

Federated Wireless 6 GHz AFC

September 2020

federated wireless

A woman with voluminous curly hair is sitting on a wooden park bench. She is wearing a grey blazer over a white top and dark pants. She is smiling and looking down at a tablet computer she is holding with both hands. In her right hand, she also holds a white coffee cup. A teal bag is on the bench next to her. The background is a blurred green hedge and trees. The text 'Federated Wireless 6 GHz AFC' and 'September 2020' is overlaid on the left side of the image. The 'federated wireless' logo is in the bottom right corner.

U.S. 6 GHz Band

Unlicensed Access to 1200 MHz of Occupied Spectrum via Sharing

- FCC adopted new rules to allow unlicensed use in the 5.925-7.125 GHz (6 GHz) band
- Use of an Automated Frequency Coordination (AFC) shared access system for **standard power** and **outdoor** devices to enforce protection
- Preserve & protect incumbent users in the band
 - Microwave links: MNOs, Utilities, Public Safety and Transportation
 - Broadcast Auxiliary Service
 - Cable Television Relay Service



Fixed Microwave Links



Mobile Broadcast Auxiliary Services

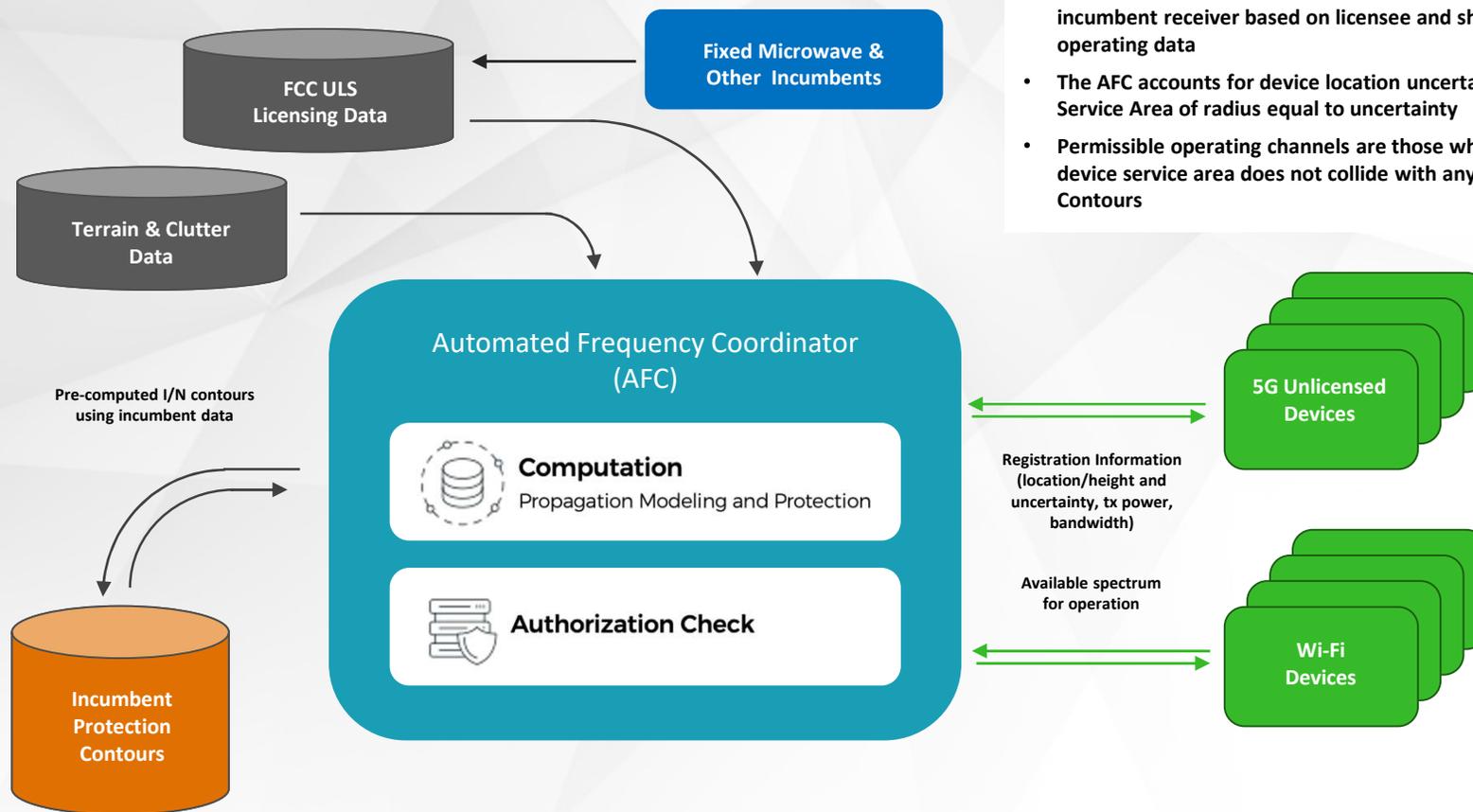
6 GHz Band Incumbents



Cable TV Relay Service

Automated Frequency Coordinator (AFC)

Cloud Automation for 6 GHz Sharing

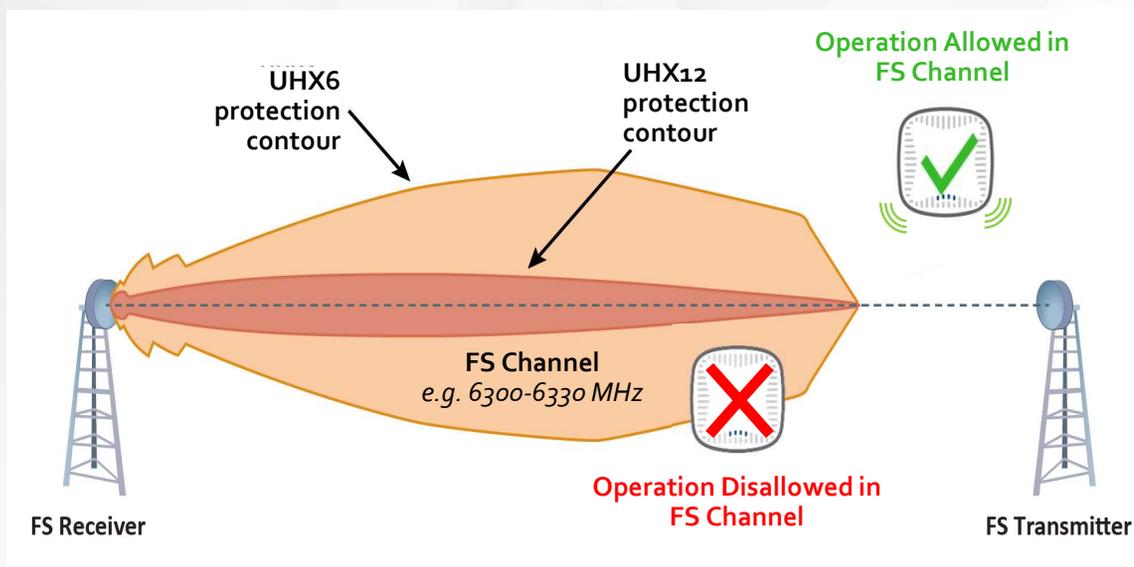


Operation

- The AFC calculates an Incumbent Protection Contour around every incumbent receiver based on licensee and shared access device operating data
- The AFC accounts for device location uncertainty by calculating a Service Area of radius equal to uncertainty
- Permissible operating channels are those where the shared access device service area does not collide with any Incumbent Protection Contours

AFC Theory of Operations

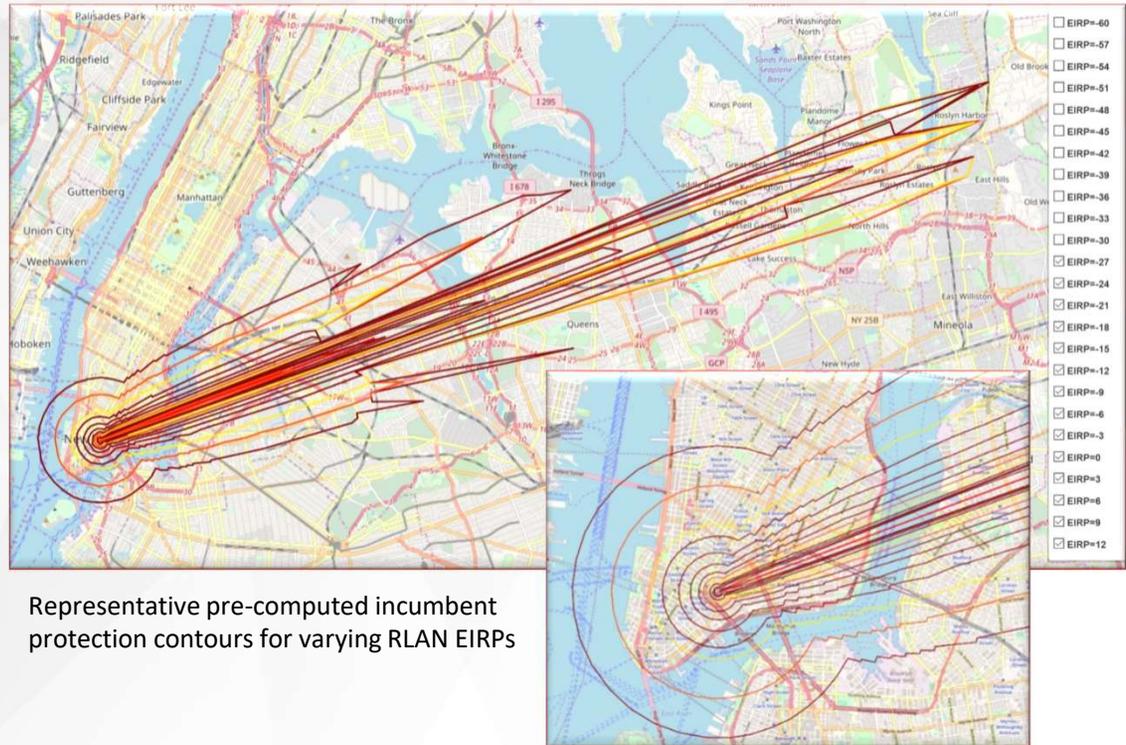
- The AFC calculates a protection area around every incumbent Fixed Service (FS) receiver using licensee data in the FCC's Universal Licensing System (ULS)
- Access Points (APs) operating above 5 dBm/MHz and all outdoor APs are required to send their 3D location and location uncertainty to the AFC before transmitting
- The AFC uses incumbent protection contours and accounts for AP location, power, and location uncertainty to determine permissible AP operating frequencies



AFC Pre-Calculated Protection Contours

~100,000 incumbent receivers in FCC ULS

- Hills, mountains and other terrain blockages can reduce protection contours in certain directions
- Protection contour size grows with the EIRP of RLAN device
- Reducing EIRP shrinks the protection contour



Representative pre-computed incumbent protection contours for varying RLAN EIRPs