• REGULATION
  – USA
  – MITIGATION TECHNIQUES
  – EUROPE

• STANDARDIZATION
  – EMC
  – INTEROPERABILITY

• CONCLUSIONS
USA APPROACH

- **FCC**
  - EMC

- **STATE REGULATORS**
  - Operating and licensing

- **SHORT/MID TERM:** FCC PART 15

- **LONG TERM:** NOTICE PUBLIC RULE MAKING
New Regulatory Directions for Access BPL -- USA

Current law: Part 15 (Code of Federal Regulations Title 47)
- Unlicensed systems must satisfy emission limits
- Unlicensed users must not interfere with licensed services
- Unlicensed users must accept interference from licensed services
- Challenging environment for service providers

NPRM (Feb. 04): Solicits input for changes to Part 15 to encourage deployment of Access BPL while ensuring protection of existing licensed services
- Change existing near-field limits (up or down)?
- Dynamic interference management (A new approach to regulation of unlicensed operators)
  - Adaptive emission control
  - Remote shut-down
  - Expedited interference remediation
Near-Field Interference

- Unlicensed operation typically based on fixed limits
- Europe - Harmonization via Mandate 313 (CENELEC and ETSI)
- Japan – Above 450 kHz trials only
- USA – Notice of Public Rule Making (NPRM - Feb 2004)
Implementing Dynamic Interference Management

**Notching**
- Suppress transmission of frequencies where interference is likely to harm local users.
- Especially well suited to OFDM systems
- Response time: Download re-configuration vs on-command
- Autonomous adaptation: Network elements detect interference and collectively adjust transmission frequencies -- responds to location- and time-dependent interference environment

**Remote shut-down**
- Compatible with an offer of reliable service?

**Expedited interference mitigation**
- National data base of operators and equipment
- Current process involves notification of offending operator by FCC.
  - Acceptable response time, especially for emergency services (e.g. ARES, FEMA)?
EUROPEAN APPROACH

• EUROPEAN COMMISSION
  – DG ENTERPRISES:
    • Encharged of the regulatory environment, notifications and infringements
    • Responsible for the Mandate 313
  – DG INFORMATION SOCIETY
    • Implement the EU Policy on “Information Society for all”
  – DG COMPETITION
    • Coherent competition policy for the European Union

• SHORT/MID TERM: EU RECOMMENDATION UNDER ARTICLE 19 OF THE FRAMEWORK DIRECTIVE

• LONG TERM: HARMONIZED STANDARD LISTED UNDER THE EMC DIRECTIVE
  – PRESUMPTION OF CONFORMITY FOR PRODUCTS AND NETWORKS
EUROPEAN APPROACH
LONG TERM

• CE MARK FOR PRODUCTS

• REFERENCES
  – DIRECTIVE EMC (89/336)
  – DIRECTIVE R&TTE (1999/5)
  – CISPR 22:94 :97
  – EN55022:95 :98
  – FCC Part 15

• BODIES
  – CISPR SC I WG 3
    • CISPR/I/26/DC
    • CISPR/I/44/CD
    • CISPR/I/89/CD
  – CENELEC/ETSI JOINT WORKING GROUP ON EMC
• TWO BIG GROUPS:

  – THOSE USED TO REGULATE

  – THOSE USED BY INDUSTRY TO ENHANCE MARKET SUCCESS
• FCC NPRM

• CENELEC/ETSI Joint Working Group on EMC of Conducted Transmission Networks
  – Will do the work of the Mandate 313 (technical harmonized standards for radiated limits for networks in Europe)

• Japanese government
• IEC: International Electrotechnical Commission
• CISPR: International Special Committee on Radio Interference
• Sub-committee I: EMC of Information Technology Equipment, Multimedia Equipment and Receivers
• WG 3: Information and Telecom. Equipment
• Amending CISPR 22 to take into account PLC
  – Expected by mid 2005
• Working Group was formed in January ‘04
• Agreed that first standard would be on hardware and safety.
• A PAR is being submitted and will hopefully be approved by the next meeting in June ‘04.
Hardware/Safety Std.

- Will cover power line injection equipment, transformer by-pass methods, node equipment placement if on power lines or in power equipment (transformer cabinets, etc.)

- Safety aspects, equipment installation to allow non-utility personnel to work on BPL equipment near power lines safely.
The Alliance's mission is to enable and promote rapid availability, adoption and implementation of cost effective, interoperable and standards-based home powerline networks and products.

- 45 members
- Already published Homeplug 1.0 specification
  - 10 Mbps-class technology
- Currently working on the Homeplug AV specification
  - 100 Mbps-class technology
  - Audio and Video distribution inside homes
International Association that represents the interests of manufacturers, energy utilities and other organizations (Universities, other PLC Associations, consultants, etc.) active in the field of access and in-home PLC (power line communications) technologies

- 60 members

- Technical and Regulatory Working Group:
  - Establish common strategies and action plans for the PLC community
• Chairman:
  – Víctor Domínguez Richards

• Work Plan
  – 8 Published Standards covering channel characteristics, coexistence, QoS and hidden node
  – PLT In-house/In-house Coexistence
  – PLT Detailed In-house Architecture and Protocols
  – PLT Programmable PSD mask
    • Mitigation techniques
  – PLT Definition of a dynamical frequency allocation for Access/In-House coexistence
CONCLUSIONS

- PLC PRODUCTS COMPLY WITH THE RELEVANT PRODUCT AND NETWORK STANDARDS FOR REGULATION
- CISPR 22 IS BEING AMENDED TO TAKE INTO ACCOUNT PLC
- ANY NEW LIMIT SHOULD BE EXTRACTED FROM EXPERIENCE
- STANDARDIZATION BODIES ARE ALREADY WORKING ON PLC