Kickoff Meeting

National Wireless Electronic Systems Testbed (N-WEST)

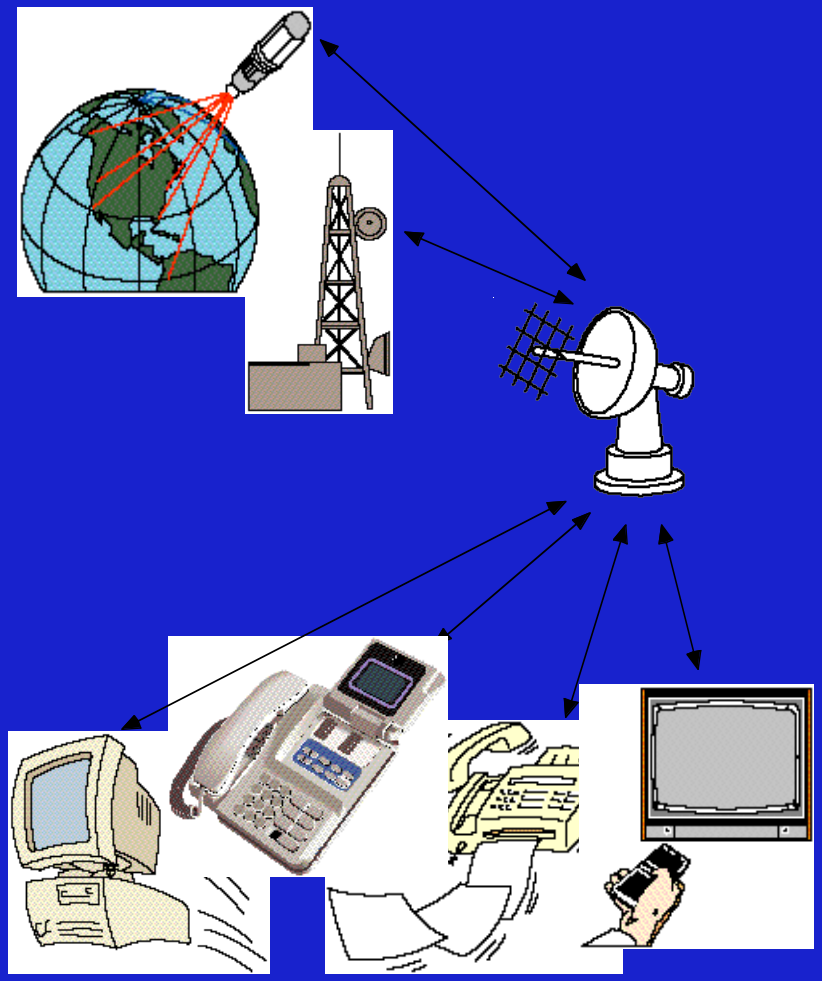
Welcome!

Roger Marks

National Institute of Standards and Technology
Boulder, Colorado

United States Department of Commerce

Broadband Wireless Communications



Broadband Wireless Systems

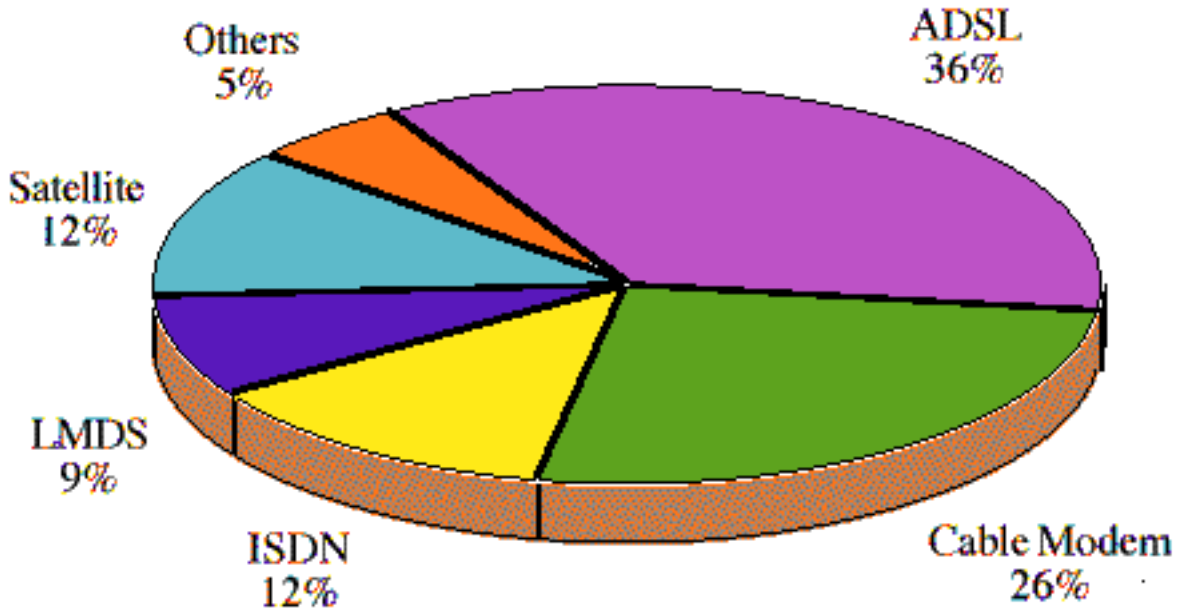
–fixed (non-mobile) customer premises units

–base stations either:
- fixed terrestrial
- in orbit (LEO or GEO satellites)
- in stratosphere (unmanned airplanes or blimps)

–broadband data into businesses, homes, etc.
- ATM, TCP/IP, digital video, telephony

–potentially inexpensive and economically competitive with wired broadband

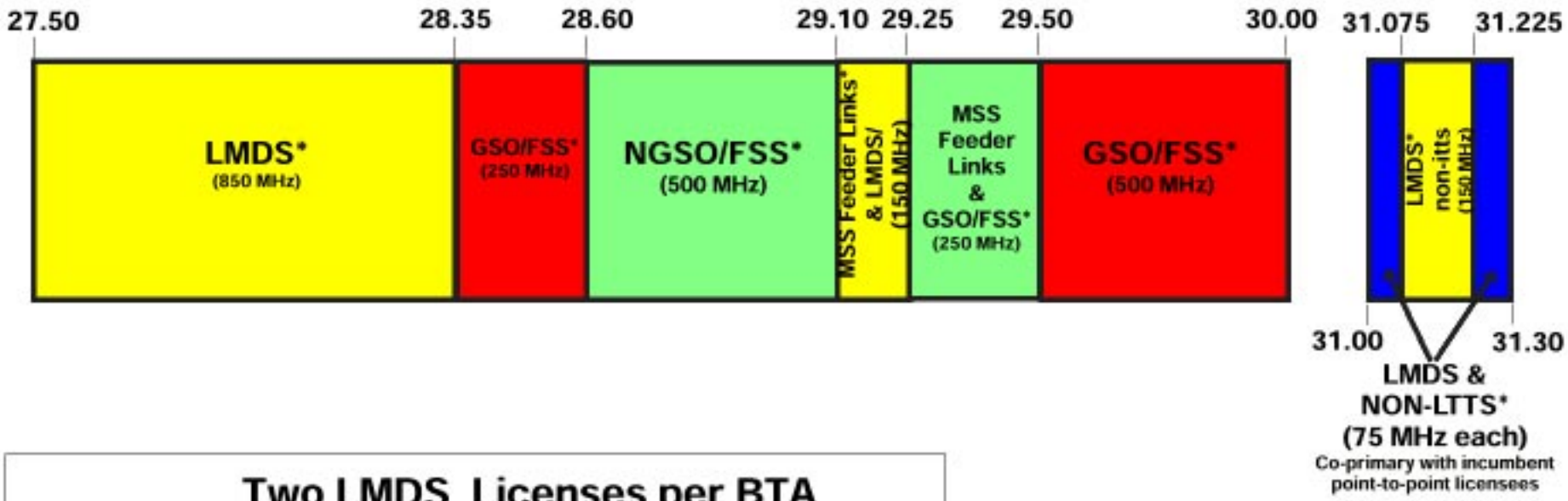
Broadband Subscribers by Technology, US Market, 2003



Source: Allied Business Intelligence, Inc.

LMDS Band Allocation
(Local Multipoint Distribution Service)

28 & 31 GHz Band Plan



Two LMDS Licenses per BTA

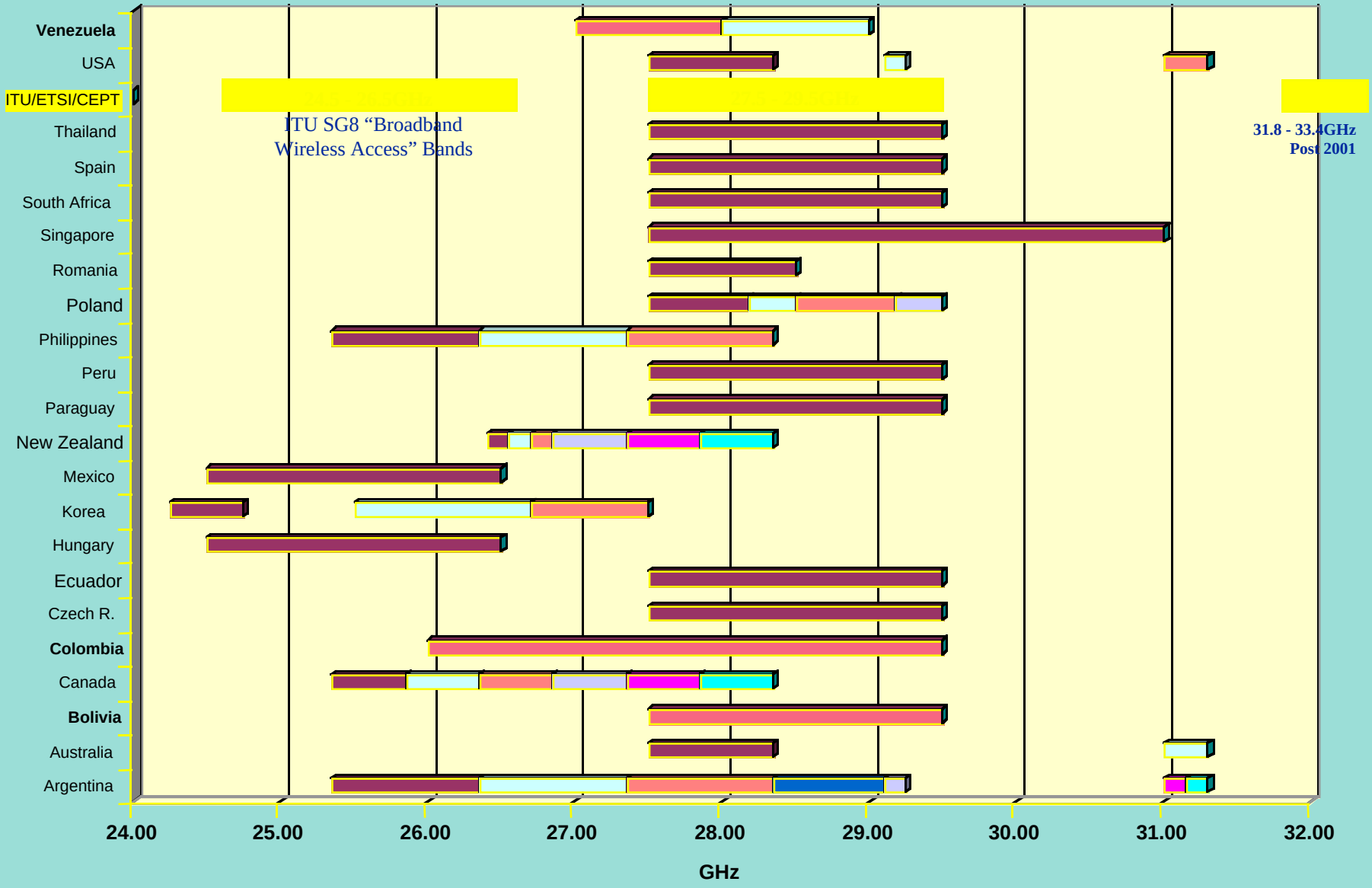
Block A - 1150 MHz:
27,500-28,350 MHz
29,100-29,250 MHz
31,075-31,225 MHz

Block B - 150 MHz:
31,000-31,075 MHz
31,225-31,300 MHz

Legend

"*" - Primary Service
FSS - Fixed Satellite Service
GSO - Geostationary Orbit
NON-LTTS - Non-Local Television Transmission Service
MSS - Mobile Satellite Service
NGSO - Non-Geostationary Orbit

LMDS Spectrum Worldwide



Wireless Standards in the United States

- FCC no longer regulates wireless standards
- no coordinated U.S. approach to wireless standardization
- standardization in newly-auctioned spectrum is slow
- multiple standards continue indefinitely
- equipment costs remain high
- U.S. equipment manufacturers handicapped internationally
- for new services, licensees and vendors may hesitate
- EU aggressively pursuing broadband standards

National Wireless Electronic Systems Testbed (N-WEST)

http://nwest.nist.gov

- U.S. Department of Commerce
  - NIST
  - National Telecommunications & Information Admin. (NTIA)
- Measurement testbed at Boulder Labs of NIST & NTIA
- Focus on LMDS right now
- Support Standardization
- Close Industry Participation
  - advice, equipment, personnel, . . .

Standardization Approach

LMDS Standards Consortium

- Broad Industry Cooperation
  - Systems Integrators
  - System Equipment Manufacturers
  - Component Suppliers
  - Service Providers/License Holders
- IEEE
  - Aggressive timetable
  - new *IEEE Industry-Centric Standards Process*
  - IEEE 802 (LAN/MAN Standards Committee)
- N-WEST provides technical data

N-WEST Supporting Companies

- **Lucent Technologies**
- **ETM Electromatic**
- **Hewlett–Packard Co.**
- **Bellcore**
- **Anritsu Company**
- **Stanford Wireless Broadband Inc.**
- **AMP M/A–COM**
- **C&W Systems, Ltd.**
- **Formus Communications, Inc.**
- **Fujitsu Compound Semiconductor, Inc.**
- **WaveSpan Corporation**
- **NEC America, Inc.**
- **Wireless Communications Association International**
- **Sanders, A Lockheed Martin Co.**
- **Raytheon Systems Company**
- **US WEST Advanced Technologies**
- **Hardin & Associates, Inc.**
- **Integrity Communications**
- **BroadBand Wireless**
- **ADC Telecommunications**

Strategy Session: July 24
Areas of Consensus

- The mission defined by N–WEST is important to the broadband wireless industry.
- Group should address terrestrial broadband wireless at all frequencies.
- Should also address satellite and stratospheric broadband wireless.
- Standardization goal should be "cheap terminals" at the customer premises.
- Helpful to standardize the interface between the indoor and outdoor unit.
- It is appropriate for this group to soon endorse one or several specific bandplans.

Working Groups

- Existing Standards and their Applicability
- Applications Suitable for Inclusion in Broadband Wireless Standards
- Interfaces and Issues Requiring Standardization
- Bandplans and RF Etiquette
- Organizational Options

Next Meeting (tentative)

- **November 9-10 in Albuquerque with IEEE 802**

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1998 IEEE Radio and Wireless Conference

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http://rawcon.org

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  System Performance: modeling, modulation, DSP...
  Active Devices: modeling, MMICs, RFICs, amplifiers...
  Passives: integrated passives, packaging...
  Antennas/Propagation: novel antennas, design
- **Banquet Address:** Larry Irving, Chief of NTIA
- **Keynote:** *Technical Challenges to LMDS Implementation*
- **Panel Session:** *LMDS: Jumpstarting the Industry*
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General Chair:
Dr. Roger Marks, *National Institute of Standards and Technology*
Technical Program Chair:
Dr. Michael S. Heutmaker, *Lucent Technologies*

RAWCON'98 Keynote Speaker

Keynote Address: "Technical Challenges to LMDS Implementation"

Barclay Jones

Chief Technical Consultant

WNP Communications, Inc.

Reception and Banquet

Monday, August 10, 1998 5:30 - 9:30 PM

Please join us for a reception and poster session from 5:30 - 7:30 PM on Monday. The banquet that follows will feature an address by Larry Irving, Assistant Secretary for Communications and Information, U. S. Department of Commerce and head of the National Telecommunications and Information Administration (NTIA).

PANEL DISCUSSION SESSION

LMDS: JUMPSTARTING THE INDUSTRY

Tuesday, August 11, 1998 7:00 - 9:00 PM

Organizers:

Roger Marks, *National Wireless Electronics Systems Testbed (N-WEST), NIST*
Sanjay Kasturia, *Raychem Corp.* (Moderator)

Panelists:

Marc Leclair, Vice President/Engineering, *Baker Creek Communications*
Mohammad Shakouri, *Lucent Technologies, Inc., Wireless Broadband Network Division*
Leland Langston, *Raytheon TI Systems*
Narisa Chu, *C&W Systems, Ltd.*; Chief Technical Consultant, *Cortelyou Communications Corp.*
Roger Marks, *National Wireless Electronics Systems Testbed (N-WEST)*

With the U.S. LMDS auctions complete, the largest block of spectrum ever licensed will soon be available to provide new services. To fully exploit the enormous potential of this 1.3 GHz of bandwidth, a number of players will have to come together and work cooperatively to address the special challenges of operating in this band. Currently, however the industry is fragmented at many levels. The licenses are in the hands of dozens of auction winners, many of whom are regional and only a few of which have experience in radio communications. Several major LMDS systems integrators have recently changed ownership, and the components required for operation in the 28-31 GHz band remain expensive.

License holders, component suppliers, and potential customers are best served by standardization. However, following recent trends, the U.S. government is leaving technology development and standardization for LMDS completely to the marketplace. No significant operational LMDS standards exist and, unlike the case of PCS, this industry cannot simply adopt, with minor modifications, the standards developed from another industry segment.

This panel discussion will feature speakers interested in proactive steps to bring about the development of a coherent LMDS industry.