PLC Standardization and Regulatory status

PLC Standardization Tutorial

Orlando, March 2004

- **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

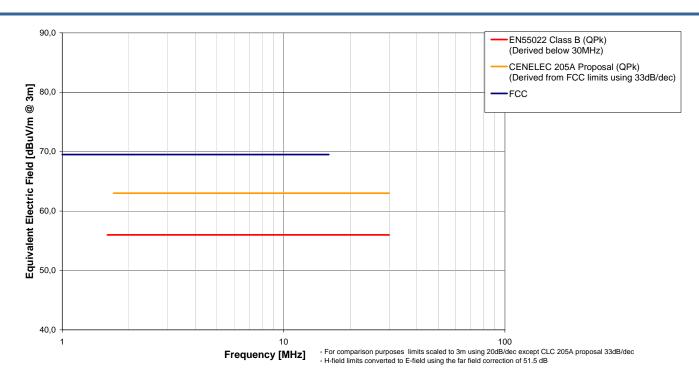Current law: Part 15 (Code of Federal Regulations Title 47)

- 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
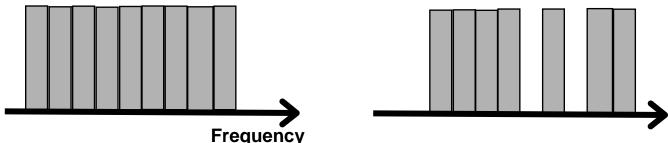 - Expedited interference remediation

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

DS2

Frequency

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 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

- 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

STANDARDIZATION

- TWO BIG GROUPS:

  - THOSE USED TO REGULATE

  - THOSE USED BY INDUSTRY TO ENHANCE MARKET SUCCESS

PLC Networks EMC standards and regulation

- 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

PLC Products EMC standards

- IEC: International Electrotechnical Commission

- CISPR: International Special Committee on Radio Interference

- Sub-committe 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

IEEE 802 PLC Tutorial

Power Eng. Society
BPL Standards

- 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.

DS2

- 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.

DS2

- 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

PLCforum

- 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

ETSI PLT

- ## 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

- 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