

WG2: Applications Suitable for Inclusion in Broadband Wireless Standards

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What is Broadband Wireless Access?

- **Broadband:** Digital, one and/or two-way communications at megabit data rates or higher, and utilizing hundreds of megahertz of bandwidth.
- **Wireless:** Microwave frequencies with emphasis on K/ K_a bands and higher.
- **Access:** Providing the customer with access to multimedia services including voice, video and data. Includes broadcast, switched and networked services. (Include pt-pt and backhaul??)

What are the Applications for Broadband Services?

- High-Speed Internet Access
- LAN/WAN Interconnections
- High-Quality Data Exchange
- Video/Graphics Communications
- Entertainment
- POTS

Broadband is an Enabler

- Video Conferencing/Video Phone
- Interactive Games
- Efficient SOHO Business Uses
- Efficient Work-at-Home Capability
- Improved Educational, Medical, Financial and Business Services

Users of Broadband Wireless Services

Two-Way Broadband: Entertainment

- Interactive Video
 - TV Game Shows
 - Home Shopping
 - Interactive Sports Programs
- Video Games
 - Synchronized, Hi-Action Games
 - Multiplayer, Networked Games
 - See Your Team Mates and Opponents
- Share Video Experiences with Friends and Relatives
- Internet Entertainment/Convergence

Two-Way Broadband: Commerce

- Home Shopping
- Real Estate
- Work-at-Home
- Medical
- Product Service Support
- Professional Service

Two-Way Broadband: Training & Education

- **Public**
 - Enhanced Classroom Experiences
 - Access to Experts
 - International Culture Experience
- **Personal**
 - Access to Personal Development Educational Material
 - Interactive Training/Tutoring
 - Personal “Handy Man” Support
- **Industrial/Business**
 - Personnel Training and Development
 - World-Wide Sales Training

Two-Way Broadband: Business

- Tele-Commuting
 - Live Anywhere, Work Anywhere
 - Address Environmental Concerns
 - Flexible Work Schedules
- Small Business Have Access to Same Resources as Large
- More Frequent Meetings with Widely Dispersed Groups
- Reduced Travel Costs
- Better Training and Product Support

Relevant Standards Issues to Meet Application Needs

- User Interfaces
 - Computer
 - PCI, USB, SCSI, Parallel Port, Firewire,...
 - Video
 - MPEG-1,2,&4; NTSC, HDTV, ...
 - Voice/Telephony
 - T1, POTS, ISDN, ...
 - Protocols

Relevant Standards Issues to Meet Application Needs (cont..)

- Air Interface
 - Modulation and Waveform Parameters
 - Message or packet structure
 - Access Control
 - Channel Structure
 - Frequency or Bandplan(s)

Relevant Standards Issues to Meet Application Needs (cont.)

- IDU/ODU
 - Single-Family Residential Configurations
 - Multi-Family Residential Configurations
 - Small Business
 - Large Business

Relevant Standards Issues to Meet Application Needs (cont.)

- Service Provider
 - OSS and OAM&P
 - Call Processing
 - Power Control
 - Security and Access Control

Broadband Access Systems

- ADSL or xDSL: Copper Pair
- Hybrid Fiber/Coax (HFC): Cable Modems
- Wireless
 - Terrestrial: LMDS
 - Satellite: GEO, LEO, MEO
 - Stratospheric

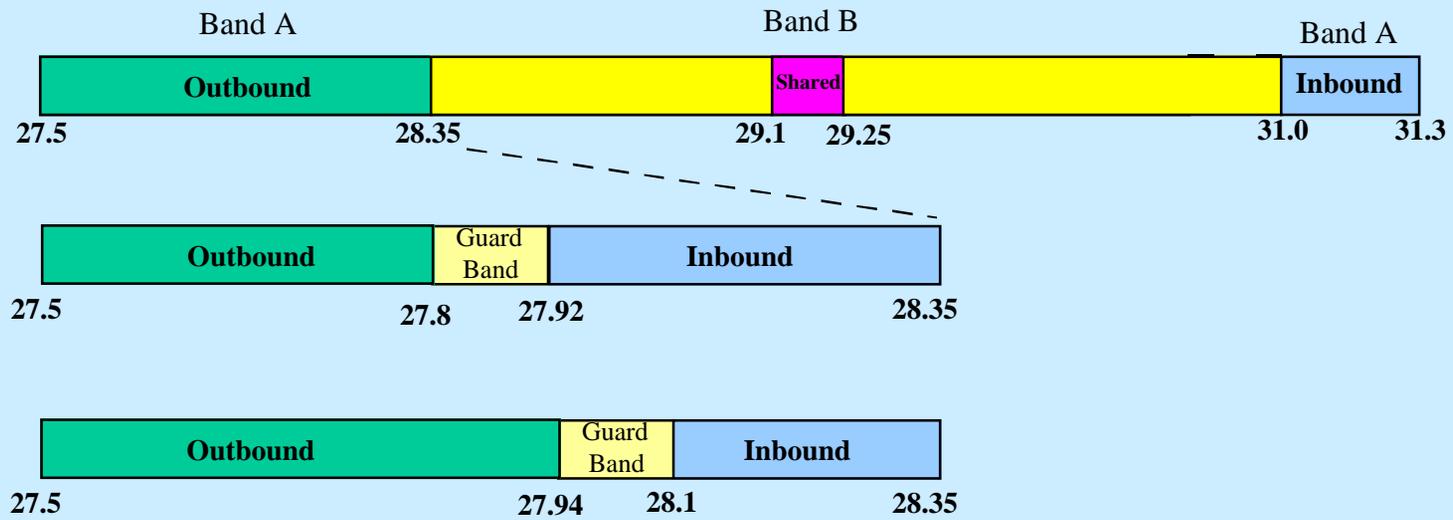
What do the Wireless Systems Have in Common?

- Frequency: K and Ka Band Operation
- CPE Antenna Aperture: Less than 18 inches
- Bandwidth: 1 GHz of Bandwidth or More
- Return Channel: Burst Mod, FDM/TDMA
- Protocol: ATM, IP
- Similar Services: Multimedia
- Similar Modulations and Waveforms: QPSK/QAM
- Similar Data Rates

How do the Broadband Systems Compete?

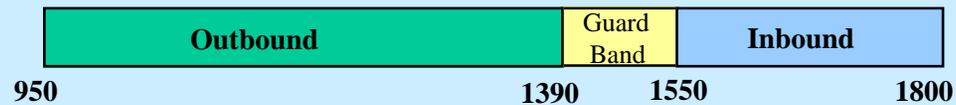
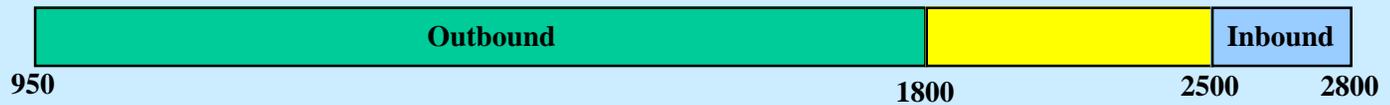
- ADSL is practical for ILECs.
- HFC and Cable Modems are Practical for Existing CATV Systems.
- Wireless Provides Alternatives.
- Wireless Provides extensions for Current Service Providers
- Satellite systems offer ubiquitous coverage, but limited capacity.
- Terrestrial systems have practically unlimited capacity, but require infrastructure build-out and have limited coverage.
- Satellite systems compete in a limited way with terrestrial systems, but compliment them in most respects.
- Stratospheric systems may compliment or compete with LMDS systems, depending on deployment; compliment satellite systems.

Proposed LMDS Bandplans



Note: Frequencies in GHz

Various IF Bandplans



Note: Frequencies in MHz

Other Frequency Bands for Multipoint Systems

US, 24 GHz



International, Korea, 26 GHz

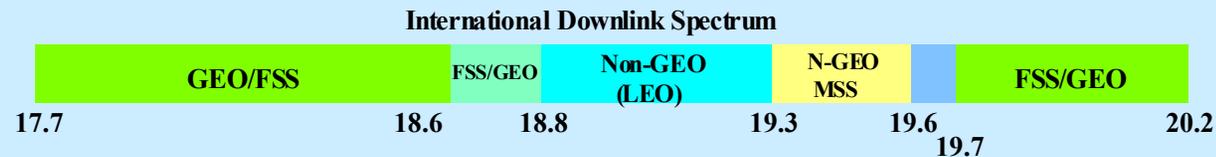
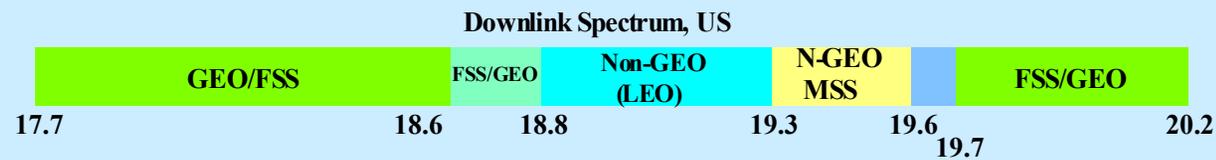


International, Germany, 26 GHz



Note: Frequencies in GHz

Ka-Band Spectrum Allocations



Note: Frequencies in GHz

Summary

- Standards Need to Address
 - All Broadband Wireless Applications
 - Each Broadband Wireless Segment
 - Many User Interfaces
- Standards Activities are Similar, but Will Require Separate Committee