

order to assist us in understanding the high speed In-House BPL technology, we seek comment in the following areas:

- In-House BPL systems built to the HomePlug standard specifications operate in the frequency range from 4.5 to 21 MHz. Are other In-House BPL devices being designed to operate in other portions of the spectrum, and at what bandwidth?

- What is the highest data transmission speed that In-House BPL systems can achieve? What speeds can be typically sustained under normal user environment conditions?

- What are the modulation techniques? What techniques are used for ensuring the security of data, especially when several residential units share the same common distribution transformer? What schemes are used for contention resolution between various In-House BPL devices, if more than one device needs to take control of the electric wire at the same time to communicate?

- Would products developed according to one standard work with products developed according to another standard, without the need for additional equipment, such as converters and adaptors?

- What standards work has been done domestically and internationally on In-House BPL technology and what are the results of such activities? Are there ongoing international standards activities that would benefit U.S. industry and what steps should the Commission take to encourage this work?

8. *Interference from BPL Emissions.* In both Access and In-House high-speed BPL technologies multiple carriers spread signals over a broad range of frequencies that are used by other services that must be protected from interference. In the spectrum below 30 MHz, incumbent authorized operations include fixed, land mobile, aeronautical mobile, maritime mobile, radiolocation, broadcast radio, amateur radio terrestrial and satellite, and radioastronomy. In the spectrum from 30 to 300 MHz, incumbent authorized operations include fixed land mobile, aeronautical mobile, maritime mobile and mobile satellite, radioastronomy, amateur radio terrestrial and satellite, broadcasts TV and radio. This spectrum is also used for public safety and law enforcement, and Federal government aeronautical radionavigation, radionavigation satellite and radiolocation. Each of these authorized services in the spectrum must be protected from harmful interference.

9. Interference issues may also arise because existing statutes on pole attachment require the co-location of

cable and telecommunications equipment from third party service providers on the same utility poles that carry power wires. The close proximity of Access BPL equipment on utility poles may affect (and be affected by) the operation of cable television service and high-speed digital transmission service, such as DSL.

10. We therefore ask for comment and information on the following questions:

- In order to transfer high frequency signals beyond the low-voltage distribution transformer, Access BPL systems use high-pass filter circuits to bypass the transformer and its inherent low-bandwidth characteristics. What is the effect of these high-pass filters with respect to high-frequency signals used inside the house, *e.g.*, from In-House BPL equipment or other in-premises technologies, that may rely on the low-voltage transformer as a natural barrier to avoid causing interference at higher frequencies?

- For Access BPL systems, several methods of RF signal injection onto the medium voltage lines can be envisioned:

- An RF voltage could be applied between a power line and ground;

- An RF voltage could be applied differentially between two phases of a power line; or

- A single power line wire could be driven as if it were a dipole antenna—*e.g.*, by inductively coupling RF energy to it.

11. Other approaches may also be possible. What methods are being considered for signal injection onto the medium voltage lines? What are the implications on radiated emissions of various methods for injecting signals onto the medium voltage lines (*e.g.*, differences in directional characteristics and magnitudes of the emitted fields)?

- Is there a need to define frequency bands that must be avoided in order to protect the licensed users on the same frequencies as those used by Access BPL systems? Are there mitigation techniques Access BPL systems can use to avoid possible interference with licensed users of the spectrum, such as mobile users or public safety and law enforcement users who may be traveling directly beneath the medium voltage lines?

- Since Access BPL equipment is installed on medium voltage lines that supply electricity to a residential neighborhood, should this equipment be treated as operating in a residential (Class B) or commercial (Class A) environment?

- How does the close proximity of Access BPL equipment to cable television and telecommunications

equipment from third party service providers co-located on the same utility pole affect the operation of these services? On the other hand, what is the effect of this close proximity to Access BPL operations?

- High-speed In-House BPL systems are being deployed in residences with a telecommunications access connection from a DSL or cable modem service.

What mitigation techniques are used by In-House BPL systems to avoid possible interference from DSL or cable modem within the same spectrum? On the other hand, what is the effect of DSL or cable modem on In-House BPL operations?

- What mitigation techniques are used by In-House BPL systems to avoid possible interference with licensed radio services, such as amateur radio, fixed, mobile and broadcast services? Is there a need to define frequency bands that must be avoided in order to protect the licensed services that use the same frequencies as In-House BPL systems?

- What are the probable interference environments and propagation patterns of Access BPL and In-House BPL systems? Are there specific issues of interference that we should address, *e.g.*, an increase in the level of the noise floor? What models are available for predicting radiated emissions from access BPL systems?

- Are there test results from field trials of Access BPL that may assist in the analysis of harmful interference? Inasmuch as In-House BPL equipment is already on the market, are there any reports that may assist in the further analysis of harmful interference?

- Are the existing part 15 rules for low speed carrier current systems adequate to protect authorized users of the spectrum who may be affected by the new high speed BPL technology? What changes to these rules, if any, are necessary to protect authorized radio services?

- How should the part 15 rules be tailored both to ensure protection against harmful interference to radio services and to avoid adversely impacting the development and deployment of this nascent technology?

- Given their different operating environment, is it necessary to tailor the rules to differentiate equipment used specifically in Access BPL and In-House BPL applications, or should one set of general limits be applied to both? What should such limits be and what is the technical basis for them?

- Is there need to specify different limits for Access and In-House systems? For example, would it be appropriate to allow higher emissions for In-House systems where the user would be the principal party affected by interference,