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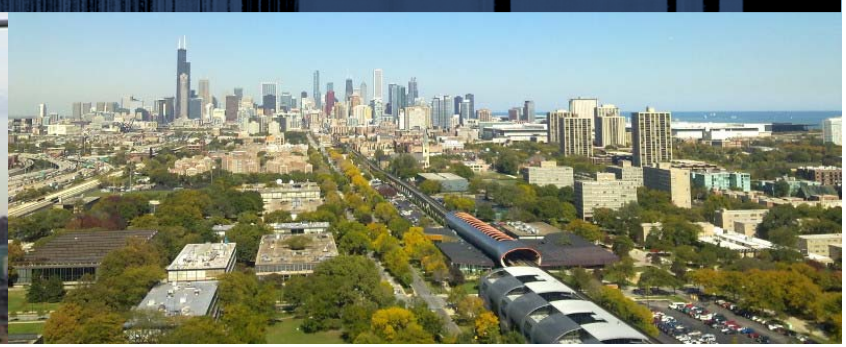
The Spectrum Observatory

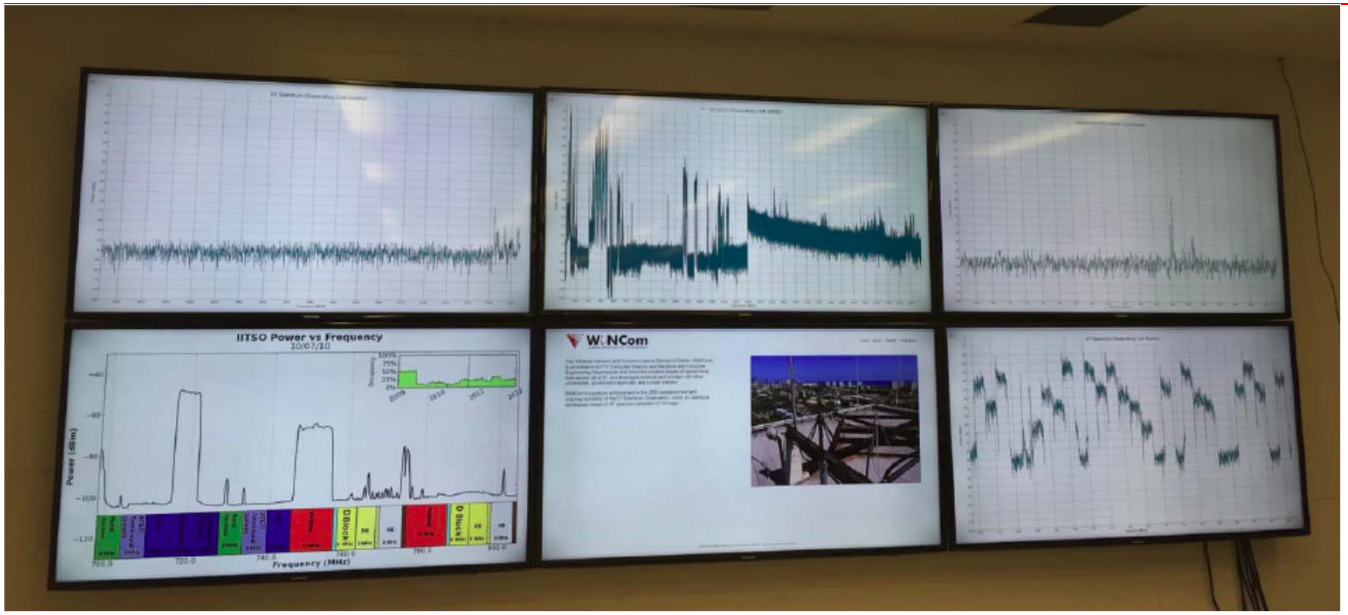


Dennis Roberson

Roberson and Associates, LLC
Technology and Management Consultants

2 August 2016

Spectrum Observatory



International Spectrum Observation Center (ISOC)

Spectrum Observatory Systems

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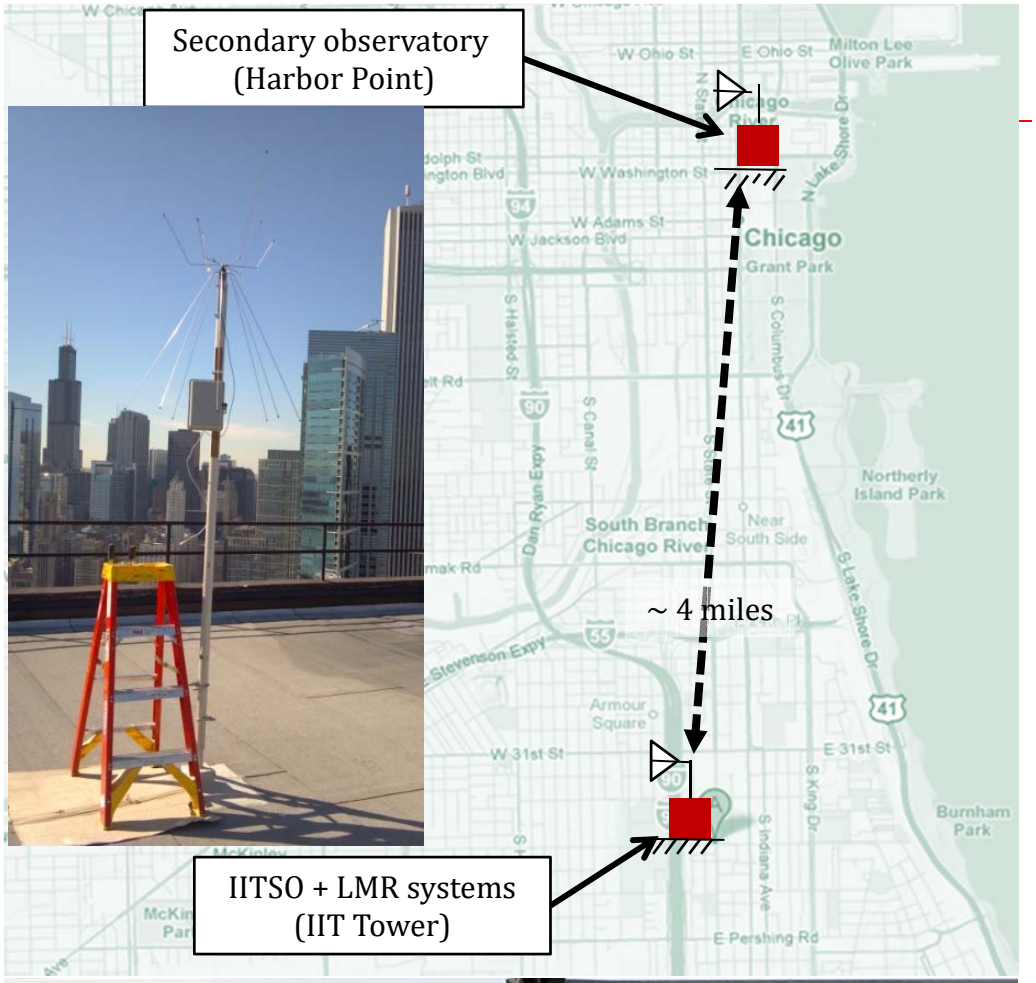
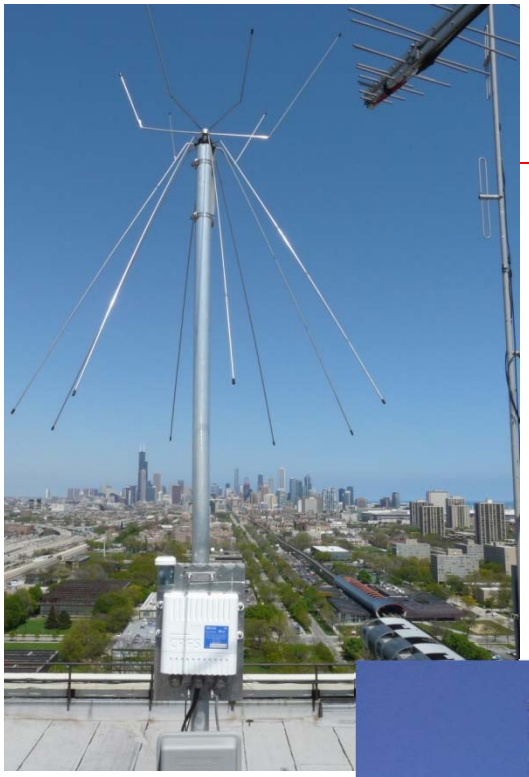
- R&S Spectrum observatory (IITSO)
  - RS Spectrum analyzer based
  - 30 – 6000 MHz
  - ~5 minute sweeps @ 3 KHz RBW
  - ~200 MB/day
- NI - USRP 2 / 200 (many)
  - Specific bands (e.g. 450-474 MHz, 700 MHz, 856 MHz)
  - ~25 ms sweeps
  - ~1 GB/day per unit
- CRFS - RFeye (5 – Turku, VT, IIT)
  - 30-6000 MHz
  - ~3 second sweep time
  - ~3.85 GB/day per location
- Tektronix - RSA 306 (3 sensors)
  - 0.1 – 6000 MHz
  - <3 s
  - 1 kHz RBW
  - ~1.5 GB/day per location

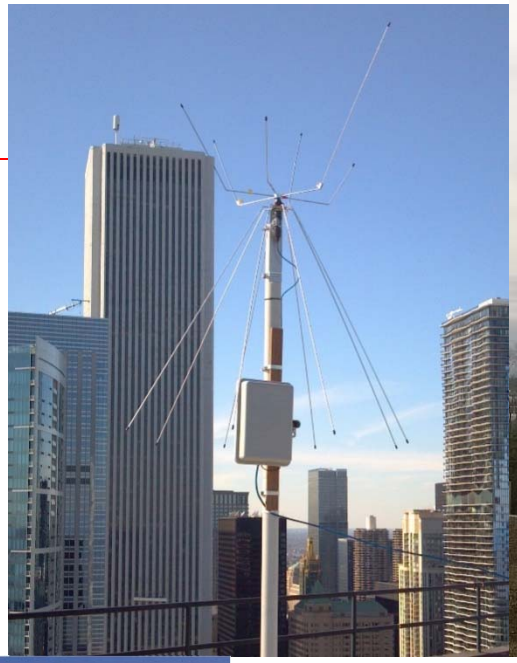


Multisite / Global Observation



IIT Tower, Chicago

Mobile, Chicago



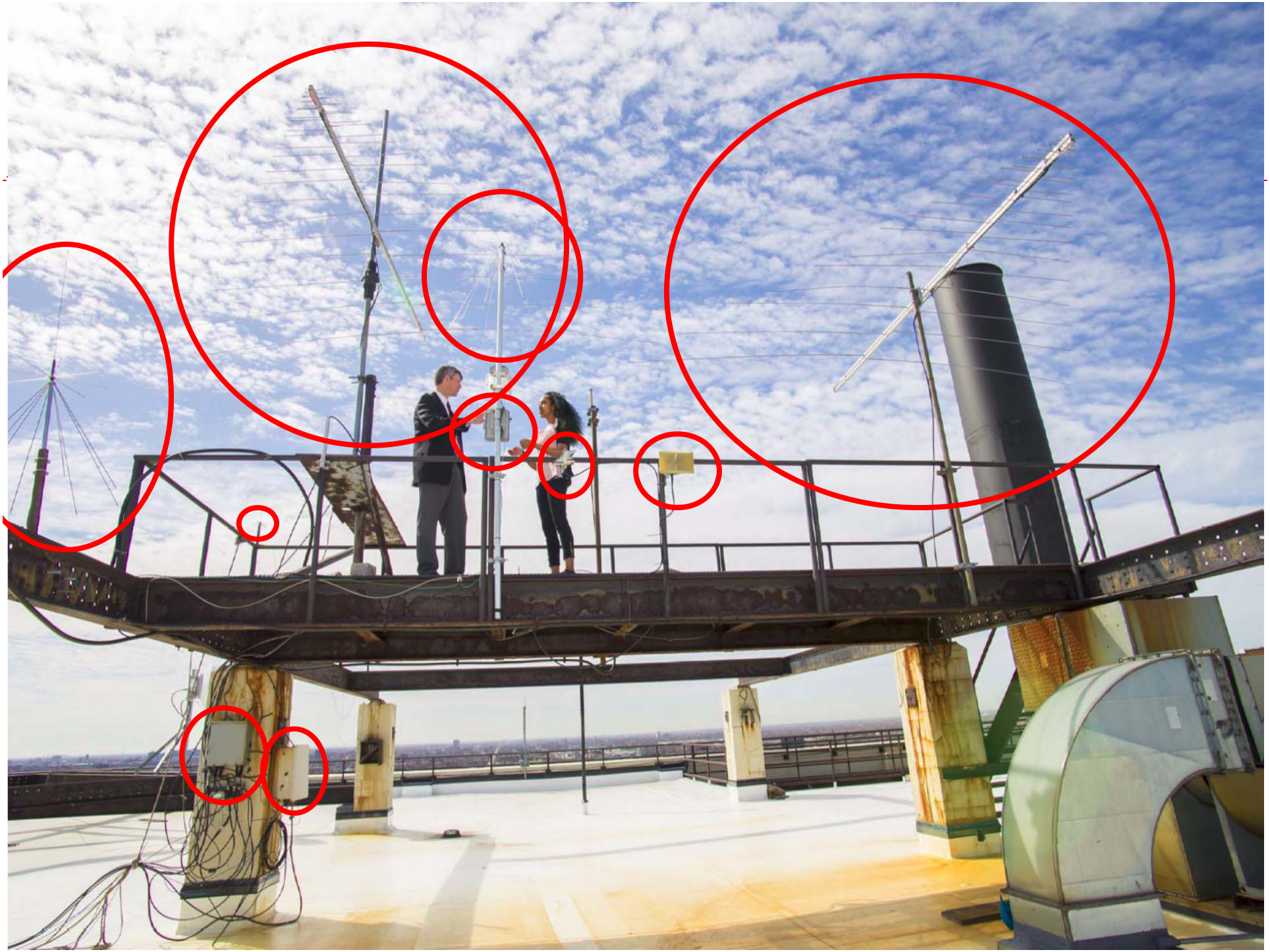
Harbor Point, Chicago

Turku, Finland

Blacksburg, VA

UIC =>

IIT Tower



WiNCom Research Team

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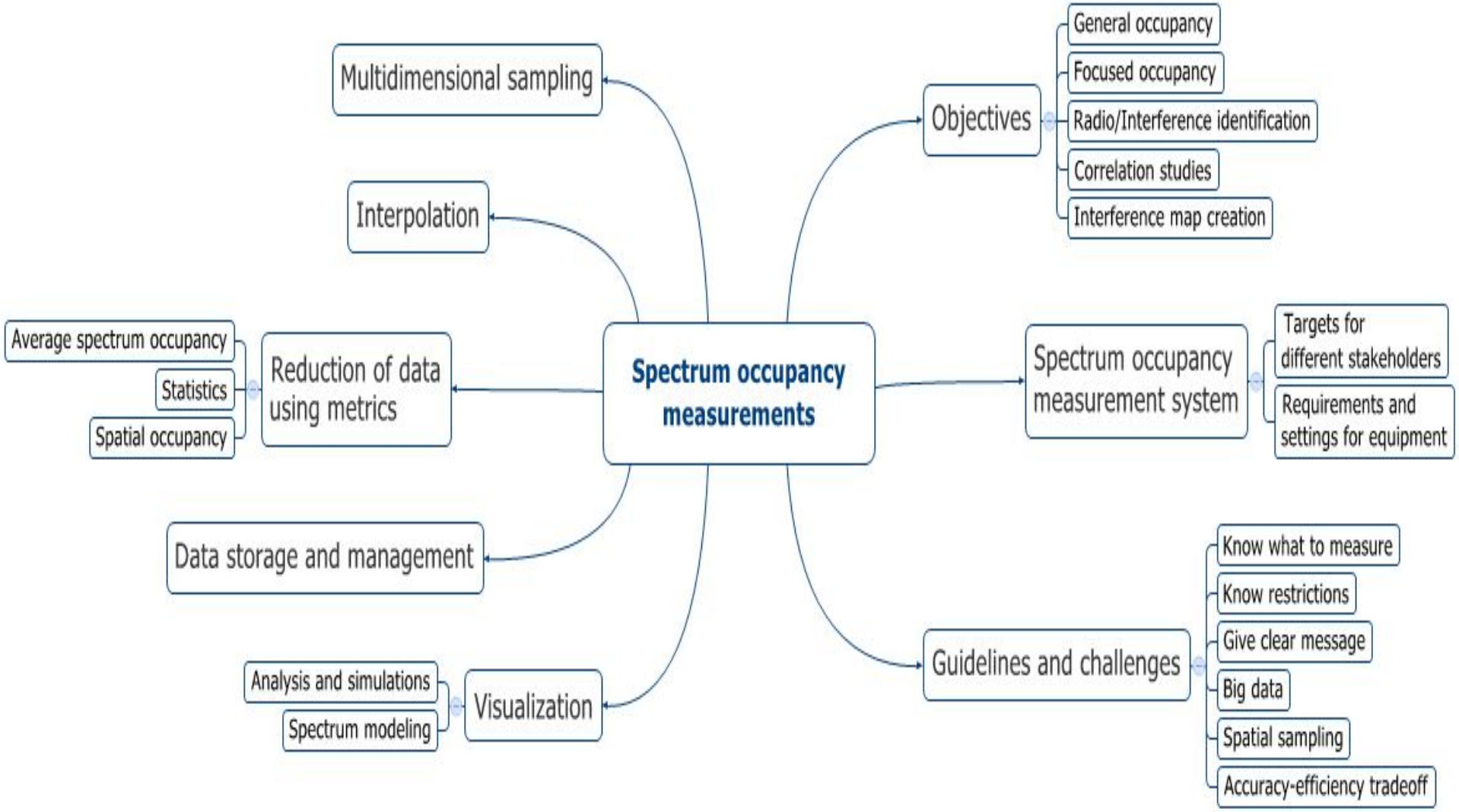
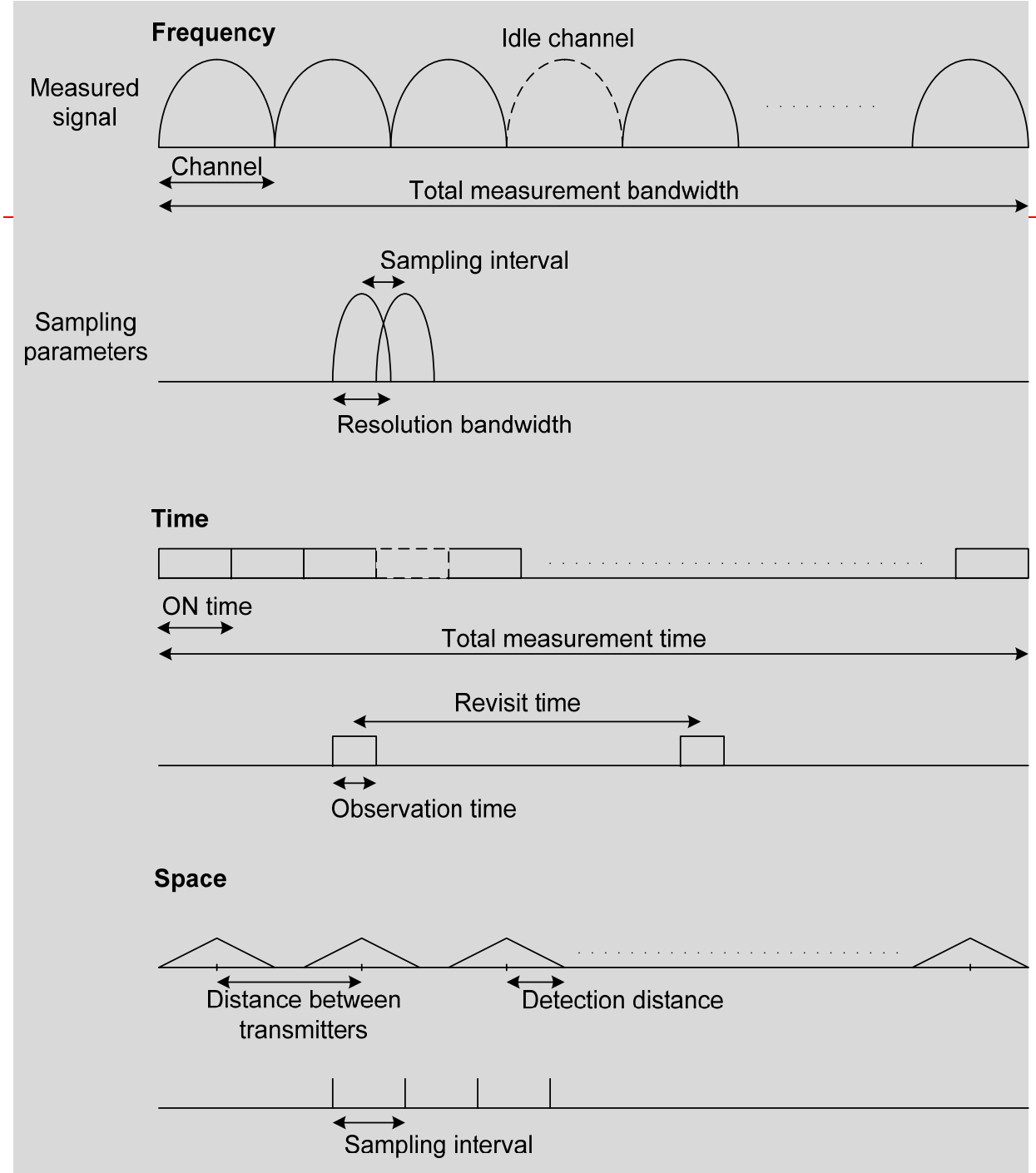
Elements of Spectrum Observation





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Many sampling parameters in spectral, temporal, and spatial domains

=> Many Trade-offs!

Spectrum Observations

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So what have we observed / learned?

1. Events
2. Cyclical Activities (daily, weekly…)
3. Long term transitions
4. Significant Trends
5. Anomalies
6. Modeling Capabilities

Anomalies:
600 MHz Band – 2012

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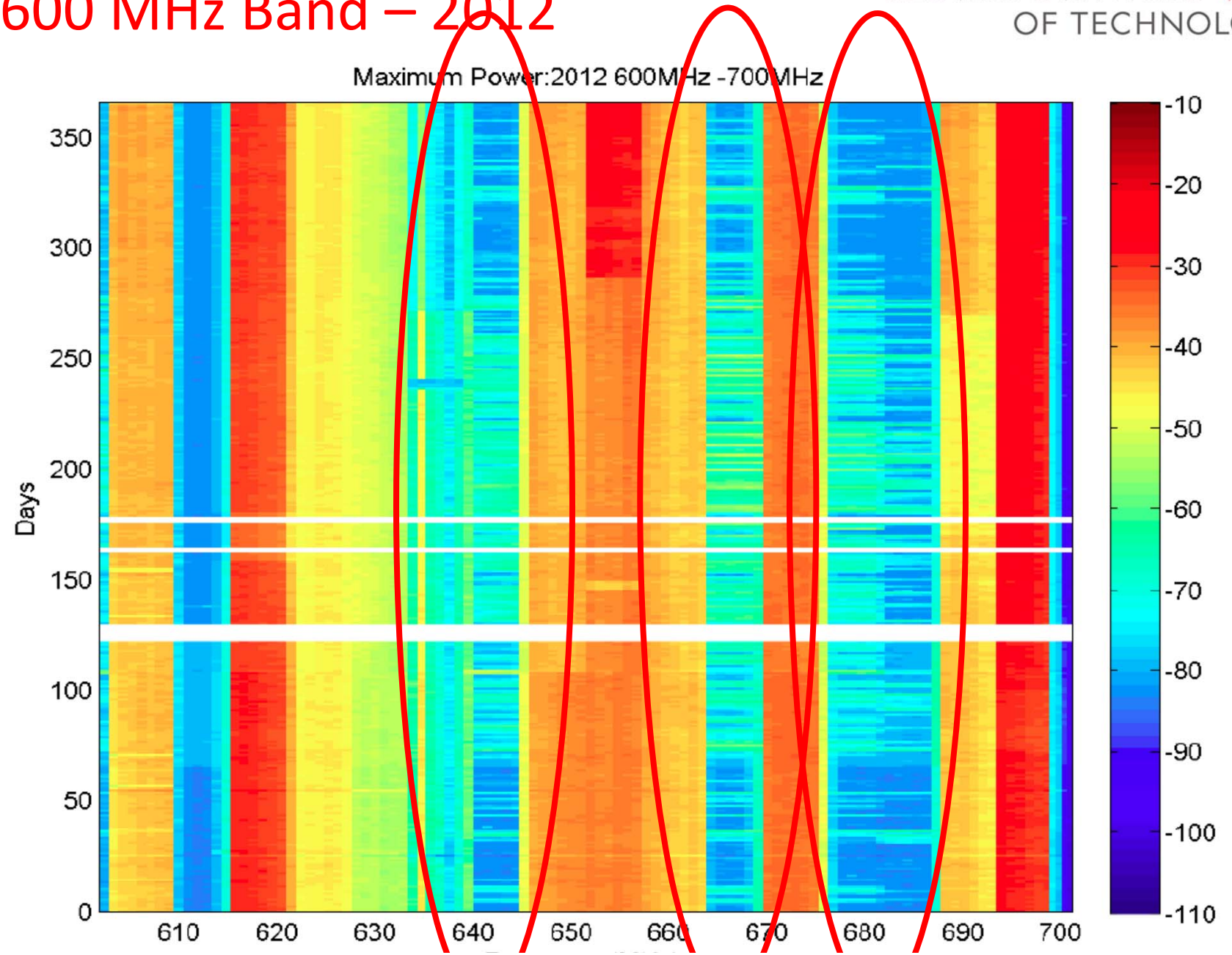

Events: June 2009 Analog to Digital Television Transition

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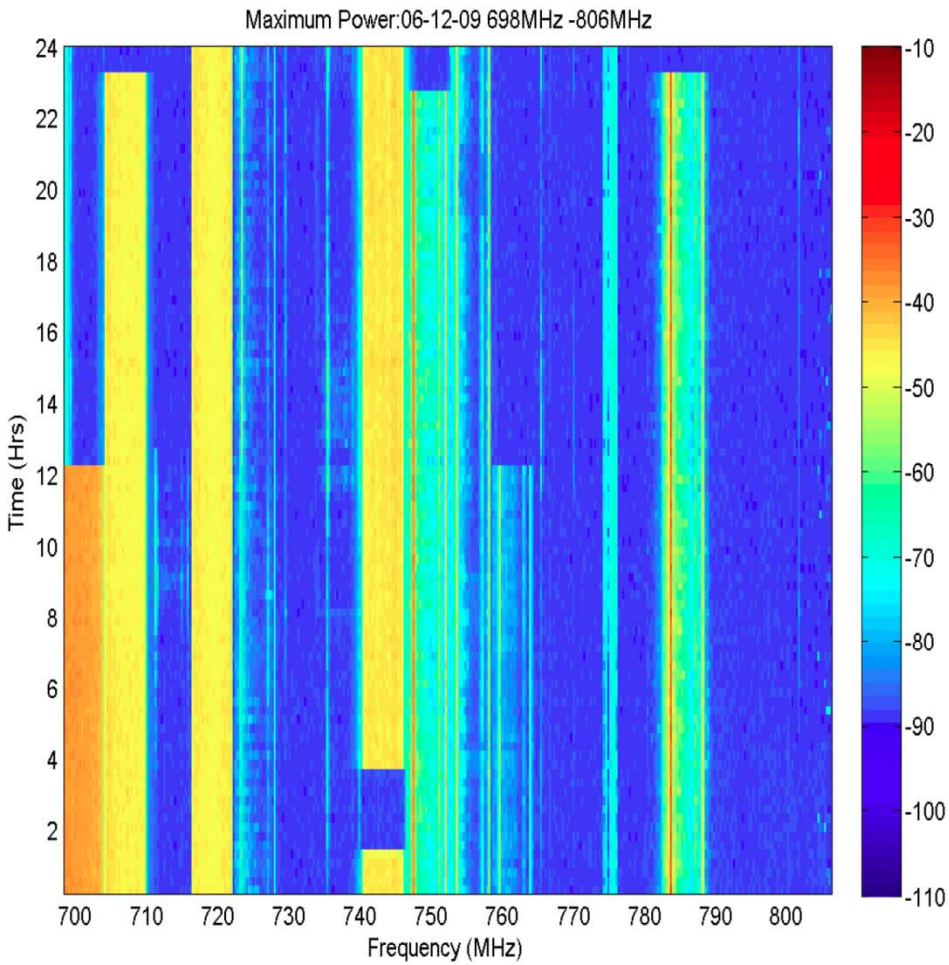
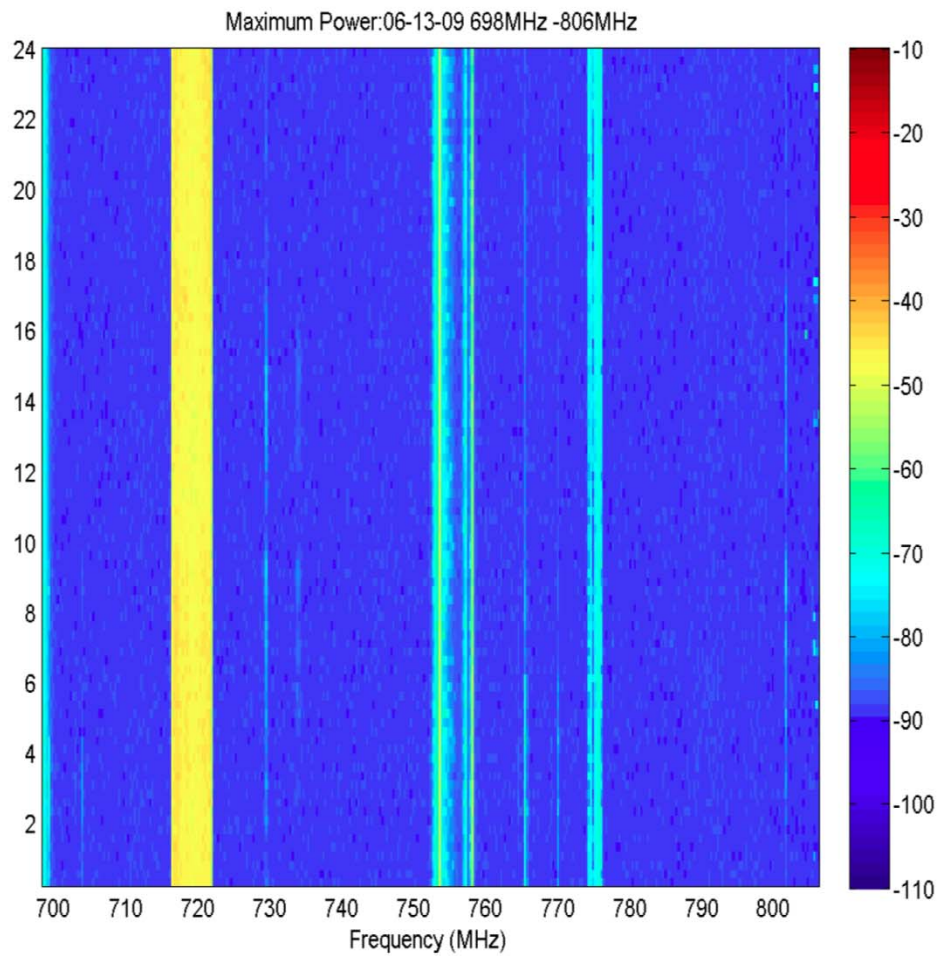


Before



After

Advertisement: Web Accessible Waterfall Charts

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Day Wise Waterfall Chart

Day

Month

Year

Select Frequency

Maximum or Average

Submit Query

Year Wise Waterfall Chart

Select Year

Select Frequency

Maximum or Average

Submit Query

- 50,000+ Pre-processed Waterfall Charts
- Choice of Daily or Yearly Charts
- Choice of 25 popular frequency bands
- Charts cover 2009-2015 (1H 2016 coming soon)

Second Advertisement!

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Today's Special Offer! Send me a large disk (>/=12 TB) and I will send you a complete set of our various datasets.

Questions or comments?

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About Us | Spectrum Observatory | Waterfall Charts | Projects | Publications

Wireless Network and Communications Research Center

The Wireless Network and Communications Research Center (WiNCom) is an initiative of IIT's Computer Science and Electrical and Computer Engineering Departments that fuses the creative talents of researchers from across all of IIT, and leverages external partnerships with other universities, government agencies, and private industry. WiNCom's signature achievement is the 2007 establishment and ongoing operation of the IIT Spectrum Observatory, which is creating a continuous record of RF spectrum utilization in Chicago

http://www.cs.iit.edu/~wincomweb/wincomnew/Wincom.html