

Power Line Communications  
(PLC)  
Should HFIA care ?

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# *Presentation Overview*

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- Introduction
- Benefits
- Concerns
- Summary
- References

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- Broadband Internet access now available to most homes
  - Distribution within the household has remained a barrier to realizing the full benefits of broadband access
  - Solutions for Home networking (i.e. home LAN)
    - Ethernet and phone lines
    - Wireless Networks
    - Power Line Networks (using existing electrical wiring)
  - PLC could use existing power transmission and distribution system for wideband communications like Internet

- Solutions for Home networking
  - Ethernet and phone lines
    - Provide fast reliable service
    - Require laying cable down to each network connection
  - Wireless Networks
    - Provide network connections anywhere
    - Cost, throughput vs. distance, security concerns, competing standards
  - Power Line Networks
    - Use power line connections existing in home (i.e power outlets)
    - Technical challenges (noise, multipath, dynamic range, interference, waveform standards ?)

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- Use of existing power transmission and distribution infrastructure for providing Internet service
    - High speed Internet access at lower cost (less infrastructure required), secure, always on
    - New source of income for power companies
    - Competition to other Internet providers
    - Most attractive for rural and remote areas
  - Provides low-cost, easy to use and flexible home network solution using existing home infrastructure (home LAN)
    - Many power outlets available in each room
    - Convenient - Computers usually connected to a power source (i.e. outlet)

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- PLC transmissions occupy the 2 to 30 MHz frequency range which means PLC could radiate energy in HF frequency band
  - Sending data over wiring not specifically designed to convey RF signals may produce unwanted emissions
    - Power transmission and distribution system
    - Balanced vs. unbalanced may impact emission levels
  - Home PLC
    - Amount of power radiation will be greatly affected by quality of home wiring, age of wiring, etc.
    - Thousands of homes radiating low power may increase HF band noise floor

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- PLC manufacturers claim no interference in HF band
  - Testing performed by UK and other countries has shown measurable interference in HF band
  - Several countries (UK, Netherlands, etc) concerned with effect of PLC on HF communications
  - Broadcasters, FEMA, NTIA and HAM radio operators in US greatly concerned with PLC effect on HF communications (> 5100 comments sent to FCC *Notice of Inquiry* in ET Docket No. 03-104)
  - NATO working group on HF communications greatly concerned with PLC emissions and its effect on HF communications

- PLC Interference in the HF band
  - Manufacturers claim they measure no interference
  - Ham radio operators and FEMA claim BPL interferes
  - Why the discrepancy ?
    - Lack of controlled environment for testing
      - Testing must use existing infrastructure some where
      - Other sources of interference possible during testing
    - No “long term” testing performed
  - Has testing taken into account the possibility of thousands of BPL users ?
  - Would thousands of BPL users have a cumulative effect on noise floor ?
  - Would these emissions propagate to other locations ?

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- PLC may be a threat to reliable communications around the world using HF
  - Should HFIA get actively involved in the debate over the future of PLC in US and World ?
    - If so, what should HFIA do ?
      - Write a letter to FCC stating its concerns about PLC
      - Encourage all HF manufacturers and the HF user community to voice concerns of PLC to FCC
      - Submit a official HFIA response to FCC's *Notice of Inquiry* in ET Docket No. 03-104
      - Other ???

- BBC R&D Paper WHP 067 (September 2003)
- Nortel Networks Challenges, Solutions and Opportunities (5 May 1999) Power Point presentation – Jim McClanahan
- Cogency - Data Communications over Power Lines (White Paper)
- FEMA says power line broadband threatens its radio systems (12/17/03) GCN
- World's Broadcasters Join Anti-BPL Chorus - <http://www.twiar.org/ticker.html>, edition 558, Week of December 20 - 26, 2003
- [http://www.lonestarbroadband.org/technology/power\\_lines.htm](http://www.lonestarbroadband.org/technology/power_lines.htm)