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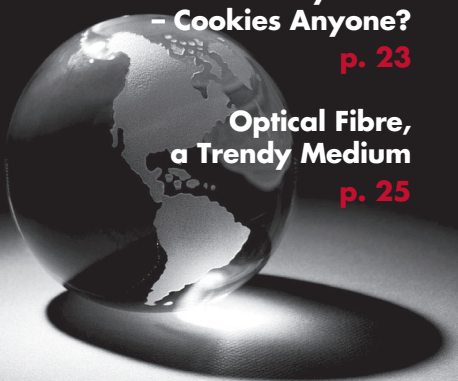
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Radvision launches "eVident"

Radvision, an Avaya Company, announced the availability of eVident, a package of video network readiness and monitoring tools. eVident offers intelligent monitoring that allows enterprises and service providers to ensure network readiness before and after voice and video applications are deployed.

eVident also provides continuous network monitoring of media to ensure Quality of Experience (QoE) for users and to detect faults that may affect application usage. When reactive measures are required, it also increases efficiency by providing real-time analysis and diagnostics.

HIGH-STAKES YEAR for Canadian Wireless Industry

GEOFFREY WHITE



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Industry Canada finalizing rules to put more wireless spectrum in play

2013 promises to be an exciting year for the Canadian wireless industry.

In our previous article for InfoTelecom #4, we wrote about the new Chairperson of the Canadian Radio-television Telecommunications Commission (CRTC), the regulator of Canada's telecommunications system and how the CRTC is intensifying its focus on consumer issues.

At the time of this edition's article, the CRTC is holding public hearings into a national set of rules governing all wireless contracts, likely drawing on hundreds, if not thousands of submissions solicited from the public. This is a major step for the CRTC, which had previously taken a very 'hands-off' approach to wireless services, leaving market forces and competition to guide the industry's growth. In an interesting development, Canada's competition regulator has also weighed in before the CRTC, suggesting that even more scrutiny is in the offing.

Similar to the CRTC and its new 'three pillars' approach (create, connect and protect), the CRTC's regulatory counterpart responsible for radio spectrum - Industry Canada - has stated that

it will be making key decisions about upcoming spectrum auctions with a view to sustained competition, investment and innovation in the interests of consumers and businesses across Canada. Industry Canada is well down the road on several processes intended to put more radio spectrum – the airwaves we rely on constantly for broadcasting, satellite, wireless voice and data services, and even garage door openers - into the hands of Canadian wireless service providers.

Things to look for from Industry Canada in 2013 include:

- Final details about the hotly-contested licensing framework for the highly-anticipated 700 MHz spectrum auction, as well as the auction itself;
- Final details about the licensing framework for the 2500 MHz auction (to happen in 2014); and
- Technical details on the use of TV White Spaces (former TV broadcast spectrum) for unlicensed fixed wireless and mobile wireless use.

In this article, we look at some of these Industry Canada initiatives under way. First, though, we give a basic overview of the how spectrum – the lifeblood of everyday communications – is used and regulated.

Spectrum – the lifeblood of everyday communications

Every wireless technology we rely on uses electromagnetic frequencies to send and receive signals. This so-called "radio spectrum" – unseen and un-thought-of by most average users – is a finite (*i.e.*, scarce, limited) natural resource that is the lifeblood of everyday communications. As smartphone use and data use by consumers continues to grow exponentially with more and more connections, more and more mobile devices,

¹ Cisco, Global Mobile Data Traffic Forecast Update, 2012–2017, (February 6, 2013), p. 5

Figure 1. Cisco Forecasts 11.2 Exabytes per Month of Mobile Data Traffic by 2017

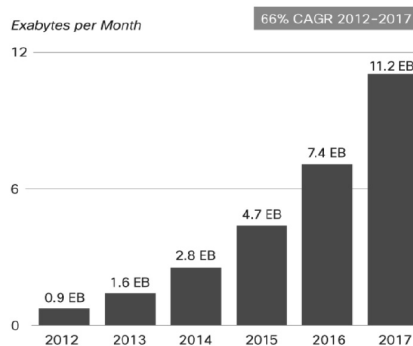
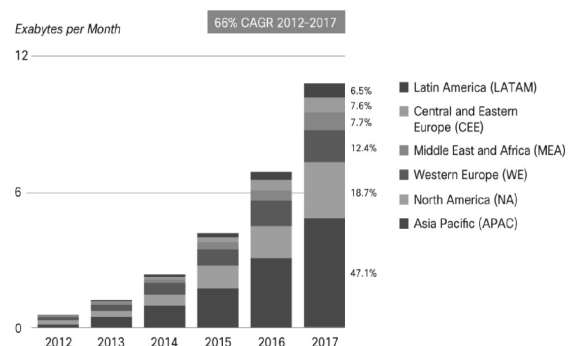


Figure 2. Global Mobile Data Traffic Forecast by Region



and those connections being “on” more of the time, spectrum scarcity and network congestion are major competitive issues. Compounding this issue is the exponentially growing demand for data by consumers.

In a recent report by Cisco, mobile data traffic worldwide is forecasted to increase 13-fold over the next four years, with Asia-Pacific projected to generate the most mobile data traffic, followed by North America¹ (Figures 1 and 2).

To address this rise in demand for mobile data, service providers are increasingly looking to offload mobile traffic to other spectrum bands that have desirable characteristics. Spectrum itself is measured in megahertz (MHz) – basically referring to the transmission frequency or number of radiowaves per second. Higher frequency spectrum has shorter radio waves and therefore lower geographic coverage. The higher the frequency, generally speaking, the more power and more towers required to cover a given area – as such, higher frequency spectrum tends to be more costly to deploy and less attractive to service providers in rural areas. Lower frequency spectrum, on the other hand, has longer radio waves, and therefore can provide greater geographic coverage with less power and towers, and thus at a lower cost.

How spectrum is managed

Because of the scarcity of radio spectrum, and because of concerns about interference, spectrum is managed as a public resource by regulators worldwide.

Spectrum is managed by regulators by dividing it into a number of frequency bands, each possessing characteristics peculiar to it, which in turn determine the usage appropriate to that band. Bands are then divided by geographic area (national at the broadest level, and small local areas at the narrowest level) or on a *point-to-point* transmission basis. Each band is then given a name, usually denoting the designated use of the spectrum. For example, the 850 MHz band is “cellular”, and 2 GHz spectrum is “Personal Communications Services” or “PCS”.

Internationally, the United Nations International Telecommunication Union (ITU), through its World Radiocommunication Conferences, seeks to harmonize how spectrum bands are managed. Band plans can and do differ from country to country, adding a layer of complexity given that band plans in one jurisdiction may greatly influence the development of equipment and handsets that may not even be useable in other jurisdictions which adopt different frequency allocations.

As is often the case in Canadian life, as goes the US, so goes Canada – but not always.

In Canada, Industry Canada sets the rules governing who can gain access to *which* frequencies *where and for how long*; *what* they use the spectrum for; *how much* they have to pay for the use of that spectrum; and *what conditions* they have to meet. Because these rules can dramatically affect the competitive landscape (barriers to entry, operating costs), the

rules are determined using hotly contested in public consultations, backroom negotiations, and sophisticated government relations and public relations initiatives.

Depending on the scarcity of the band question and demand for it, Industry Canada may issue spectrum to operators via frequency-specific and area-specific spectrum licenses (issued through a competitive process, where scarcity / demand are high, or on a first-come, first-served basis where scarcity / demand are low), or operator licenses. For the upcoming 700 MHz and 2500 MHz processes, Industry Canada has decided upon a competitive licensing process – auctions; whereas for the former TV whitespaces spectrum, Industry Canada will be allowing unlicensed use by those who obtain operator-specific licenses.

In terms of license conditions, some are technical in nature to avoid interference, or procedural in nature – such as annual reporting requirements. But others, such as mandatory roaming and tower sharing with other service providers, mandatory research and development expenditures, and mandatory deployment as the case may be, may significantly affect the value of the spectrum for potential users. In addition, Industry Canada often sets rules (in the case of licensed spectrum), about transferability and divisibility of spectrum licenses – setting the circumstances, if any, in which one licensee may transfer its spectrum to another entity.

Initiatives to put more spectrum into use

Responding to the rapid rise in mobile broadband usage, industry stakeholders identified the need for more spectrum to be reallocated to commercial wireless usage. Taking a page from similar moves in the US, Australia and UK, in the coming months Industry Canada will be auctioning licenses for the 700MHz and 2500MHz spectrum bands, as well as setting rules for the unlicensed use of former TV whitespaces spectrum.

700 MHz - the “beachfront property” of radio spectrum

Industry Canada has stated that it will be auctioning blocks of this spectrum, designated for “Mobile Broadband Service” or MBS, sometime in 2013.

A key characteristic of using 700 MHz spectrum for mobile broadband is that it has excellent propagation characteristics and in-building penetration – making it an exceptional candidate for urban and rural deployment of LTE mobile broadband speeds at a lower cost than higher frequency spectrum. Due to these qualities, the 700MHz spectrum has been described as the “beachfront property” of spectrum because of its high propagation / lower cost deployment profile and comparative efficiency. Of course, beachfront property does not come cheap, and the 700 MHz auction is expected to yield billions of dollars in fees.

Wi-Fi Taking over

WiGig

The Wi-Fi Alliance is about to absorb the Wireless Gigabit (WiGig) Alliance and intends to initiate an interoperability certification program for WiGig products. WiGig operates in the unlicensed 60 GHz band and offers short-range multi-gigabit connections up to 7 Gbps. WiGig should be available by 2015 in devices such as smartphones, tablets and laptops in addition to Wi-Fi capability.

2 The Combinatorial Clock Auction (or “CCA”) format uses a series of procedural rules, eligibility rules, bidding activity rules and information disclosure rules that are intended to eliminate gaming behaviour and to promote price discovery and truthful bidding. In the first stage, (the allocation stage), bidders, using pre-purchased eligibility points, bid in each round on a package of licences in response to prices set by the auctioneer (Industry Canada). Prices rise in each of the bidding or “clock” rounds until there is no excess demand for any of the licences. In the second part of the allocation stage, known as the supplementary round, bidders participate in a single round of bidding where they place additional bids for packages of licences, constrained by certain activity and eligibility rules from the clock rounds. An algorithm will then be used by the auctioneer to “identify the highest value combination of valid bids”, with each bidder winning, at most, only one of the packages it bid on.

The proposed use of the CCA format has generated considerable controversy for its complexity and concerns over uncertain and unfair outcomes, especially about the supplementary round. Concerns have also been raised about the suitability of the CCA format for use in a country as large as Canada.

Bell Expands**Fibe™ TV**

Bell will expand its Fibe™ TV service this year to more than 10 cities, such as Ottawa and Markham. Fibe™ TV had 250,000 subscribers at the end of 2012 and 85 per cent came from cable TV operators or were brand new customers, while 15 per cent migrated from Bell's satellite TV service. Fibe™ TV is available in specific areas in Toronto and Montreal. Fibe™ TV delivers digital and high-definition channels and offers 3-D ready through a fibre optic network.

Bell expects to see more than 80 per cent of its growth come from its wireless, TV, Internet and media services.

Industry players have voiced various concerns over the proposed licensing process, and positions have typically been divided between larger national incumbents on the one hand and smaller regional providers and new entrant competitors on the other. The main point of contention centers on the rules for the auction – including the highly complex “Combinatorial Clock Auction”² format; whether the rules unfairly support the incumbents, or whether auction measures instituted by Industry Canada give an artificial and unfair advantage to new entrants. Industry Canada, in consideration of these issues, has decided to use targeted measures to promote competition and ensure all Canadians, regardless of geographic location, enjoy these benefits. These measures are largely technical, but basically Industry Canada will apply limits to the amount of certain, highly-desirable “prime” spectrum the incumbents may obtain, thereby ensuring that all auction participants, in theory, have a shot at it.

2500 MHz

With the gradual rollout of faster broadband speeds enabled by LTE technology, the 2500 MHz band is also highly suitable for the deployment of advanced mobile broadband to meet growing consumer demands, and will be a critical component in facilitating the exponential growth of mobile broadband traffic. Industry Canada has stated that it will be auctioning blocks of this spectrum, designated for “Broadband Radio Service” or BRS, sometime in 2014.

As mentioned above however, the higher the frequency, the more power and more towers required to cover a given area, making 2500 MHz typically more costly to deploy than 700 MHz. Nevertheless, mobile service providers need more than just the 700 MHz band to meet consumer demands, and so the prospect of gaining access to 2500 MHz spectrum is still attractive and highly sought after – either as a supplement to potential 700 MHz licenses, or as a substitute.

Due to its propagation characteristics, 2500MHz spectrum will more likely be deployed in urban areas, making use of the ease of setting up micro towers on buildings, while 700MHz will likely be used to provide mobile broadband to cover larger areas with more spread out populations. Much like the 700MHz auction, Industry Canada decided to use the controversial Combinatorial Clock Auction competitive licensing process format. Industry Canada has also decided to implement targeted measures to promote competition, given extensive holdings of this spectrum by two large incumbents from a previous process.

TV White Spaces Spectrum

In addition to making the 700 MHz and 2500 MHz spectrum available to mobile service providers, last October, Industry Canada decided to allow unlicensed use of former TV broadcast spectrum commonly referred to as “TV White Spaces spectrum” (TVWS) for fixed use and mobile use. That decision follows on a public consultation in late 2011. In the consultation, a number of interested stakeholders,

including equipment manufacturers and Google, urged Industry Canada to allow the unlicensed use of TVWS spectrum. Rationally, network operators, with a vested interest in capitalizing on their existing network and spectrum license assets, especially for LTE, opposed that use on the basis of a number of technical concerns.

Ultimately, Industry Canada, noting [a] shift away from conventional licensing approaches could lead to a more flexible, adaptive administrative environment by enabling opportunistic use of the radio frequency spectrum³ - settled on license-exempt use of the spectrum (controlled by an interference database).

The license-exempt approach represents potentially very large opportunities and challenges.

On the one hand, TVWS is the little brother of the 700 MHz spectrum. Given TVWS' high propagation characteristics, i.e., its ability to penetrate thick materials such as walls, and travel longer distances with less towers, antennas, and repeaters, TVWS could be a cost-effective way for smaller players to access premium spectrum without having to face-off directly with larger, better-capitalized players in a costly spectrum auction. On the other hand, the unlicensed nature of the spectrum, implying no carrier will ever have any guaranteed, stable, ongoing access to the spectrum, could limit investments in technology needed to deploy in that spectrum.

Looking forward

As larger national and regional incumbents rally to ‘future-proof’ their current networks by acquiring new capacity and new capabilities in the new spectrum bands, the smaller new entrants will continue their tooth-and-nail approach to expanding their toe-hold in the market by leveraging any newly acquired spectrum licenses and deploying new technologies and innovative business models.

The 700MHz and 2500MHz spectrum auctions, along with potential deployments using TVWS spectrum, will decide what the future of the Canadian telecoms marketplace will look like. Who will capitalize on Canadian’s ever-growing reliance on mobile data and technologies?

Given recent lifting of foreign investment restrictions (limited to smaller telecommunications companies), given challenges faced by newer entrants into the Canadian marketplace, and given increased regulatory intervention into the industry, the competitive landscape in the Canadian wireless industry is very dynamic.

Against this backdrop of a dynamically shifting competitive landscape, we will not be surprised to see some major, game-changing developments in the coming months.

Steven Richardson, MA, BA (Hons.), a Researcher at Nordicity focussing on a broad range of telecommunications and broadcasting issues also contributed to this article.

³ Framework for the Use of Certain Non-broadcasting Applications in the Television Broadcasting Bands Below 698 MHz, SMSE-012-02 at Section 5.2.