

Sharing Radar Bands with Commercial Systems

2011 – International Symposium on
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Overview

- Thank-you Boulder, NTIA, DoC for providing this beautiful and supportive setting.
- Thank-you attendees and speakers.
- TDWR spectrum-sharing experience.
- Openness to database operation.
- Successfully sharing new spectrum.
- Spectrum Sharing Database model.
- Extending the TV White Space database model.
- SSD Inputs and Outputs
- Moving Forward

TDWR Sharing Experience

- January 2010 – WISPA first became aware of TDWR interference issue and started working w/ “wireless industry group”, FCC, NTIA.
- July 2010 - With sanction of WIG and generous technical support from Spectrum Bridge, our manual TDWR database went live.
- Display all TDWR systems or enter a location - nearby TDWR systems displayed. Optionally register your outdoor base station information. If within 35 km, exclude frequencies +/- 30 MHz.
- End-User Education – Email list announcements; Julie Knapp Memorandum; created TDWR flyer; publicize two FCC enforcement actions; Rashmi Doshi industry webinar.
- Bottom Line – Operators will first “look up and avoid” and will later (with incentives) register their base station locations.

Openness to Database Operation

(Survey of 5470 – 5725 MHz Operations)

- (7%) - No new equipment should be able to operate in the 5570 to 5680 MHz range. This frequency range should be permanently "notched" out.
- (17%) - There should be no new rules.
- (40%) - New equipment should be required to automatically register in an online geo-location database. Depending on the equipment location and proximity to a TDWR system, this database would either a) enable operation from 5470 to 5725 MHz or would b) deny operation from 5570 to 5680 MHz.
- (47%) - Operators should be required to manually register equipment in a 5 GHz database and avoid TDWR frequencies.
- To retain use of 5570 to 5680, 87% indicated acceptance of new rules that would **require** use of a database (either manual or automatic).

Successfully Sharing New Spectrum

(Example: 3550 – 3650 MHz)

- ISART – “Develop Forward-Thinking Rules and Processes to Fully Exploit Spectrum Resources”.
- A dynamic spectrum sharing database (frequency and time) is probably an efficient way to fully exploit shared spectrum.
- SSD model appropriate for 3550-3650 MHz and, with tweaking, for other shared spectrum.
- Mobile broadband industry has not indicated interest in 3550-3650.
- 3550–3650 is a natural extension of the current Part 90 (licensed-lite) 3650–3700 MHz band. Multiple equipment vendors already exist.
- Fixed Wireless Broadband (WISP) industry needs additional unlicensed or lightly-licensed spectrum to serve the 15% of the population who have no broadband option available at home (no cable or DSL infrastructure).

Spectrum-Sharing Database (SSD) Model

- Proactive to avoid interference rather than reactive (i.e., “finding and fixing interference after the fact”).
- 3650-3700 is not “shared” and it’s not pure “unlicensed” but we can combine the registration part of 3650 “light-licensing” with the TVWS database model to create a new SSD database model. 3650-3700 MHz is Part 90 (not Part 15) fixed station operation.
- 3650-3700 MHz spectrum is already in use today at several thousand fixed station locations nationwide.
- 3650-3700 MHz currently requires a one-time nationwide license and also requires that each station be registered (with GPS coordinates, equipment description, etc.) in an FCC database.

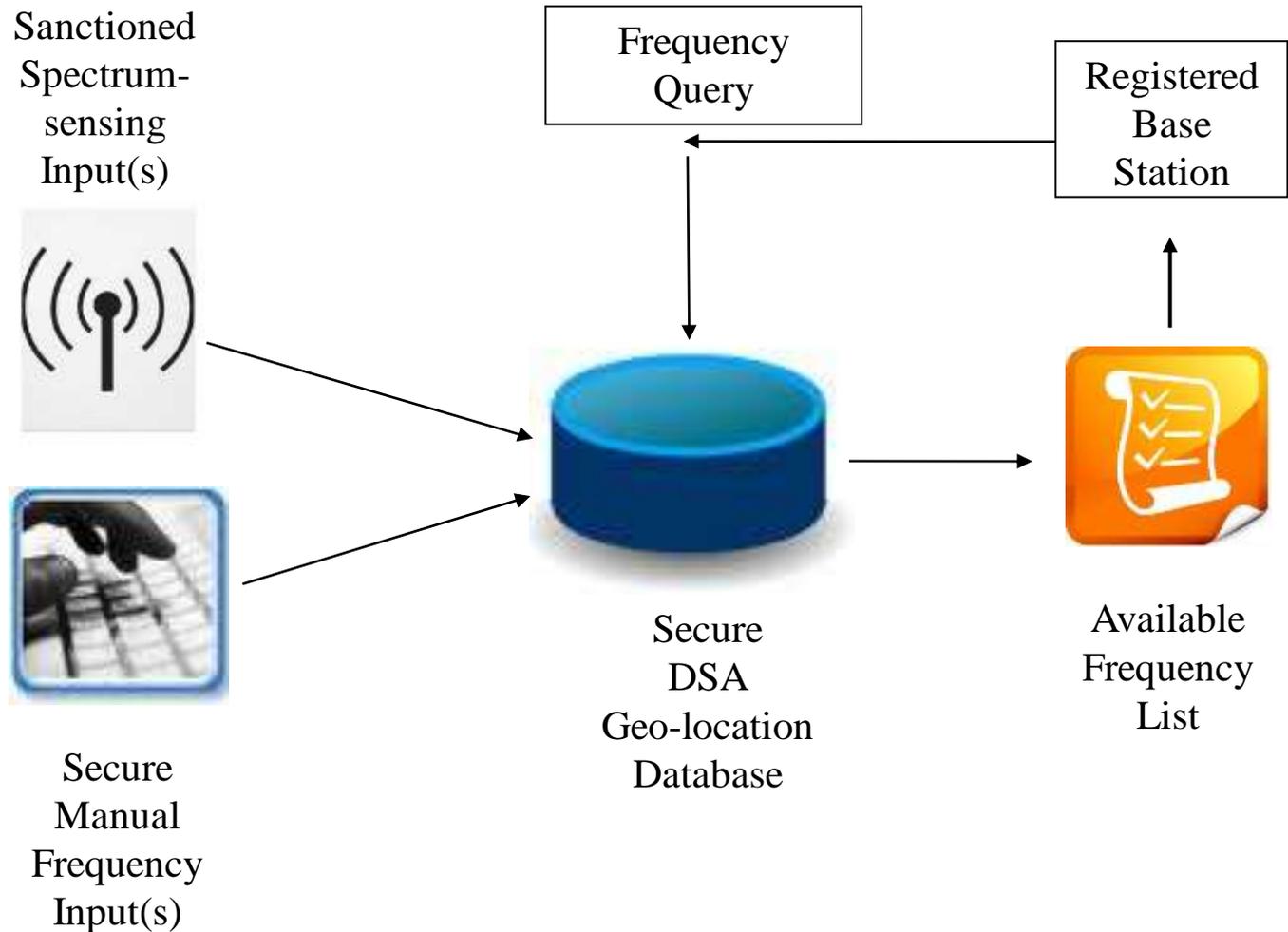
Extending the TV White Space Database Model

- We have an existing TV White Space (TVWS) geo-location database model that knows where the existing (licensed) TV coverage areas are and knows how much distance is needed to protect them from unlicensed interference.
- Fixed TV band devices (TVBDs) must connect over the Internet to one (of the nine) databases to obtain an available-channels list.
- Software development is close to completion.
- Redundancy (9 or 10 database vendors) that will provide the same synchronized information.
- Security (user-to-database and data-to-database) is built in.

SSD Inputs and Outputs

- Secure Manual Radar Frequency Inputs – Only designated government entities may manually enter “frequency-in-use” information.
- Secure, Dynamic, Near-Real-Time Inputs – Sanctioned spectrum-sensing receivers can do full-time band scanning to detect radar operation.
- Output – A list of available frequencies available to each fixed base station, depending on the station’s geographical area.
- Can be used with any existing radar system bands or any frequency band. No radar retrofitting costs.

Spectrum-Sharing Database (SSD) Model



Moving Forward

- WISPA looks forward to continuing to work with all Members of the radar, standards and vendor communities, FCC, NTIA, DoD to continue to play a positive role in enabling, establishing and practicing successful, interference-free spectrum sharing.
- Thank-you for this opportunity to participate.