

## North Dakota State University RFID and Wireless Sensor Laboratory

The Center for Nanoscale Science and Engineering (CNSE) at North Dakota State University has been actively engaged in RFID and wireless sensor research and development since the Center was established in 2002. The Research 2 building at NDSU houses 12,000 sq. ft. of space serving these electronics programs. The programs involve antenna design, ASIC development, hardware prototyping, applications development, electronic materials development and packaging. They include a full range of passive RFID, battery assisted RFID and active wireless sensor systems.

In late 2007, NDSU CNSE opened an additional lab facility dedicated to radio frequency testing. The **RFID and Wireless Sensor Laboratory (RWSL)** is located in the new **Center for Technology Enterprise** building. The cornerstone of the new laboratory is a state-of-the-art 3 meter anechoic antenna test chamber optimized for RFID and wireless communication testing. The new laboratory will provide valuable testing capability and support opportunities for research and development partnerships between NDSU, industry and government in RFID technology areas.

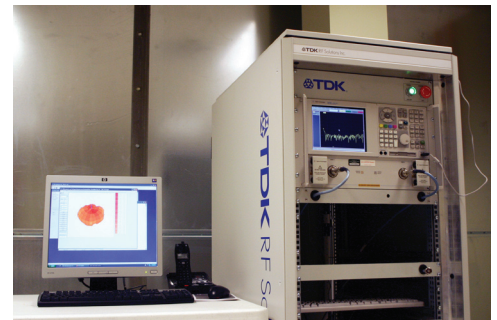


*Anechoic Antenna Chamber*

### Capabilities / Specifications:

#### Anechoic Chamber:

- 19' 9" L x 11' 10" W x 11' 3" H
- Frequency range – 700 MHz to 18+ GHz
- 3+ meter measurement distance
- Turntable and roll-over-azimuth positioner allow full 3D antenna pattern measurements (up to 1 kg load)
- Flexible, expandable test system allows selection of signal source and receiver:
  - Agilent N5230A Vector Network Analyzer
  - Anritsu MG3700A Signal Generator
  - Agilent E4407B Spectrum Analyzer
  - Tektronix RSA3408B Real Time Spectrum Analyzer
- Mono-static (1GHz - 18 GHz) or bi-static (700 MHz – 6 GHz) radar-cross-section measurements
- Absolute gain measurements possible with precision dipole antenna



#### Antenna Design and Prototyping:

- Ansoft HFSS 11 full-wave electromagnetic solver
- Rapid planar antenna prototyping using Direct Write (printed conductive ink) technology

#### RFID Tag Measurements:

- Minimum tag turn-on power
- Tag IC impedance

#### Materials Characterization:

- Agilent E4991A RF Impedance / Material Analyzer

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