

COMPARISON OF RADIO SPECTRUM USAGE IN URBAN
AND RURAL ENVIRONMENTS FOR RADIO ASTRONOMY
AND PASSIVE REMOTE SENSING BANDS

Petrin, A.J., Steffes, P.G.

Georgia Institute of Technology, School of Electrical and Com-
puter Engineering

Abstract Submission Form
2004 National Radio Science
Meeting

Abstract: petrin4426

Date Received: September 10, 2004

The increasing usage of radio spectrum in both frequency and power, coupled with the vulnerability of radio astronomy and passive remote sensing systems to interference, necessitates a better understanding of the existing and predicted usage of the spectral environment. The Radio Spectrum Engineering Lab (RSEL) at Georgia Tech has developed a Radio Spectrum Evaluation System (RSES) which provides coverage from 400 MHz to 7.2 GHz and offers the capability to observe and analyze spectral usage in multiple dimensions: frequency, power, location space, azimuth, polarization and time. This system has a demonstrated capability of detecting signals emanating from satellites (GEO, MEO, and LEO), terrestrial radars, and terrestrial communication systems (broadcast, narrow band, spread spectrum, and low duty cycle operation).

Using the RSES system two comprehensive broadband spectrum studies where performed to characterize the spectral environments in an urban area and at a radio astronomy observatory located in rural North Carolina. A measurement site in midtown Atlanta, GA was selected to provide a baseline of spectrum usage in an urban area saturated with spectrum users, to increase the probability of intercepting spurious emissions. The Pisgah Astronomical Research Institute (PARI), located in the Pisgah National Forest was chosen as the comparison spectrum measurement site to analyze spectrum usage in a rural environment. To provide accurate and substantive information on spectrum usage more than five billion data samples were taken. This data was analyzed using an advanced detection algorithm developed at the RSEL to produce information on spectrum usage levels and characteristics.

In this presentation measurements and analysis of spectrum usage in the 608 614 MHz, 1395 1430 MHz, 4950 5000 MHz, and 6425 7200 MHz bands used for radio astronomy and passive sensing will be presented. The urban and rural spectrum measurements will be compared to show the different usage levels and characteristics present in these environments.

1. (a) Allen Petrin
1244 Defoor Village CT NW
APT440
Atlanta, GA
30318 USA
me@allenpetrin.com
- (b) 404-509-4501
- (c) 404-894-5935
2. J - Radio Astronomy
3. (a)
4. C - Contributed Paper
5. For: Spectrum Management
in the 21st Century, joint
with Comm-F, Session
co-chairs: Mike Davis
(Comm-J), Karen
St.Germain (Comm-F)