--SCHEDULE A--

Evidence of
David J. Salant

on behalf of

BCT.TELUS Communications Inc.

Industry Canada Gazette Notice No. DGRB-018-99

Consultation on Proposed Policy and Licensing Procedures for the Auction of Additional PCS Spectrum in the 2 GHz Frequency Range

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1. My name is David J. Salant and I am currently a Managing Director of the Auction practice at LECG, Incorporated. My business address is 2000 Powell Street, Suite 510, Emeryville, CA 94608. I received an A.B. in Economics and Mathematics from Washington University and an M.A. and a Ph.D. in Economics both from the University of Rochester. At LECG I have specialized in auction design and implementation. Prior to that, I was a principal member of the technical staff at GTE Laboratories where I was responsible for auction strategy and for developing engineering/economic models that assess new telecommunications technologies.

2. I have worked in regulatory economics, particularly in telecommunications, for over eleven years. My regulatory experience includes among other things price caps, universal service, and spectrum auctions. I have assisted firms in acquiring rights to leases for spectrum rights, oil leases, and other large assets in numerous multi-billion dollar auctions. I have worked with the government agencies of such countries as Australia, Canada, Colombia, Guatemala, Israel, Mexico, Peru, and the United States in designing mechanisms for regulatory restructuring, auctions, and privatization. I have advised firms seeking to acquire spectrum licenses for PCS, cellular franchises, and LMDS/microwave concessions in the United States, Latin America, and Europe. Specifically, I designed and implemented the first spectrum auction for paging licenses for the Mexican Ministry of Communications in November 1996 and for trunk radio frequencies for the Guatemalan Superintendent of Telecommunications in May 1997. In addition, I was a member of the team that developed auction software adopted by Industry Canada, the Mexican Ministry of Communications and Transport, and the Guatemalan Superintendent of Communications.

I. Introduction

3. The Canadian Government is about to commence its second auction for licensing spectrum. This promises to continue its successful introduction of market mechanisms as a regulatory mechanism. The vigilance of Industry Canada in its preparations is likely to ensure the continued success of the process. However, as discussed below, this painstaking vigilance

needs to be maintained in order to ensure continued success.[1] Small details can make a large difference in the outcome. In what follows, I provide some views about how the rules can make a difference.

4. The auction rules must consider four major concerns. First, a limited amount of spectrum cannot support an unlimited number of firms. Thus, competition may not be best served by maximizing the number of competitors. There are situations where more is not necessarily better. Rather, competition will be best served by carefully allocating the spectrum to a select number of firms that are financially and technologically prepared to actively compete. Strong firms will exist only if each firm has adequate spectrum to satisfy customer demand for both voice and data services, the financial wherewithal to purchase the spectrum and to deploy services, and the technological knowledge necessary to offer innovative new services. Second, a successful competitive market requires planning for the future. Firms must know if, and when, more spectrum will be available and if auctioned spectrum can be resold. The Department should clearly state its position on these important issues. Third, the auction rules must allow bidders maximum flexibility in acquiring spectrum. To this end, four 10 MHz licenses should be auctioned on a regional basis. This allows the existing regional carriers to become nationwide providers and allows the existing nationwide carriers to acquire more spectrum. Finally, within this framework, bidders should be allowed to obtain the licenses at a competitive price. One of the dangers in establishing auction rules is the possibility that bids might be manipulated for anti-competitive purposes such as to exclude other entrants or to raise prices for other entrants. It is to this point, in particular, that this evidence speaks.

II. The Goal of Competition is to Drive Costs Down Not Up

5. The Department must eliminate the manipulation of bids with the sole intent of raising rivals' costs. Efficient providers should be able to obtain the spectrum at market prices—not at unrealistic prices created by manipulation of the process. To this end, bidders should not be allowed to bid on more spectrum than they would be allowed to actually purchase under the market cap. Allowing bidders to bid on more spectrum than they are allowed to hold has two problems. The first is obvious, a bidder may end up winning more spectrum than it is allowed which, in turn, engenders problems of how to withdraw or where to withdraw. For example, which properties does the firm get to keep and on what terms. It is better to avoid the problem in its entirety by not permitting it rather than trying to draw up auction rules that handle it without distortionary effects on the real purpose of the auction: getting the spectrum into the hands of those firms that most value it. The second problem with allowing bidding on spectrum beyond what can legally be held is that it allows frivolous bids or bids whose sole purpose is to drive up the costs for rivals. The problem with this is that, again, spectrum may end up in the wrong hands. A firm that can and should win on two properties may be knocked out of the running on

[1] *See* David Salant, "Auctions and Regulation: Reengineering of Regulatory Mechanisms," *Journal of Regulatory Economics 17(3): Special Issue on Auctions and Regulation*, May 2000.

one of them simply because the eventual winner forced too high a price on the other with a frivolous bid. An even worse scenario occurs when a bidder (such as a competitor in another market with no legitimate interest in the spectrum) bids in the hope of depleting a war chest intended for network enhancement or to position the firm to survive in the face of soon-to-come competition against international giants—whether domestically or as part of a global strategy Canadian domestic firms must undertake to stay competitive.

6. To prevent manipulation of the auction, withdrawal penalties should be in place to deter bidders from placing erroneous bids. As proposed in the auction design, the withdrawal penalty may equal the difference between the withdrawn bid and the resulting sale price. The unease with bid withdrawal concerns the price that the bidding will revert to upon withdrawal of a high bid.

7. A policy of reverting to the second highest bid when a high bid is withdrawn opens a window for manipulation. A bidder may place a high bid then better that high bid in the next round. Thus, the bidder has placed not only the highest bid but also the second highest bid. If the policy is to go to the second highest bid when a bid is withdrawn, then the new minimum price will have been set by the withdrawing bidder and may not reflect the bidding level of the remaining participants. This problem will not be solved by taking the third or fourth highest bids or any set increment of bids. One solution to this problem is that when a bid is withdrawn the minimum price should revert to the highest bid made by the non-withdrawing bidders. Another solution is to limit the number of withdrawals, or to not allow any withdrawal after a firm has topped its own bid with no intervening bids.

8. There are several examples of auctions where one bidder may have influenced the price paid by the winning bidder. Whether this was advertent or inadvertent is not relevant. What is relevant is that it can happen. For example, in the A-block auction in California in 1995, Pacific Telesis' rival bidder, ALAACR, won no spectrum at all. Indeed, ALAACR seemed to bid on spectrum that made no business or economic sense. All it did by forcing up the price was reduce the money Pacific Telesis would have to compete for properties in other states. Table 1 below shows the results for the California PCS auction and the high bidder for each round.

Table 1

ROUND	ALAACR.	Pacific Telesis
1		$38,291,000
3		$57,437,000
21	$171,732,731	
22		$183,220,000
30	$300,000,000	
31		$330,001,472
75	$350,000,000	
76		$367,500,000
77	$385,875,000	
78		$405,169,000
79	$425,427,000	
80		$446,698,000
81	$470,000,000	
82		$493,500,000

9. Qualcomm/Pegaso PCS similarly was able to increase its competitors costs in the Mexico City region in the Mexican PCS auction. In that auction there were two 10 MHz D and E-block licenses and two 30 MHz licenses in each region. Qualcomm/Pegaso PCS raised the prices for both the 10 MHz licenses before switching back to the 30 MHz licenses. It did so to force the two incumbents eligible for the 10 MHz licenses but not for the 30 MHz licenses to reveal how high they would go before bidding seriously for the 30 MHz licenses. The strategy employed by Qualcomm/Pegaso in the D and E-blocks was similar.[2]

10. Following is a brief description of the actions Qualcomm/Pegaso took to force up the price of the 10 MHz blocks. In the auction there were two 10 MHz D- and E-blocks and two 30 MHz blocks in each region. The D- and E-blocks in the Mexico City region covered the same population and had the same capacity. Any bidder interested in a 10 MHz block would have been equally satisfied with either a D- or E-block license. Pegaso PCS raised the price for both the 10 MHz licenses before switching back to a 30 MHz license. It did so in order to force two incumbents, Dipsa/Telmex and Iusacell, that were eligible for the 10 MHz licenses but not the 30 MHz licenses to reveal how high they would go before bidding seriously for the 30 MHz blocks.[3]

11. Qualcomm/Pegaso engaged in a systematic strategy to raise the costs of both 10 MHz licenses. The manipulation began in Round 24 when Qualcomm/Pegaso submitted a bid making the D-block more expensive than the E-block. The other bidders, including Dipsa/Telmex, logically responded by bidding on the now relatively inexpensive E-block. Pegaso PCS then withdrew

[2] *See* <http://209.66.67.148/html/inalambrico/ina_final.html> for the auction round results.
[3] See http://209.66.67.148/html/inalambrico/ina_final.html for the auction round results.

its D-block bid, which allowed it to submit an E block bid of more than twice the previous price. Qualcomm/Pegaso then topped its own bid and withdrew that same bid. Since the auction rules indicated that on withdrawal the minimum bid would be set by the second highest bid, Qualcomm/Pegaso succeeded in locking in a minimum price of 396 million for the E-block instead of the previous 169.4 million.

12. After increasing the price of the E-block, Qualcomm/Pegaso PCS moved to the D-block where it submitted a bid more than two and a half times the minimum. Pegaso PCS then waited. Obviously, Qualcomm/Pegaso's bid prevented its competitors from switching from the E-block to the D-block. Eventually the price of the E-block reached the price of the D-block and Dipsa/Telmex submitted a bid for the D-block in Round 32.

13. The strategies employed by Qualcomm/Pegaso did carry some risk. Most importantly, when withdrawing a bid the bidder takes the risk that the final price will be below the withdrawn offer. The risk to the withdrawing firm is the assessment of a penalty equal to the difference between the two values. Even with this risk, bidders still may choose to raise their competitors costs. The adoption of additional rules for bid withdrawal would serve to reduce opportunities for price manipulation. In that auction though, Qualcomm/Pegaso was willing to risk 100 million dollars in withdrawal penalties to increase the prices paid by its rival bidders. Appendix A contains details by round for the Mexican auction.

III. Conclusion

14. As stated above, the rules established for the auction of spectrum must carefully consider four major concerns. First, a limited amount of spectrum cannot support an unlimited number of firms. There are situations where more is not necessarily better. Second, a successful competitive market requires planning for the future. Firms must know if, and when, more spectrum will be available and if auctioned spectrum can be resold. Third, the auction rules must allow bidders maximum flexibility in acquiring spectrum. To this end, four 10 MHz licenses should be auctioned on a regional basis. Finally, within this framework, bidders should be allowed to obtain the licenses at a competitive price. To avoid market manipulation, bidders should be permitted to bid on only as much spectrum as they are to own. Strong withdrawal rules also should be adopted to avoid price manipulation.

APPENDIX A

Mexico PCS Auction Summarized Round Results: Mexico City Region					
Round	***Information***	***Band A***	***Band B***	***Band D***	***Band E***
1	Bidder	TELINOR	GPO_HERMES	DIPSA	GRUPO_IUSACELL
	Minimum Bid	$ 26,001,000	$ 400,000,000	$ 15,000,000	$ 5,000,000
2	Bidder	SPC			
	Minimum	$ 51,001,000			
	Bid	$ 52,010,000			
3	Bidder	TELINOR			SMR_MEX
	Minimum	$ 77,010,000			$ 10,000,000
	Bid	$ 77,010,000			$ 10,001,000
4	Bidder	SPC			QUALCOMM
	Minimum	$ 102,010,000			$ 15,001,000
	Bid	$ 102,011,000			$ 15,260,000
5	Bidder	BNMEX_MCI		GRUPO_IUSACELL	MIDICELL
	Minimum	$ 127,011,000		$ 20,000,000	$ 20,260,000
	Bid	$ 127,011,000		$ 20,200,000	$ 21,500,000
6	Bidder	SPC		DIPSA	
	Minimum	$ 152,011,000		$ 25,200,000	
	Bid	$ 152,011,000		$ 26,000,000	
7	Bidder	BNMEX_MCI			GRUPO_IUSACELL
	Minimum	$ 177,011,000			$ 26,500,000
	Bid	$ 177,011,000			$ 26,700,000
8	Bidder			SPC	MIDICELL
	Minimum			$ 31,000,000	$ 31,700,000
	Bid			$ 31,001,000	$ 32,200,000
9	Bidder			GRUPO_IUSACELL	
	Minimum			$ 36,001,000	
	Bid			$ 36,191,000	
10	Bidder	SPC		DIPSA	
	Minimum	$ 202,011,000		$ 41,191,000	
	Bid	$ 202,011,000		$ 42,000,000	
11	Bidder	BNMEX_MCI			GRUPO_IUSACELL
	Minimum	$ 227,011,000			$ 37,200,000
	Bid	$ 227,011,000			$ 37,400,000
12	Bidder			QUALCOMM	MIDICELL
	Minimum			$ 47,000,000	$ 42,400,000
	Bid			$ 47,160,000	$ 42,400,000

Mexico PCS Auction Summarized Round Results: Mexico City Region					
Round	**Information**	**Band A**	**Band B**	**Band D**	**Band E**
13	Bidder			DIPSA	GRUPO_IUSACELL
	Minimum			$ 52,160,000	$ 47,400,000
	Bid			$ 53,000,000	$ 47,602,000
14	Bidder				MIDICELL
	Minimum				$ 52,602,000
	Bid				$ 52,602,000
15	Bidder	QUALCOMM		SPC	GRUPO_IUSACELL
	Minimum	$ 252,011,000		$ 58,300,000	$ 57,862,000
	Bid	$ 252,011,000		$ 58,300,000	$ 58,065,000
\16	Bidder	SPC		DIPSA	MIDICELL
	Minimum	$ 277,212,000		$ 64,130,000	$ 63,872,000
	Bid	$ 277,212,000		$ 65,000,000	$ 65,000,000
17	Bidder	BNMEX_MCI		GRUPO_IUSACELL	QUALCOMM
	Minimum	$ 304,933,000		$ 71,500,000	$ 71,500,000
	Bid	$ 304,933,000		$ 71,504,000	$ 71,511,000
18	Bidder	SPC		DIPSA	MIDICELL
	Minimum	$ 335,426,000		$ 78,654,000	$ 78,662,000
	Bid	$ 335,426,000		$ 79,000,000	$ 78,662,000
19	Bidder	BNMEX_MCI		GRUPO_IUSACELL	QUALCOMM
	Minimum	$ 368,969,000		$ 86,900,000	$ 86,528,000
	Bid	$ 368,970,000		$ 86,901,000	$ 86,625,000
20	Bidder	SPC		DIPSA	MIDICELL
	Minimum	$ 405,867,000		$ 95,591,000	$ 95,288,000
	Bid	$ 418,043,000		$ 96,000,000	$ 95,288,000
21	Bidder				TELINOR
	Minimum				$ 104,817,000
	Bid				$ 105,030,000
22	Bidder			QUALCOMM	MIDICELL
	Minimum			$ 105,600,000	$ 115,533,000
	Bid			$ 108,751,000	$ 115,533,000
23	Bidder			DIPSA	TELINOR
	Minimum			$ 119,626,000	$ 127,086,000
	Bid			$ 120,000,000	$ 127,087,000
24	Bidder			QUALCOMM	MIDICELL
	Minimum			$ 132,000,000	$ 139,796,000
	Bid			$ 180,000,000 withdrawn	$ 139,796,000
25	Bidder				DIPSA
	Minimum				$ 153,776,000
	Bid				$ 154,000,000

Mexico PCS Auction Summarized Round Results: Mexico City Region					
Round	*Information*	*Band A*	*Band B*	*Band D*	*Band E*
26	Bidder				QUALCOMM
	Minimum				$ 169,400,000
	Bid				$ 360,000,000
27	Bidder		MIDICELL	GRUPO_IUSACELL	QUALCOMM
	Minimum		$ 440,000,000	$ 132,000,000[1]	$ 396,000,000
	Bid		$ 440,000,000	$ 145,000,000	$ 396,000,000 withdrawn
28	Bidder		GPO_HERMES	QUALCOMM	
	Minimum		$ 484,000,000	$ 159,500,000	
	Bid		$ 500,000,000	$ 400,000,000	
29	Bidder	MIDICELL			
	Minimum	$ 459,847,000			
	Bid	$ 459,847,000			
30	Bidder	SPC			DIPSA
	Minimum	$ 505,832,000			$ 396,000,000[2]
	Bid	$ 505,832,000			$ 396,000,000
31	Bidder	MIDICELL			GRUPO_IUSACELL
	Minimum	$ 556,415,000			$ 435,600,000
	Bid	$ 560,000,000			$ 435,600,000
32	Bidder		SPC	DIPSA	
	Minimum		$ 550,000,000	$ 440,000,000	
	Bid		$ 555,500,000	$ 440,000,000	
33	Bidder				QUALCOMM
	Minimum				$ 479,160,000
	Bid				$ 479,160,000 withdrawn
35	Bidder	QUALCOMM			
	Minimum	$ 616,000,000			
	Bid	$ 616,000,000			
36	Bidder	MIDICELL			
	Minimum	$ 677,600,000			
	Bid	$ 850,000,000			
37	Bidder		QUALCOMM		
	Minimum		$ 611,050,000		
	Bid		$ 611,050,000		
38	Bidder		SPC		
	Minimum		$ 672,155,000		
	Bid		$ 672,155,000		
39	Bidder		QUALCOMM		
	Minimum		$ 739,371,000		

Mexico PCS Auction Summarized Round Results: Mexico City Region					
Round	***Information***	***Band A***	***Band B***	***Band D***	***Band E***
	Bid		$ 739,371,000		
40	Bidder		SPC		
	Minimum		$ 813,308,000		
	Bid		$ 813,308,000		
41	Bidder				QUALCOMM
	Minimum				$ 479,160,000[3]
	Bid				$ 479,160,000 withdrawn
45	Bidder		QUALCOMM		
	Minimum		$ 894,639,000		
	Bid		$ 853,973,000		
46	Bidder	SPC			
	Minimum	$ 935,000,000			
	Bid	$ 892,500,000			
47	Bidder		MIDICELL		
	Minimum		$ 896,672,000		
	Bid		$ 896,672,000		
48	Bidder				
	Minimum				
	Bid				
49	Bidder				
	Minimum				
	Bid				
50	Bidder		QUALCOMM		
	Minimum		$ 941,506,000		
	Bid		$ 941,506,000		
51	Bidder			MIDICELL	
	Minimum			$ 484,000,000	
	Bid			$ 462,000,000	
52	Bidder			DIPSA	
	Minimum			$ 485,100,000	
	Bid			$ 485,100,000	
53	Bidder				MIDICELL
	Minimum				$ 479,160,000[4]
	Bid				$ 479,160,000
Results	Bidder	SPC	QUALCOMM	DIPSA	MIDICELL
Results	Bid	$ 892,500,000	$ 941,506,000	$ 485,100,000	$ 479,160,000

Notes:

1 For Round 27, Band D, the reported minimum bid in the round results is $198,000,000. The value included in this table represents the corrected minimum bid. The correct minimum bid is 110 percent of the last non-withdrawn high bid.

2 For Round 30, Band E, the reported minimum bid in round results is $435,600,000. The value included in this table is the corrected minimum bid.

3 For Round 41, Band E, the reported minimum bid in round results is $527,076,000. The value included in this table is the corrected minimum bid.

4 For Round 53, Band E, the reported minimum bid in round results is $527,076,000. The value included in this table is the corrected minimum bid.

Source:
Cofatel PCS Auction ending May 8, 1998. Round Results.
http://209.66.67.148/html/inalambrico/ina_final.html