

ITU-R Task Group 1/8

The Bush Administration's Commitment to Implementing New Technologies

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Administration's Commitment to Spectrum Innovation

- Ultra-wideband
- Broadband over Power Line
- Third Generation Wireless
- Additional Spectrum for Wireless Device Applications (5 GHz U-NII)
- Expanding Opportunities for Spectrum Use at Higher Frequencies (70/80/90 GHz)
- President's Spectrum Policy Initiative
- Position, Navigation, and Timing Policy



U.S. Approach to Technical Assessment of New Technologies

- **Characterization** of emissions of new technology
- **Compatibility** studies assessing the interference potential of new technology emissions to authorized radiocommunication systems
- **Compliance** measurement procedures to accurately portray interference potential of emissions from new technology

Characterization of Emissions for New Technologies

- Measure the temporal and spectral characteristics of various signals representing the new technology
- Develop measurement methods using commercial off-the-shelf test equipment
- Determine whether signals fall within the known models for interfering signals
 - Continuous wave model
 - Noise model
 - Pulse model

Compatibility with Authorized Radiocommunication Systems

- Susceptibility of receivers
 - Measurements (GPS)
 - ITU–R Recommendations
 - ICAO and RTCA standards
- Operational scenarios
 - Minimum separation distance
 - Antenna coupling
 - Propagation model
 - Other factors
- Acceptable emission levels

Analysis of Existing Systems

GPS Satellite
1575 \pm 12 MHz
1227 \pm 12 MHz
1176 \pm 12 MHz

Desired
Signal



Other
Non-GPS
Systems

What signals (power & structure) from UWB will cause interference to GPS? To Other Federal Systems?

Navigation

Aviation, space, maritime, rail, & vehicular

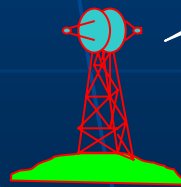
Position Determination

Surveying, asset tracking, precision agriculture, search & rescue, & E911

Timing

Banking, power distribution, Internet synchronization

Potential
Interfering
Signal



UWB System
900 - 30000 MHz
BW~2000 MHz

Communications
Radars

Development of Service Rules for New Technologies

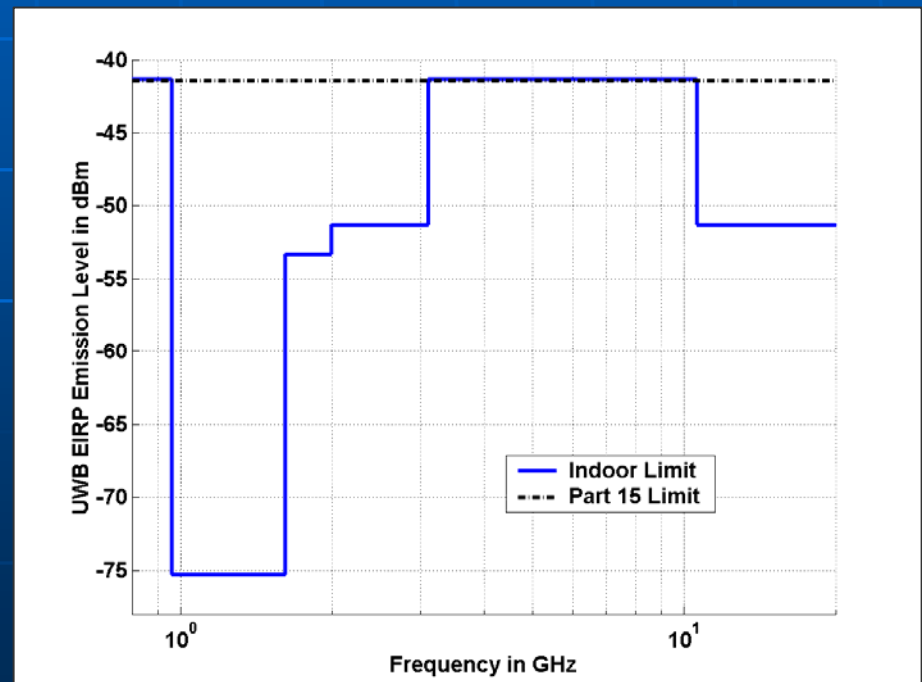
- The FCC develops service rules for new technologies through a public rulemaking process
- As the co-regulator each stage of the FCC rulemaking process is coordinated with NTIA
- Throughout the FCC rulemaking process NTIA receives advice from federal agencies:
 - DOD (National Security)
 - DOT (Aviation)
 - NASA/NSF (Space and Science)
 - DOJ (Public Safety)
 - DHS (Homeland Security)

Development of UWB Service Rules

- Based on the interference potential of the UWB device application
- Six distinct emission masks
 - Ground penetrating radar systems
 - Other imaging systems (wall, through-wall, and medical)
 - Surveillance systems
 - Vehicular radar systems
 - Indoor communications systems
 - Outdoor (handheld) communications systems

Emission Mask for UWB Devices

- A technically based approach (measurements and analysis) was used to develop the UWB emission limits necessary to protect the radio frequency spectrum used by GPS as well as other current and future radionavigation satellite systems.
- To date, all credible studies have shown the U.S. developed UWB emission limits adequately protect GPS receivers (based on 2 meter distance separation and protection of assisted GPS receiver technology).



Compliance Measurement Procedures

- Detector
 - Peak detector
 - RMS detector
 - CISPR detector (below 960 MHz)
- Measurement bandwidth
 - Varies with detector type and frequency
- Measurement interval (RMS averaging time)
- Application-based variations (e.g. GPR emissions radiated into sand pit)

Developments in the Past Year

- Three years after the FCC adopted rules, UWB technology continues to evolve.
- Initially impulse based, UWB technology and rules have been expanded to include:
 - Direct sequence technology
 - Multiband orthogonal frequency division multiplexing technology
 - High data rate binary phase shift keying technology
- Compliance measurement procedures have been developed to measure a UWB device under actual operating conditions
- Coordination procedures are being developed for fixed higher power UWB systems.
- Investigation of ground penetrating radars used on vehicles in ongoing.

Relationship to Task Group 1/8 Activities

- Development of ITU–R Recommendations to provide guidance to administrations
 - Characteristics of UWB systems
 - Impact on radiocommunication services
 - Framework for national UWB regulations
 - Measurement techniques
- The results of the U.S. compatibility studies serve as the basis for our contributions to ITU–R TG 1/8

Summary

- U.S has taken a aggressive but responsible approach to the development and deployment of new technologies.
- The NTIA technical studies serve as the basis for the development of the service rules that permit the safe and effective authorization of new technologies.
- NTIA studies for new technologies are available at: <http://www.ntia.doc.gov/osmhome/osmhome.html>
- U.S. rules successfully strike a balance between deployment of new technologies and protection of the existing radiocommunication systems.