Radio Frequency Interference Management Efforts at the National Radio Astronomy Observatory Green Bank Site

Carla Beaudet, John Ford, Toney Minter, Mike McCarty, Karen O'Neil, and Richard Prestage
National Radio Astronomy Observatory, Green Bank, WV, 24944,
http://www.nrao.edu

The National Radio Astronomy Observatory (NRAO) at Green Bank, WV operates a site featuring the Robert C. Byrd Green Bank Telescope, the largest fully-steerable radio telescope in the world. The telescope operates at frequencies from 300 MHz up to 100 GHz studying many effects. In addition to this telescope, the site is home to many other experiments from magentometers to future radio telescope engineering prototypes. These experiments are all hindered by interference from nearby and distant sources. The RFI suppression efforts at Green Bank are focused on providing the cleanest spectrum possible for our users. This is accomplished by a combination of local RFI mitigation, and through administration of the National Radio Quiet Zone (NRQZ), a 13,000 square mile area covering parts of West Virginia and Virginia.

The NRQZ was created by the FCC in November of 1958 to minimize harmful interference to the National Radio Astronomy Observatory in Green Bank, WV and the radio receiving facilities for the United States Navy in Sugar Grove, WV. The NRQZ sets limits on emissions from fixed licensed transmitters inside the quiet zone. NRAO is charged with administering the quiet zone. NRQZ Administration efforts consist of commenting on applications for new transmitters inside the borders of the quiet zone, as well as comments on applications for upgraded transmitters. Challenges include a large volume of applications when new technologies are rolled out, such as the recent FCC-mandated narrow-banding of Land Mobile Radio, and new challenges from ubiquitous mobile transmitters such as automobile radars, as well as satellite ground terminals and satellite transmissions.

Local RFI suppression efforts include efforts to ensure that the observatory does not pollute its own environment, and efforts to help utility providers, such as power companies and cable television companies, locate and repair leaky or defective equipment that causes interference to the site. On-site suppression efforts include measuring all equipment installed near the telescopes, and shielding all equipment at the site that is used on a continuous basis. These efforts involve measuring emissions in an anechoic chamber, and then engineering shielded enclosures for any devices whose emissions exceed the power densities listed in Table 1 of Recommendation ITU-R RA.769. This encompases virtually every device that uses electricity.