population covered by the license.

Furthermore, the spectrum offered in Canada was technologically identical to the spectrum offered in the 2006 U.S. AWS auction, where licenses sold for much less than the Canadian licenses.

The high price of spectrum in the Canadian auction is contrary to historical patterns because Canadian spectrum has generally sold for less than spectrum in the U.S. If one assumed the spectrum in Canada was to be allocated in exactly the same fashion as elsewhere one would expect more of a historic or at least comparable result. However, this was not the case because the Canadian auction design and the licensing terms and conditions differed from other countries. Consequently, it is reasonable to conclude that the valuation premium observed in Canada is at least partially, if not fully, the result of the specific design used for the Canadian AWS auction.

This intervention can come at a very high price both to the industry and to the Canadian public. As evidenced in the UK 3G (third generation) auction and other 3G auctions in the early 2000s, excessively high spectrum prices can negatively affect competition, as investors tend to sell their holdings when earnings decrease and/or debt ratings drop. In severe cases, it can lead to market exit (as evidenced by the fallout of the UK 3G auction) or market consolidation because weaker market participants go bankrupt or are acquired by a more solvent company, all of which has a direct effect on competition.

This last point is particularly critical for the Canadian wireless sector that after many years of significant net investment and negative cumulative wireless cash flows has just recently been able to offset its investments and carrying charges. The network investment requirements for the AWS band, plus the CAD 4.26 billion spectrum price paid has the potential to reverse this development and return the Canadian wireless industry to an era of negative annual and cumulative cash flows.

In essence, the outcome of the Canadian AWS auction could be a repeat of the 3G auction outcome in the UK and other European countries as the cost of the licenses is the cost of staying in business. TELUS submits that this is not simply a case of arm chair quarter-backing but a critical matter to address. If the Canadian AWS auction design was responsible for the extremely high prices of the spectrum licenses, it could harm the very policy objectives that Industry

² For instance, the average price per MHz-Pop in the U.S. AWS auction was CAD 0.57, while the Canadian mean prices per MHz-Pop were CAD 1.26 and CAD 1.78 for restricted and unrestricted AWS spectrum, respectively.

Canada strives to achieve if the same auction design were to be used for future Canadian spectrum auctions.

To reduce future problems Industry Canada must address the consequence of granting preferences to bidders, particularly well-financed competitors already in the communications industry. While it would be extremely nice for TELUS to have the same preferential treatment as we enter the TV business rather than investing over a billion dollars in new broadband infrastructure, we continue to support a competitive market where the Department quits picking winners and losers.

Generally, preferential treatment of any bidding party carries a significant risk. Most importantly, it can lead to inefficient market entry. For this reason, before implementing an auction design that favors some bidders over others, it is necessary to balance carefully the costs and benefits of such programs or any regulatory intervention whatsoever. Specifically, if wireless markets are deemed competitive, the potential risk of harming competition through regulatory intervention outweighs the potential benefits of sustaining and enhancing competition.³ Even if it were to be determined that wireless markets are not competitive, the cause of the lack of competition must be examined. Simply adding more players to a market that is noncompetitive does not guarantee more competition. It is not entirely clear what Industry Canada was concerned about when it decided to establish set-asides and mandatory roaming and tower/site sharing provisions. The Department provided no analytical findings demonstrating the necessity and expected benefits of these regulatory tools. However, these provisions do appear to have had a major effect on the prices of the licenses.

The main component of the preferential treatment was the set-aside provision—spectrum reserved for entrants. A set-aside provision is not new to auction design and has often been discussed in the economic literature, which frequently points out the economic flaws.⁴ For instance, some economists have found that set-asides are unproductive and encourage inefficient entry into wireless markets. Most regulators also seem to have grown increasingly careful with their use of a set-aside provision in spectrum auctions. For instance, the U.S. Federal Communications Commission has refrained from using set-asides and comparable provisions in its more recent auctions, including the 2008 700 MHz auction. Furthermore, even when set-asides were used, they were typically restricted to a small percentage of the available spectrum. To the best of our knowledge, there is no precedent for reserving 40 of 90 MHz, or 45 percent of the spectrum, for entrants, which was the case in the Canadian AWS auction.

³ In competitive markets, no one single seller (or buyer) has the power to affect the market price of a service (or good). To determine the level of competition in a market, economists examine, among others, price levels, pricing trends, market shares, market share trends, abilities to collude, and market concentration.

⁴ See, for instance, Thomas W. Hazlett and Babette E.L. Boliek, "Use of Designated Entity Preferences in Assigning Wireless Licenses," *Federal Communications Law Journal* 51, 640, or Robert W. Crandall and Allan T. Ingraham, "The Adverse Economic Effects of Spectrum Set-Asides," *Canadian Journal of Law & Technology*, Vol. 6, November 2007, 131–140, n19.

The set-aside provision in the Canadian AWS auction resulted in a double tax for the incumbents. First, set-asides decrease the supply of spectrum available to incumbents, other things being equal thereby driving up the price of the available spectrum artificially. Second, as implemented in Canada, the set-aside provision artificially raised the demand for spectrum because the entrants were allowed to place bids on unrestricted spectrum with no intention of buying, but with the objective of increasing the prices the incumbents would have to pay. We refer to this behavior as “fake bidding.” We also recognize that if the department is going to create a model that allows one competitor to substantially raise another carrier’s cost and thereby deplete capital its competitor might otherwise use to compete, the first carrier will of course pursue the strategy.

While a reduction in supply is purely an economic fact, proving that the entrants engaged in fake bidding is more complicated. Auction behavior depends on many factors including, among other things, auction strategy, financial strength, dynamics and results from preceding auction rounds, and economically rational or irrational behavior. In addition, auction eligibility rules require that bidders maintain a certain level of activity. Thus, what might appear to be a fake bid may in fact be a bid to maintain eligibility. This type of behavior is referred to as “parking of points.” Therefore, identifying fake bidding is prone to Type I errors—or “false positives.” Nevertheless, fake bidding can be identified with reasonable accuracy. Specifically, when an entrant bids on an unrestricted license and does not bid on the identical set-aside, it is likely an example of fake bidding. Similarly, when an entrant bids on an unrestricted license even though it could acquire an equivalent set-aside license at a lower (often much lower) price, it is also potential fake bidding.

The set-aside provision also provided entrants with a possible strategic advantage because it allowed them to bid on open spectrum to maintain eligibility, while waiting for competitive entrants to drop out of the bidding. The consequences of this strategy are at least threefold. First, it results in an increase in the incumbents’ license prices. Second, it jeopardizes one of the most fundamental auction design features, the eligibility rule. Third, it likely explains the record number of rounds it took to complete this auction.

Industry Canada’s definition of an “entrant” intensified the effect of both the set-aside and fake bidding. Industry Canada determined that all bidders with less than 10 percent of the national wireless market would be considered new entrants. In practicality, this meant that only Rogers, TELUS, and Bell Canada were subject to restrictions. All other bidders received preferential treatment. Defining an entrant on its national market share is shortsighted. First, it fails to consider regional incumbents, such as SaskTel and MTS that might have an incentive to enhance their regional market positions. Second, the definition fails to consider competition from wireless, wireline, satellite, and especially converged players, which are often large, well-capitalized firms with strong customer relationships, such as Shaw and Videotron that compete directly with the three nationwide incumbents. Third, the definition seems inconsistent with the

market definition used by the Canadian Competition Bureau that confines its definition to provincial, not national. It appears that Industry Canada failed to assess the incentive of so-called entrants to significantly raise the incumbents' costs, which they clearly did. Consequently, the failure to classify at least some of the larger, regional entrants as incumbents made it easier for them to protect and strengthen their current market position at the expense of the nationwide carriers.

TELUS recognizes it was not the intent of the Department to push up returns to Treasury at the expense of incumbents, but that said having seen that result there can be no justification in terms of fairness for creating the same conditions in future auctions.

Comments are sought on the appropriate level of regulation that the Department should use when managing spectrum into the future with respect to the subjects raised in this paper.

TELUS supports the *Telecommunications Policy Review Panel Final Report* recommendations of “relying as much as possible on market-based approaches to spectrum management” and “moving toward the establishment of market-based exclusive spectrum rights (i.e. the ability to buy, sell, and lease spectrum) and elimination of barriers to the development of secondary markets in spectrum.”⁵ These recommendations were supported by Professor Cave and his colleagues when they said “The Panel’s recommendations are consistent with a sizable body of economic, legal and technical analysis appearing in the literature that considers that market-based approaches to spectrum management would bring significant improvements in economic efficiency, competition and innovation.”⁶

In June of 2007 the Department incorporated this approach into the revised *Spectrum Policy Framework for Canada*. Of particular note are the provisions that:

“(d) Regulatory measures, where required, should be minimally intrusive, efficient and effective.

(e) Regulation should be open, transparent and reasoned, and developed through public consultation, where appropriate.

(f) Spectrum management practices, including licensing methods, should minimize administrative burden and be responsive to changing technology and market place demands.

(h) Spectrum policy and management should support the efficient functioning of markets by:

- Making spectrum available for use in a timely fashion;

⁵ Telecommunications Policy Review Panel, Final Report, March 2006, recommendations 5-9 (c) & (d), page 5-21.

⁶ Study of Market-based Exclusive Spectrum Rights, McLean Foster & Co., August 21, 2007, section 2.1, page 9.

- Facilitating secondary markets for spectrum authorizations;⁷

TELUS supports these guidelines as appropriate in determining the level of regulation for spectrum management into the future. As noted in the Cave report, “While the rationale for market mechanisms is clearly supported in the SPF, it is evident that the legal means are not in place to facilitate establishing secondary markets in a flexible manner, in other words, without both parties in secondary trades having to seek specific Ministerial approval rather than relying on self-certification for example (subject to audit by the Department).”⁸

In this context the Cave report⁹ makes a series of detailed recommendations to assist Industry Canada in accelerating the reform of spectrum management in Canada. These recommendations fall into three main categories; policies related to market-based exclusive spectrum rights, changes to the institutional framework for spectrum management and those relating to the implementation of spectrum trading. **TELUS supports these recommendations.**

Comments are sought on the various types of spectrum auctions and auction formats to be used by the Department as well as the circumstances under which a particular format or attribute should or should not be applied.

Auction Format

As the Department notes in the Consultation Paper “Auctions are an efficient market-based means of assigning spectrum licences, through a fair and transparent process, to those who value them most.”¹⁰ TELUS agrees. The other two main types of licensing are generally not appropriate for spectrum licences where demand exceeds supply. The Comparative Requirements licensing method is time and resource consuming and more importantly non-transparent. The third licensing method employed by the Department, the First Come – First Served is only suitable in those situations where supply exceeds demand. Although efficient spectrum auctions can be challenging to design as Peter Cramton noted recently “From an auction theory viewpoint, spectrum auctions are both challenging and interesting. The government is auctioning many items that are heterogeneous but similar. Often there are competing technologies as well as companies to provide a wide range of communications services. As a result, the setting has a complex structure of substitutes and complements. This is among the most difficult auction settings seen in practice.”¹¹

⁷ Spectrum Policy Framework for Canada, Industry Canada, June 13, 2007, section 4.4, page 9.

⁸ Study of market-based Exclusive Spectrum Rights, Op. Cit., section 4.10, page 69.

⁹ Study of Market-based Exclusive Spectrum Rights, Op. Cit., section 6 pages 95-99.

¹⁰ DGRB-001-09, Consultation on Revisions to the Framework for Spectrum Auctions in Canada, Industry Canada, April, 2009, section 2, page 2.

¹¹ Spectrum Auction Design, Peter Cramton, Department of Economics, University of Maryland, April 22, 2009, section 1, page2.

Alternative auction formats

As can be seen from the discussion that preceded this section, a badly designed auction can destroy value. **TELUS strongly believes that the Department's priority should be a fair, market-based auction devoid of artificial and unnecessary interventions.** Without further detail, we are somewhat agnostic on what type of auction is best and suspect all would be destructive if the intervention and gaming that played out in the AWS auction happened again.

Industry Canada and indeed most administrations around the world have used variants of the simultaneous multiple-round ascending (SMRA) auction format to allocate spectrum licences on a competitive basis. It is universally recognized that an SMRA spectrum auction undistorted by any constraints on any participants results in an economically efficient allocation of spectrum licences. One disadvantage that has been identified with SMRA auctions is their length. The AWS spectrum auction is a case in point. These auctions see the majority of the licences decided relatively early in the auction and the remaining licences are then continuously contended for among the auction participants. Unfortunately the design of the SMRA auction requires this as the closing rule (the rule that ends the auction) is set such as to always allow a bidder to respond to a bid. This closing rule is required to mitigate gaming among the participants and ensure that the licences go to those that value them the most. If an SMRA auction format is chosen it must be recognized that it comes with the potential to become a lengthy process. This length is off-set by the familiarity that both the Department and industry participants have developed with the SMRA format. There have been many SMRA format spectrum auctions around the world to-date, over 80 in North America, and information concerning the strategies and outcomes from this format are widely available.

The Department in the Consultation Paper pointed out another problem with current SMRA auctions “However, when synergies exist between licences, it may be difficult for bidders to assemble the package of licences that best fits their business plan.”¹² The Department then goes on to note that this can be addressed by the use of combinatorial or package bidding. The extra levels of complexity that this introduces to auction design have limited the use of this capability to very few auctions involving only a few licences. This complexity is not an inherent design issue for SMRA as combinatorial bidding will greatly increase the complexity of any auction format, the greater number of potential combinations on offer the greater the levels of complexity introduced. In a Canadian spectrum auction involving combinatorial bidding the licence tier used for the licences would probably have to be limited to tier 2 or tier 1 if the recent FCC process were to be followed. If the Department were to use the same FCC approach that was used in the U.S. AWS spectrum auction there is another difficulty and this has been identified as the exposure or substitution problem along with the associated hold-up problem. Peter Cramton illustrated this with an example from the U.S. AWS spectrum auction thusly “When Verizon is bumped off the large F block licence it is easy for Verizon to substitute down to the A block, submitting say the 100 or so bids on the A lots that roughly cover the corresponding F lot. The problem is that once shifting down it would be nearly impossible to

¹² DGRB-001-09, Op. Cit., section 3.1, page 3.

shift back up to F. The reason is that in subsequent rounds Verizon would only be bumped from some of the corresponding A block lots. Verizon would have to withdraw from many A lots in order to return to F, exposing itself to large withdrawal penalties. In addition on block A, Verizon would be vulnerable to various hold-up strategies, where speculators could pick important holes in a synergistic aggregation of lots.”¹³

TELUS notes that the FCC has sought to address the combinatorial challenge by developing a new auction format SMRPB that has not been highly successful. In a relatively recent paper¹⁴ the “standard” SMRA format as well as the SMRPB formats performed less well than the combinatorial alternatives tested against them. The clear winner was a combinatorial clock format, that, it should be noted has not been used “in the field” in an actual spectrum auction.

The Department makes reference in the Consultation Paper to combinatorial bidding in a standard clock auction. Without more information regarding the process and the nature of the referenced auction format it is difficult to see how this would work and therefore be in a position to support the concept. The auction type referenced relies on one or more algorithms which could be open to manipulation or gaming as the other auction formats are. Clearly if a clock auction with combinatorial bidding were introduced by Industry Canada then the algorithm would have to be completely transparent and rigorously constructed and tested. The Department, in its reference could be referring to the package clock auction design outlined by Peter Cramton in his very recent Spectrum Auction Design¹⁵ paper. The auction format outlined in Mr. Cramton’s paper calls for a clock stage followed by a supplementary round where “Bidders can increase their bids on packages bid in the clock stage and submit new bids on other packages.”¹⁶ In the third stage “All the clock bids and the supplementary round bids are then run through an optimizer to determine the value maximizing assignment of the spectrum.”¹⁷ Presumably this optimizer is what is meant by the Department in referencing an algorithm. Although a variant of this three stage format has been successfully used by Ofcom in the 10 – 40 GHz auction and the L-band auction the new format with an apparently improved activity rule has not yet been tested in field conditions. The major difference in formats appears to be the adoption of a different activity rule to use a simplified form of revealed preference in the optimizer. TELUS understands that Ofcom intends to trial this new format in their 2.6 GHz spectrum auction. A key component of this particular auction format is the process whereby participants are enabled to, in effect, design their own band plan that they will bid on. This feature perhaps will work well in the U.K with its geographic isolation from neighbouring states with their band plans. TELUS cautions that in our 2.5 GHz band there will be incumbents who vastly increase the interference complexities and issues in allowing spectrum auction participants such freedom here. Too, spectrum harmonization with the U.S. has been a longstanding and successful feature of Canada’s spectrum policy. This is important not just from an interference issues perspective but

¹³ Spectrum Auction Design, Op. Cit., section 2.1, page 9.

¹⁴ An Experimental Test of Flexible Combinatorial Spectrum Auction Formats, Christopher Brunner et al, California Institute of Technology, September 6, 2007.

¹⁵ Spectrum Auction Design, Op. Cit., section 1.2, page 4.

¹⁶ Ibid.

¹⁷ Ibid.

also in procurement of network and consumer equipment. Canadians have long benefited from this policy and the U.S. has already held its spectrum auction in the 700 MHz band that defined that band plan in the U.S. There could be significant difficulties if the Department were to use such a user defined band plan approach in either the upcoming 2.5 GHz or 700 MHz spectrum auctions.

The Department has also discussed generally the use of clock auctions in the Consultation Paper. This form of auction is akin to the SMRA format and, as pointed out above, may be faster but this may or may not be significant. Paul Milgrom had this to say “Clock auctions embody many of the same principles as the simultaneous ascending auction and the design can accommodate both heterogeneous items requiring individual process and homogeneous items requiring a single price. Though the clock auction is simple in principle, implementing it poses practical challenges. Because the auctioneer increases bids in discrete increments, prices can overshoot, requiring subtle adjustments to the auction design. For example, in the simple case described above, what should the rules specify if ten units of a good are offered but demand drops from eleven to nine in some round when the price increases? As discussed below, one theoretical solution to this problem is for the auctioneer to get more information from bidders than just point estimates of their demand at prevailing prices. The auctioneer can then use the additional information to decide to whom to assign the goods as changing prices change the signs of excess demands.”¹⁸ Again, if the Department proposed to use a clock auction format for a spectrum auction the type and form of the additional information would have to be known by all participants before the commencement of the auction and subject to full public consultation. Mr. Milgrom concluded his discussion of the clock auction format thusly “When there are a few homogeneous classes, each with many goods, the clock auction design can run much faster than the standard simultaneous ascending auction design, and it leads, with straightforward bidding, to the same near-competitive outcomes. However to work effectively, clock auctions require more information than just a single bidder demand vector at each price vector. As of this writing, practical bidder interfaces to acquire the needed information have yet to be devised.”¹⁹ Peter Cramton uses his optimizer to do this which may be a way forward although there have been other alternatives in other designs recently.

Before leaving the discussion of clock and SMRA spectrum formats it might do well to remind ourselves of the strengths of the SMRA design. As P. Cramton said “It is an effective and simple price discovery process. It allows arbitrage across substitutes. It lets bidders piece together desirable packages of items. And, because of the dynamic process, it reduces the winner’s curse by revealing common value information during the auction.”²⁰ Because there is, as Cramton also notes, limited substitution across licences this increases the desirability of an auction format that handles combinatorial or package bidding efficiently and effectively. The package clock auction format seems to meet this objective better. A major caveat with respect to Cramton’s design, as outlined above, is that letting auction participants effectively design their own band plan works

¹⁸ Putting Auction Theory to Work, Paul Milgrom, Cambridge University Press, 2004, Chapter 7.2.2, page 280.

¹⁹ Putting Auction Theory to Work, Op. Cit., chapter 7.1 page 294.

²⁰ Spectrum Auction Design, Op. Cit., section 2, page 6.

well in an island environment such as the United Kingdom or Australia or New Zealand. It can cause major interference and coordination issues in an environment such as Canada with the world's longest border with a much larger neighbour who already has an established band plan for the spectrum to be auctioned.

Given the strengths of the SMRA design **TELUS recommends that any move away to another auction format be the subject of a separate consultation, not one associated with a particular band but rather one that focuses purely on alternative auction formats, perhaps including industry workshops as part of the process.** Introducing a new spectrum auction format for use with major spectrum auctions in Canada risks getting caught up in all the other issues e.g. eligibility, timing, reserve prices and the like and losing the opportunity to really focus, with the industry, on auction format. Implementing such a process would help the industry, fully conversant with the SMAR format, understand the need for change and why it should be the format the Department is then proposing. TELUS is not aware of any consultation by the Department specifically on the addition of the Vickery second-price format. TELUS notes that introducing spectrum auction formats without consultation detracts from regulatory and more importantly business certainty. Typically spectrum auctions in Canada involve a large amount of capital and the Department does the industry a large disavour by not fully and actively consulting on any new format it is considering adopting.

TELUS notes that the Department recently employed a sealed-bid, second-price auction or Vickery auction for the two national spectrum licences in the bands 849-851 MHz and 894-896 MHz for Air-Ground Services and is using it for the Auction of Residual Spectrum Licences in the 2300 MHz and 3500 MHz Bands for the 10 tier 4 licences available. TELUS further notes that there were only two bidders participating in the Air-Ground Services spectrum auction. The Vickery auction format is an efficient format for instances where the items on offer and the bidders are both small in number. As the numbers of each go up the problems with this format multiply. Paul Milgrom discusses the disadvantages of the Vickery auction format and divides them into three classes; practical disadvantages, monotonicity problems and merger-investment disadvantages. Chief among the practical disadvantages is the complexity as the number of units on offer increase. "For example, consider a Vickery auction to sell twenty spectrum licences. In principle, each bidder must submit bids on every combination of licences he might win, but there are more than one million such combinations. If the bidder must incur even a small cost to determine a value for each distinct combination of licences, then the cost of running a Vickery auction makes it impractical."²¹ Vickery auctions would seem suited to those instances where there are very few items on offer and very few bidders. In proposing to use this format for another spectrum auction the Department should be prepared to change the format if the number of participants or licences on offer seems likely to be more. Paul Milgrom summarized it this way "Auctions in which bidders bid for packages of items are more complicated than simple auctions for separate items. Package auctions are most attractive when they can help bidders avoid the problems of winning some assets without acquiring needed complementary assets, that is, when the substitutes condition may fail. In exactly these conditions, however, the preceding

²¹ Putting Auction Theory to Work, Op. Cit., chapter 2.5, page 57.

analysis indicates that the Vickery auction has serious and possibly fatal defects as a practical mechanism.”²²

On a final note TELUS suggests that the FCC experiment with anonymous bidding was greeted with mixed reviews. A prime attribute in efficient auction design for multiple round auctions is the process of price discovery by the participants. Anonymous bidding removes this in the interests of reducing the potential for signalling, coordinated bidding and retaliatory bidding. A well designed auction format restricts these behaviours and the threat of retaliatory bidding disciplines all participants toward straight forward bidding behaviour. Absent the ability to discipline participants gaming the results of the auction, non-gaming participants are at high risk to suffer economic costs that are an inefficient outcome of an auction.

Foreign Ownership Restrictions

TELUS believes that the best way to manage the issue of foreign ownership restrictions is to **have each potential participant submit their Canadian ownership and control filings before the commencement of the spectrum auction.** This would avoid the real risk of a participant failing to meet this condition after the auction and after they have both acquired a number of licences and distorted the pricing for all other participants. The Department has been reluctant to do this citing the additional workload of examining filings of potential bidders who then choose not to take part in the spectrum auction. One possible way around this difficulty may be to levy a filing fee that is refundable only after successful participation in the spectrum auction. This would deter “window shoppers” and ensure that all auction participants were fully eligible to compete.

Comments are sought o the Department using auctions to select those to whom a satellite authorization will be issued.

TELUS encourages the Department to use auctions to select those to whom a satellite authorization will be issued, in those cases where there is competitive interest. Given that there would generally be only one authorization issued at a time and given that the financial requirements of a satellite launch limit the number of applicants this would seem a good place to use a Vickery auction format with a rigorously developed reserve price to lessen any concerns respecting gaming or collusion that might arise.

Comments are sought on all issues relating to the Department’s proposal regarding the renewal process for long-term licences, including:

- *that licences continue to have a high expectation of renewal;*

²² Putting Auction Theory to Work, Op. Cit., chapter 8.1, page 315.

TELUS recommends that the renewed licences come with a high expectation of renewal in order to solidify business certainty. The nature of the wireless networks business, and other high fixed cost businesses, is one of significant upfront investment with returns only earned over a long period of time. A review of the public financial statements of the three largest wireless carriers in Canada shows that it took over 21 years before the industry was able to earn back the investment made to establish the networks. Given the huge embedded investment and ongoing capital and operating expenditures made by all cellular and PCS carriers coupled with the current and, as most economic pundits have it, ongoing economic rigours, having a high expectation of renewal attached to these licences culminates in lower costs of capital and longer planning horizons for these networks. This in turn benefits Canadians in both better and more intensive coverage and in competitive rivalry. TELUS notes that in DGRB-004-02 the cellular and incumbent PCS licences were granted with a high expectation of renewal, just as the PCS spectrum licences acquired in the 2001 spectrum auction were.²³ Somewhere along the line and without specifically consulting on the matter this commitment has gone missing.

The newly acquired AWS spectrum licences merely state that “The process for issuing licences after this term and any issues related to renewal will be determined by the Minister of Industry”.²⁴ The expectation of renewal is as important as the licence term in ensuring business confidence and hence certainty. Moreover, TELUS notes that in the Consultation Paper and speaking of the renewal of auctioned licences the Department “recognizes the significant investments made by licensees to establish networks and the importance of long-term certainty that the industry requires to provide a stable investment climate. It is therefore proposed that licences continue to have a high expectation of renewal per the existing Framework.”²⁵ **TELUS recommends that all spectrum licences, those assigned by other licensing methods such as the cellular and PCS licences as well as auctioned spectrum licences come with a high expectation of renewal.**

- *that licences continue to be issued for 10-year terms;*

As previously noted in our response to DGRB-002-09, TELUS believes that the renewal term for cellular/PCS licences should be longer than the proposed 10 year term. In the current Consultation Paper the Department states that its reluctance to set a longer licence term is because “Industry Canada’s powers to revoke differ from those in other countries and do not include the power to revoke for spectrum management reasons”²⁶ or in other words if reallocation of the spectrum to a different use was thought necessary.

²³ DGRB-004-02, Consultation on a New Fee and Licensing Regime for Cellular and Incumbent Personal Communications Services (PCS) licensees, page 14, section 5.3.1.1.

²⁴ AWS Spectrum Licence, Industry Canada, December 2008, page 1, section 1.

²⁵ DGRB-001-09, Op. Cit., section 5, page 7.

²⁶ DGRB-001-09, Consultation on Revisions to the Framework for Spectrum Auctions in Canada, section 7.1, page 7.

This reservation should not deter the Department in renewing licences for a greater term than 10 years.

The Department as it has noted still retains the right of revocation in this band “where the *Radiocommunication Act*, the *Radiocommunication Regulations* or the terms or conditions of licence have been contravened, or where an authorization was obtained through misrepresentation or for non-payment of fees.”²⁷ In other words, save reallocating bands to a completely different use, the Department has all the revocation powers it needs and should move to lengthen the licence term to a minimum of 15 or more preferably 20 years.

The call for lengthier licence terms finds support in the McLean Foster report prepared for the Department in 2007. The report’s authors say “We have considered both very long-term licences, which safeguard investment in assets over a term of 30-40 years, and long-term licences for, say, 15-20 years, which gives the regulator the opportunity to recover spectrum at intervals when it is desirable to do so. On balance, very long-term arrangements are more favourable on the grounds that they give better investment incentives and involve a clearer definition of licensee’s rights. However, departures from this may be appropriate in specific bands.”²⁸

The FCC has recently moved to an initial 15 year term for spectrum licences in both their recent AWS spectrum auction and their 700 MHz spectrum auctions. While not as long as those recommended by Professor Cave and his colleagues this is still a 50% improvement on what the Department is proposing. **TELUS respectfully recommends that spectrum licences be renewed for a period of no less than 15 years and preferably for a period of 20 years.**

As noted above the one concern expressed by the Department regarding licence renewal periods over 10 years is not one that applies to auctioned spectrum bands in any realistic fashion. A spectrum auction by its very nature assigns the spectrum to the parties that value it the most for the most valued uses. The less the uncertainty associated with these licences the greater incentive the operators have to invest and the greater willingness investors have in advancing them the funding to do so.

Most businesses in Canada do not operate under the threat of a ten year end to their ability to do business and reap returns from their investments. Longer terms engender greater certainty and therefore greater willingness to invest for long term stability and success. This greater investment brings newer services to market faster to meet the emerging requirements of Canadian consumers and businesses.

Ian Munro made much the same point when he said “The more uncertainty that the government injects into future licence terms, the greater will be the disincentive for licensees to invest in new and better technology and service offerings (and the lower will be the initial auction revenues for

²⁷ Op cit.

²⁸ Study of Market-based Exclusive Spectrum Rights, McLean Foster & Co. in collaboration with Prof. Martin Cave, Robert W. Jones and Dr. William Lehr for Industry Canada, August 31, 2007, page 7.

such licences). Just as an auction can determine the optimal distribution of licences initially, a secondary market (unencumbered by regulatory risk) can ensure an efficient distribution over time. The natural reluctance of politicians and bureaucrats to “let go” must be overcome and spectrum licences should be made perpetual.”²⁹ Mr. Munro also notes in this context that “Also in those rare cases of an unforeseen and overriding public need developing, the government could exercise its right of eminent domain, with appropriate compensation for the licensee that is required to vacate its spectrum.”³⁰

In the recent consultation conducted by the Department for DGRB-002-09 respecting the renewal of spectrum licences for cellular and PCS licences all active carriers save TBayTel called for a licence period of at least 15 – 20 years for the reasons outlined above.

- *that the conditions of licence applied to the renewed licences may differ from those on the existing licences, with such changes being made following a consultation; and*

TELUS notes that in the consultation for DGRB-002-09 referenced above the Department proposed to do away with some licence conditions. TELUS supported the Department’s proposal to remove the Spectrum Aggregation limit for cellular and PCS spectrum, remove the old resale and roaming provisions and we further requested the Department change the Lawful Intercept condition of licence to allow for cost recovery and use of standard equipment. TELUS also in that Consultation requested the Department to remove the R&D condition of licence as not longer necessary. **TELUS recognizes that the conditions of licence may change from time to time but agrees with the Department that such changes must be preceded by a full public consultation.**

- *that fees be imposed for renewed licences and be based on an estimation of the market value of the spectrum.*

TELUS submits that the Department has set itself the wrong challenge. Rather than the challenge it has outlined for itself, that of estimating market value, the Department’s challenge, in TELUS’ view is to set fees that earn a fair return for the Canadian public for auctioned spectrum licences.

We would submit that a fair return does not and should not equate to market value. In the truest sense Government is not a business, rather it is in the business of enabling business to occur. Government is a steward of spectrum and its job is to work to ensure that spectrum is used to enable wealth creation. Licence holders enable that wealth creation by investing in the networks that are an input to improved productivity. The investment made through the use of spectrum forms a large part of the return to the public.

²⁹ Ian Munro, *Chicken Little Eats Crow: How the Critics Got It Wrong about Spectrum Auctions*, Atlantic Institute for Market Studies, October 2008, page 20.

³⁰ *Ibid.*

Measuring the economic contribution our investment adds in terms of auction fees already paid, investment in plant and operating expenses, including employment, are all factors that contribute to fair return. TELUS believes that the taxes the business pays are also an important component of a return to the Canadian public. TELUS also considers that a fair return must include compensation for Government managing the spectrum.

Any further returns must both reflect investment in the spectrum, business taxes and fees and the impact of setting fees higher. In assessing a fair return to Canadians one of the goals of government should be to ensure that the maximum number of Canadians benefit from the use of this resource. Clearly if government sought to create commercial return on spectrum, the ultimate impact would be to diminish investment in higher cost areas such that carriers ensure a reasonable return to their shareholders. That is not the goal of stewardship and it is not a holistic view of the matter.

TELUS further notes that the Spectrum Policy Framework (SPF) itself does not speak of ensuring, let alone maximizing, a return for the Canadian public. As stated in the SPF the “Framework is comprised of a Preamble, a Policy Objective (the Objective) and a set of Enabling Guidelines (the Guidelines).”³¹ A careful review of these three elements will find no reference to such a requirement. What is referenced is a requirement to “maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum resource.”³² Rather than justify a regime to maximize rents on spectrum licensees this objective requires that the Department take a holistic look at all of the benefits to Canadians derived from up-to-date, ubiquitous, broadband mobile networks and the continuing large investments required by the licensees. **TELUS asserts that such a holistic view of the net benefits accruing to Canadians is the right focus for the Department. We submit that rather than develop market-based formulas outside of a consultative process, the Department work with industry to establish a methodology to set fees at a fair and reasonable level.** We submit that the RABC could provide a forum to help define what is meant by a “fair return”. In this context the McLean Foster or Cave report is instructive where it states “In recent years, spectrum revenues have far exceeded the cost of the spectrum management program. For the six years from fiscal year 1998/99 to 2006/07, program expenditures totalled some \$549.8 million while program revenues from the same period totalled \$3.011 billion, made up of \$2.078 billion from licence fees, \$888.3 million from auctions (revenues which are amortized over ten years) and \$44.4 million from equipment certification fees.”³³ These totals do not, of course given the time the report was written include the \$4.25 billion extracted from the wireless industry due to the AWS spectrum auction.

In the last consultation on fees for cellular and PCS spectrum licences in 2003 the Department did take note of industry’s concerns and acted to address fees that were set too high in its original

³¹ DGTP-002-07, Spectrum Policy Framework for Canada, Industry Canada, June 2007, page 7, section 4.1.

³² Ibid.

³³ Study of Market-based Exclusive Spectrum Rights, Op. Cit., section 4.9.3, page 68.

proposal. Instead of a seven year ratcheting process culminating in a licence fee of \$0.052 per 1 MHz of assigned spectrum per person in a defined geographic area the Department took the counsel of industry and correctly, in our view, lowered the imposed fee to a more reasonable 2011 level of \$0.03512361 per person. TELUS is of the view that even this level is too high as it extracts approximately \$130 million annually from Canada's wireless carriers. To put that amount into context the department is looking at ways to spend \$225 million to extend service to rural and remote areas of Canada. That \$130 million could otherwise be spent on network investment by operators assuming a corresponding reduction in licence fees. As the industry prepares to invest billions in 3G and LTE technology, infrastructure and services, the government should ask whether that investment is a fair return in itself and in turn whether higher taxes in terms of fee increases stimulates or deters said investment. If stimulating investment for the benefit of the Canadian public, because they are the beneficiaries of such investment, is the goal of public policy then higher fees are merely a prescription for failure. By the Department's own estimates the cellular and PCS operators in paying the approximately \$130 million in licence fees annually account for 57% of the total non-broadcasting licence fee revenue while accounting for a very small percentage of non-broadcast spectrum usage.

TELUS notes that in its consultation DGRB-002-09 the Department states that it is "undertaking a formal study to assess the current market value of cellular and PCS spectrum. The study will include, but not be limited to, an international fee comparison and a review of prices paid for similar spectrum in Canada. Once the study is complete, the Department will launch a separate consultation seeking comments on the proposed fee."³⁴ This seems somewhat circular. The Department did an internal PCS licence study in the 2002 process outlined above and it was universally panned. A similar situation greeted the setting of the 28 GHz fees when that band was introduced. TELUS strongly recommends that the Department establish a consultation aimed at determining the terms of reference and methodology for such a study before launching it and if such a study has begun that it be halted until such a consultation has been completed.

TELUS made the same points in our response to the consultation for DGRB-002-09 regarding the renewal of our cellular and PCS spectrum licences allocated by means other than a spectrum auction. TELUS was joined by all active carriers (save TBayTel) responding to that consultation in calling for increased consultation as to the terms of reference and methodology for any study related to setting fees. With respect to TBayTel that had other over-riding concerns in that consultation the entire mobile wireless industry is calling upon the Department to carry out such a consultation. TELUS respectfully suggests that the Department should concur.

Furthermore TELUS, at the Banff World Television Festival this year called on the government and the Department to reinvest the money earned in its upcoming spectrum auctions into the digital economy. As noted the government failed to capture any of the funds extracted from the wireless industry to reinvest into the wireless industry in such initiatives as lawful intercept cost

³⁴ DGRB-002-09, Consultation on the Renewal of Cellular and Personal Communications Services (PCS) Spectrum Licences, section 5.2., page 7.

recovery, lower licence fees, stimulate broadband expansion or any other supportive program to fund not the old economy but rather the emerging digital economy.

Comments are sought on the continued need for the condition of licence requiring that licensees invest a percentage of their adjusted gross revenues in R&D.

As TELUS noted in our response to DGRB-002-09 we believe that this particular condition of licence has, in our view, outlived its usefulness and should be removed. Again we note that all active carriers (including TBayTel) called for the removal of this condition of licence in that consultation.

The requirement for research and development spending may make sense where artificial encouragement is required to ensure that a technology or technological ecosystem gains momentum and does not stagnate. The wireless business, however, has very robust ecosystems that are global in nature and continued innovation is a permanent feature of the industry. Furthermore, Canadian carriers are highly incented to find ways to innovate their offerings in order to differentiate themselves and attract or retain the subscribers required to earn a return on the significant network investments.

In particular TELUS is concerned that at a time when capital is constrained by recession and when the industry must make billions of dollars to upgrade or build innovative new networks significant spending is being dictated by a narrow definition of R&D used by CRA.

Investment in 3G and LTE is by definition investment in innovation. It is clear now that wireless has established very stable ecosystems that innovation at the network level does not have to be encouraged. Vendors are now competing in a global market serving over a billion consumers and business customers. In a 3G world innovation is enabled through the building of modern infrastructure for businesses to innovate on. According to the Department of Finance, Canada's SR&ED program compares favourably with other similar world class incentive programs. Accordingly, the level of R&D generated by wireless development should be optimal based on the income tax incentives for SR&ED and there should not be a need to have an artificial requirement in the licence conditions for, especially, cellular and PCS spectrum to conduct R&D just for the sake of conducting R&D.

Comments are sought on the establishment of a new Tier level that would differentiate urban and rural areas or whether other mechanisms could achieve the same purpose more effectively.

TELUS considers that introducing another new Tier level injects unneeded complexity in frequency coordination and administration. The Department's stated goal in proposing this is to

help reduce any digital divide that might exist. Establishing a new Tier level is only one way to accomplish this goal. **A better way, in TELUS's opinion, is, as outlined above, is for the Department to move to implement full secondary markets with self-certification (no requirement for Ministerial approval).** Spectrum licences are fully divisible in both the frequency and geographic domains and can accommodate the need for smaller licences for those companies interested in serving only smaller rural areas. The Department might consider setting up a form of secondary trading agora to facilitate the identification of both supply and demand and to facilitate such transfers.

TELUS notes that in the DGRB-002-09 consultation there were two prospective carriers that raised issues surrounding the current secondary market. Although we will respond to the consultation in the Reply Comment phase TELUS submits that the potential problems identified by the two respondents would largely be resolved by the adoption of the recommended self-certification model together with a secondary trading agora.

Conclusion

In conclusion TELUS;

- Supports the recommendations found in the Study of Market-based Exclusive Spectrum Rights in order to accelerate the reform of Spectrum Management in Canada.
- Requests the Department to carefully balance the costs and benefits of regulatory intervention in any licensing process but especially spectrum auctions
- Recommends that if any intervention can be justified the Department;
 - Ensure that any benefits are limited to actual entrants, not regional or converged competitors
 - Focus on the use of ex-post versus ex-ante benefits
 - Ensure that any benefits awarded to entrants not come at the expense of incumbents but rather via a direct government subsidy.
 - Minimize the side effects of any regulatory intervention
- Supports the use of spectrum auctions where demand exceeds supply
- Urges the Department to consult solely and widely on any auction format to be used for major spectrum auctions other than SMRA.
- Calls on the Department to pre-screen potential spectrum auction participants with respect to any Canadian ownership and control requirements.
- Supports the use of an auction to select those to whom a satellite authorization will be issued.

- Recommends to the Department
 - Renewed spectrum licences have a high expectation of renewal
 - Have a minimum term of 15 or 20 years
 - Conduct a full public consultation on any condition of licence to be changed on renewal of spectrum licences
 - That it consults on the terms of reference and methodology of any study designed to address renewal fees.
- Recommends that the Department eliminate the R&D condition of licence.
- Recommends that rather than creating a new Tier licensing area the Department instead establish a strong infrastructure for secondary trading of spectrum in Canada using the current licensing tiers.

All of which is respectfully submitted.

Yours truly,

(Submitted electronically)
Ed Prior