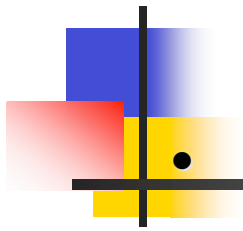


Open Spectrum and Community Wireless Networking in Canada: The Policy and Regulatory Landscape



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Overview

- Background - Spectrum policy and CWN'g
- US spectrum policy - unlicensed spectrum
- Spectrum policy & regulation in Canada
 - governance
 - Allocations for licence-exempt use
 - legislation, regulations governing licence-exempt use
- Recent policy developments for license-exempt spectrum in Canada
- Next steps



CWNS and Spectrum Policy

- Use of radio spectrum requires a government license, subject to conditions (frequency use, interference, power, duration, geographic area etc.)
- spectrum as a “scarce” public resource that had to be managed to minimize interference and to avoid a “tragedy of the commons”
- licences issued via administrative “beauty contests” and, more recently, auctions
- over time, small amounts of unlicensed or ‘licence-exempt’ spectrum set aside for low power devices, amateur use, research etc. (2.4 GHz and 5-6 GHz)
- Tiny fraction of available spectrum (U.S.- 2%, UK - 4.3%, CAN - no data)
- CWNs make use of LE spectrum, primarily in 2.4 GHz range (e.g. wifi hotspots)



Limits of Unlicensed Spectrum

- Expansion & development of CWN'g initiatives depends on access to high quality unlicensed spectrum
- Current allocations hamper development:
 - *2.4 GHz/"junk bands" too crowded, interference;*
 - *allocated on a "no interference/no protection" basis;*
 - *subordinated to primary/licensed users;*
 - *higher frequency bands (e.g. 5 GHz) and power limits reduce signal penetration;*
 - *100m radius*
 - *obstacles (walls, buildings) - LOS only*
 - *disturbance (weather, vegetation)*



Prospects for Increased LE Spectrum a 'digital dividend'?

1. **Smart Radio technology**

- software defined radio (SDR)
- Potential to eliminate spectrum scarcity

2. **Digital Television Transition (DTV)**

- DTV transition, unused "white spaces" between channels will soon become available
- prime "beachfront" low frequency spectrum, ideal for wireless broadband applications, R&R applications
- In the U.S., FCC supports setting aside portions of TV white space for UL use - fixed date for DTV by 2009
- **Problems/obstacles:**
 - international policy trends favor spectrum auctions and an underlying property rights ideology - spectrum too valuable to simply give away - value of auctions so far: US \$40Bn; CAN \$1.7Bn
 - Canada - no fixed date for completion of the DTV roll-out.

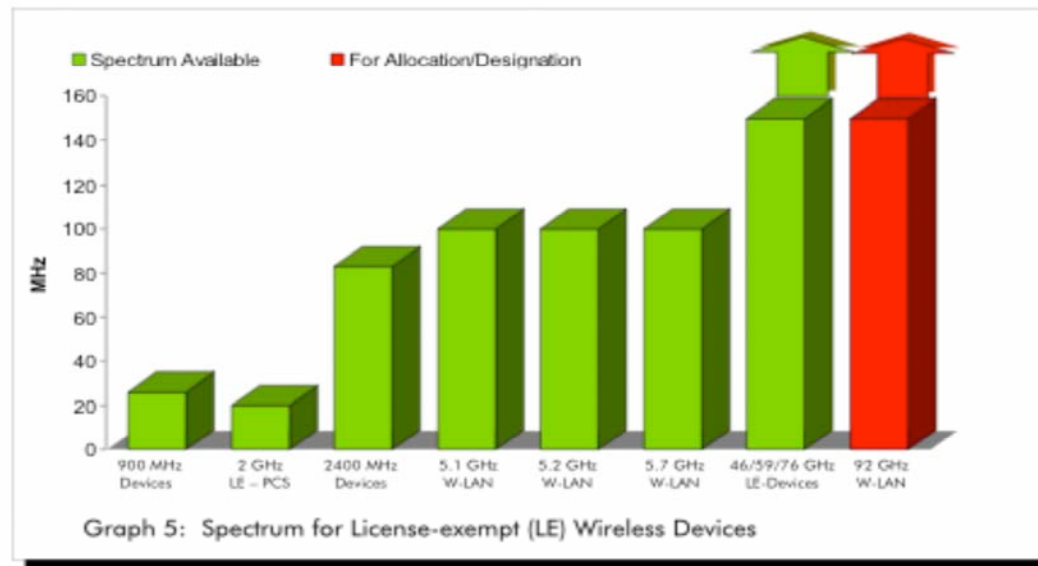


Spectrum Management / Governance in Canada

- *Radiocommunications Act*
- S. 5 empowers Minister of Industry to ensure:
 - “the orderly establishment or modification of radio stations and the orderly development and efficient operation of radiocommunication in Canada”
- Minister’s powers include
 - issuing radio, broadcasting, and spectrum licenses;
 - fixing terms and conditions associated with such licenses;
 - setting and enforcing license terms and conditions;
 - planning and allocating spectrum usage;
 - setting and enforcing technical standards; and,
 - defending Canada’s spectrum interests internationally

Licence-exempt Frequency Bands in Canada

- June 2001, IC designated the 2400 – 2483.5 band for LE use on a no-interference/no protection basis by LPDs, including WLANs, and microwave transmitters.
- other LE bands / uses: “family radio,” Bluetooth, microwaves, remote keys etc.



Source: Industry Canada (2001) *RP-020 2001 Edition (December 2001) - Guidelines on the Licensing Process and Spectrum Release Plan (2001 Edition)*, Spectrum Management and Telecommunications Policy, Radio Systems Policy.



LE Spectrum Does Not Mean Unregulated

- Low-power licence-exempt radiocommunication devices (LPDs) are regulated & certified with respect to frequency utilization, transmission power level, and capacity to cause interference
 - IC issues Spectrum Utilization Policies for LE bands
- Operation of radio communication device on licence-exempt basis permitted on condition that device is *certified* by IC for such use
 - IC engages in various device certification activities:
 - Testing, standards development, enforcement
 - Certification covers power limits, frequency utilization, interference



Other Regulations: Telecommunications, Public Health, and Antennae

Telecommunications Act:

- An LPD device might fall under the definition of a “telecommunications common carrier” as per Sec. 2(1) of the Act if it is used to offer services for compensation.

Public Health:

- Technical requirements for the regulation of radio frequency exposure with respect to human health
- Health Canada (1999) Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 KHZ to 300 GHZ – “Safety Code 6”

Antennae and Supporting Structures:

- LE radio systems using antenna supporting structures may be subject to IC procedures governing their installation and impacts on air navigation & the environment



Recent Policy Developments

- Movement toward more flexible and market-oriented approaches to spectrum management - auction-based, property rights model
- overall thrust toward deregulation in telecommunications policy
 - relaxation of public interest obligations
 - relaxation of foreign-ownership rules
 - Let market decide
- modest release of new LE spectrum (5 GHz range)
- Canada's DTV transition
- 2005 public consultation on a renewed spectrum policy framework for Canada.
- 2006 Telecommunications Policy Review Panel Final Report



Questions, implications

- Are existing community wireless spectrum needs being met?
- If not, what policy changes would be required for them to be?
- What are the prospects for CWN access to spectrum (licenced and licence-exempt) under a property rights / auction-based management regime?
 - ie. will CWN reap the “digital dividend”?



Next Steps

- Document spectrum usage & challenges
 - Spectrum analysis with community partners?
- Industry Canada Spectrum Auction Public Consultation - CWIRP intervention (late May)?
- Final paper on CWN and spectrum policy in Canada
- Brief on regulation of health effects of RF