Shared Spectrum Synopsis

Introduction

The following synopsis provides a brief snapshot of Share Spectrum standards, implementations and innovations in the United States and the European Union. The objective is to encourage an innovative approach to New Zealand's up and coming 5G spectrum allocation.

1. Shared Spectrum Standards

United States - Citizens Band Radio Service (CBRS)

https://en.wikipedia.org/wiki/Citizens_Broadband_Radio_Service

Citizens Broadband Radio Service (CBRS)[1] is a 150 MHz broadcast band of the 3.5 GHz band (3550MHz to 3700MHz) historically used by the United States government for radar systems.[2] In 2017, the Federal Communications Commission (FCC) completed a process begun in 2012 to establish rules for commercial use of this band. Wireless carriers using CBRS are expected to be able to deploy 5G mobile networks quickly and easily, without having to acquire spectrum licenses.

European Union - Licensed Shared Access (LSA)

http://www.nera.com/publications/archive/2016/mechanisms-to-incentivize-shared-use-of-spectrum.html

One of the most promising approaches is Licensed-Shared Access (LSA). In an LSA arrangement, the incumbent grants access to spectrum in its band to a secondary user on an exclusive basis. LSA has the benefit of being relatively simple to implement, as access to spectrum is only shared between two parties, while also providing mobile operators with certainty over availability of spectrum capacity.

ETSI releases specifications for Licensed Shared Access (LSA)

http://www.etsi.org/news-events/news/1181-2017-04-news-etsi-releases-specifications-for-licensed-shared-access

ETSI produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, broadcast and Internet technologies. The ETSI Technical Committee for Reconfigurable Radio Systems (TC RRS) has announced the completion of the specification for the support of Licensed Shared Access (LSA). This provides a means to enable spectrum sharing coordination between LSA licensees and existing spectrum licensees, thereby ensuring Quality of Service (QoS).

2. Shared Spectrum Implementations

United States - FCC Shared Spectrum and the 3.5 GHz Band

http://www.federatedwireless.com/shared-spectrum-and-the-3-5-ghz-band/

For those unaware, in April 2015 the Federal Communications Commission adopted rules for the 3.5 GHz band (or the Citizen's Broadband Radio Service) unlocking 150 MHz of spectrum for shared use by commercial entities. The FCC's action opened a new chapter in the regulation and administration of our nation's radio spectrum. I believe it will pave the way toward future 5G applications – a massive increase the reach, capacity, and resiliency of wireless networks and in the rollout of new industrial applications, enabling the Smart City and the Internet of Everything.

Shared use of spectrum is essential, but challenges with implementation remain, comments European Commission ahead of DSA Global Summit 2018
https://www.realwire.com/releases/Shared-use-of-spectrum-is-essential-challenges-with-implementation-remain
London, United Kingdom, 17 April 2018: Speaking ahead of the Dynamic Spectrum Alliance (DSA) Global Summit 2018, which will take place in London from 1-3 May 2018, the European Commission's Head of Unit for Radio Spectrum Policy has urged how essential the shared use of spectrum is but cautioned that challenges with implementation remain.

France - Mobile spectrum sharing pilot begins in France
https://www.computerweekly.com/news/4500270132/Mobile-spectrum-sharing-pilot-begins-in-France
An extensive pilot of licensed shared access (LSA) spectrum sharing technology has begun in Paris, supported by Ericsson, local startup Red Technologies, mobile chip supplier Qualcomm and the French government.

The pilot programme will see the Ministère de la Défense – the French equivalent of the UK's Ministry of Defence – share spectrum that it currently holds in the 2.3 to 2.4GHz band using Ericsson's radio access network.

Italy - Licensed Shared Access (LSA) Pilot
http://www.sviluppoeconomico.gov.it/index.php/en/news/2033594-licensed-shared-access-lsa-pilot
The Italian Ministry of Economic Development and the Joint Research Centre of the European Commission have started a pilot project on the sharing of radio spectrum at 2.3 GHz band, based on the Licensed Shared Access (LSA).

The pilot is developed under the technical coordination of Fondazione Ugo Bordoni and involves industrial partners from numerous European countries: PosteMobile (Italy), Qualcomm Technologies, Inc. (Italy), Nokia Networks (Italy/Finland), Cumucore (Finland) Fairspectrum (Finland) and Red Technologies (France).

Europe - LSA Implementation
https://www.cept.org/ecc/topics/lsa-implementation
"A regulatory approach aiming to facilitate the introduction of radio communication systems operated by a limited number of licensees under an individual licensing regime in a frequency band already assigned or expected to be assigned to one or more incumbent users.

Under the Licensed Shared Access (LSA) approach, the additional users are authorised to use the spectrum (or part of the spectrum) in accordance with sharing rules included in their rights of use of spectrum, thereby allowing all the authorized users, including incumbents, to provide a certain Quality of Service (QoS)".

3. Shared Spectrum Innovations

5G Spectrum Sharing brings new innovation

https://www.qualcomm.com/invention/technologies/5g-nr/spectrum-sharing

Access to shared and unlicensed spectrum will extend 5G in multiple dimensions - such as more capacity, higher spectrum utilization, new deployment scenarios. It will benefit mobile operators with licensed spectrum but also opens the doors to those without licensed spectrum – such as cable operators, enterprise or IoT verticals – to take advantage of the 5G New Radio (5G NR) family of technologies.

5G NR is designed to natively support all spectrum types and, through forward compatibility, has the flexibility to take advantage of new spectrum sharing paradigms. This creates opportunities for new innovation to take spectrum sharing to the next level in 5G.

What is CBRS Shared Spectrum for in-building small cell wireless?

https://www.thinksmallcell.com/LTE/what-is-cbrs-shared-spectrum-for-in-building-small-cell-wireless.html

What's different is the way that the spectrum is assigned to each user. This isn't sold to operators in large blocks covering wide geographic areas nor a completely unlicensed free-for-all (such as Wi-Fi). Instead, use within each building is individually requested and assigned on a case-by-case basis. Where it is no longer required, it is returned for use by others.

Shared Spectrum Company

http://www.sharedspectrum.com/

The ever-increasing demand for wireless bandwidth, combined with the artificial constraints placed on it by traditional regulatory approaches, have made RF spectrum an incredibly scarce and expensive resource.

Shared Spectrum Company (SSC) is unlocking the full potential of this resource with its pioneering and innovative cognitive radio technologies that eliminate artificial barriers and support more efficient use of spectrum. Core among these technologies is SSC's Dynamic Spectrum Access (DSA) solution.

The FCC Should Use Blockchain to Manage Wireless Spectrum

https://www.wired.com/story/the-fcc-should-use-blockchain-to-manage-wireless-spectrum/

Instead of having a centralized database to support shared access in specific spectrum bands, innovators should explore the use of blockchain as a lower-cost alternative. If the effort succeeds, the benefits could be considerable: The system could reduce the administrative expense of allocating spectrum and increase efficiency by enabling demand-matching spectrum sharing and by lowering transaction costs.

Even better, the public quality of the information on the blockchain could expose patterns in use and inspire new technical innovation in the process. Plus, new models for short-term leasing of our airwaves could emerge and expand the range of wireless uses.