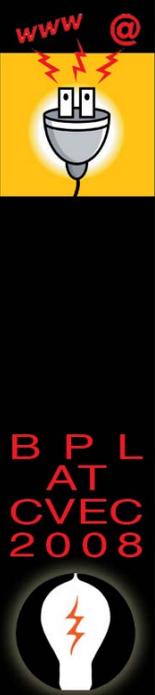


	<p>Central Virginia Electric Cooperative</p>
<p>B P L AT CVEC 2008</p>	<p>Profile:</p> <ul style="list-style-type: none">• 34,000 meters in 14 counties• 7.5 customers per line mile• Located between Charlottesville, Lynchburg & Richmond• Independently purchases energy providing best value for members• Innovative and successful cooperative with strong subsidiary• Mission Statement: "Improving the quality of your life in a quietly impressive way"

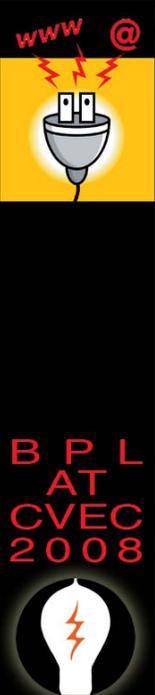


Central Virginia Electric Cooperative

Why consider BPL:

- Cooperative members have paid for the system and should enjoy full benefits
- Quality of life & rural economic opportunity
- Support existing employers
- Utility Applications – System Control – Security – AMR – Outage Notification
- Cooperatives delivering service in rural areas where otherwise unavailable – Same as rural electrification

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Central Virginia Electric Cooperative

BPL Project:

- Monitored status of technology
- Attended conferences in 2003
- Reviewed vendor technologies and service offerings
- Conducted market research to determine level of interest
- Visited IBEC Beta Site
- Executed License & User Agreement with IBEC

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Market Research

Personal Computer Profile:

- 70% of respondents own a computer
- 80% of those subscribe to an Internet service
- Factors in selecting a service provider
 - ✓ Reliable connections
 - ✓ Initial cost & monthly access fees
 - ✓ Speed of access



Market Research

Broadband Preferences of Dial-up Internet Users:

What Technology would make you more interested in broadband service?

- Broadband through electric wires (43%)
- DSL broadband (38%)
- Wireless broadband (36%)
- Broadband through satellite dish (26%)
- Broadband through cable TV (22%)



Market Research

Broadband Preferences of Dial-up Internet Users:

What Technology would make you less interested in broadband service?

- Broadband through satellite dish (32%)
- Broadband through cable TV (28%)
- DSL broadband (14%)
- Wireless broadband (14%)
- Broadband through electric wires (13%)



Market Research

Broadband Preferences:

Would you be interested in broadband service if the setup and recurring service costs were...

- Broadband service (\$299 installation & \$49.95/month) – (22% interest)
- Broadband service (\$199 installation & \$39.95/month) – (24% interest)
- Broadband service (\$99 installation & \$29.95/month) – (52% interest)




Business Model

License & Use Agreement:

Similar to pole attachment agreement

CVEC:

- Grants non-exclusive access to distribution system to provide BPL
- Installs equipment in energized environment
- Notifies members of BPL availability
- Bills for installation and monthly service

IBEC:

- Designs BPL system & provides equipment
- Provides ISP services & network management
- Provides monthly residual to CVEC




BPL – The Service

First Rural BPL Deployment:

July 2004 – Announced Commercial Market Pilot

- Colleen Substation (800)
- 175 line miles with up to 25 regenerators operating in sequence

Service Terms:

- Minimum of 256k bi-directional service (bursts to more than 1mg)
- \$29.95 / month
- Full ISP services
- 10 hrs / month dial-up access



BPL – The Service

Rural BPL Market Pilot Results

- Users experienced speeds of 300-700 kbps
- Implemented hardware modifications & software changes
- Discovered vulnerabilities and shortcomings
- Planned design of next generation equipment
- Tested system with local Amateur Radio Club
- Responded to daily requests for BPL expansion



BPL – The Service

The Next Step

- Department of Agriculture awarded IBEC \$19M Loan from Rural Broadband Fund
- System-wide deployment planned for CVEC & 2 other cooperatives
- Next Generation of BPL equipment in production by Tyco
 - Hang & Go Installation (~ 10+ per crew per day)
 - Extended range between regenerators
 - 200/80 megabit backbone
 - Fully accessible from remote location
- 18 Month deployment schedule



Central Virginia Electric Cooperative

Why BPL for CVEC?

“Through their initiative, and by virtue of the members’ ownership of 4000 miles of distribution line, broadband Internet service can now be made available for Cooperative members, as it should be. The technology is available and the members have made the investment in the physical plant.

Central Virginia Electric Cooperative has the duty to ensure that its members receive the best value for their investment so they enjoy the same economic opportunities and quality of life as urban residents.”

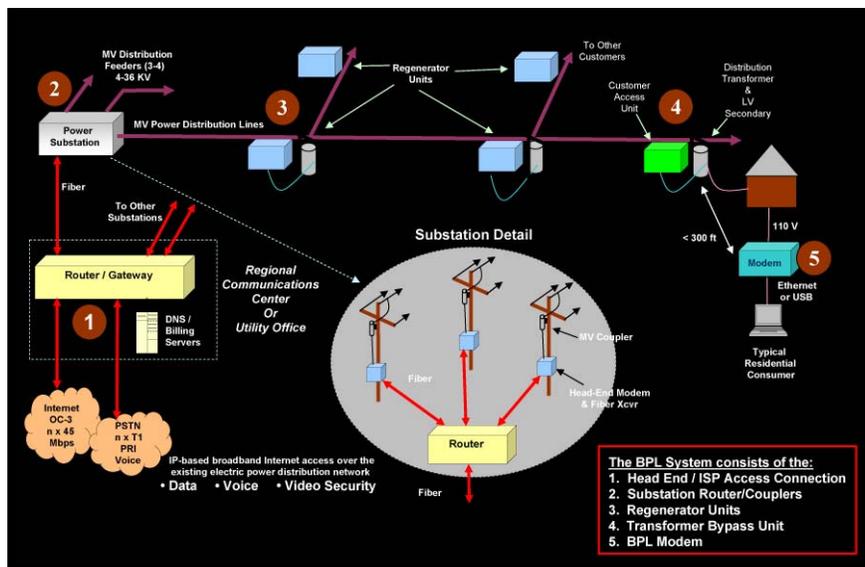
*Howard L. Scarborough
Former CVEC President & CEO*



BPL Network & Equipment

- Network Overview
 - MV Couplers
 - BRU – Regenerators
 - CAU Customer Access Units
 - LV Couplers integrated into CAU power connection
- Overhead Installations
- Underground Installations
- Standards Work / EMC

IBEC BPL Network Architecture





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BPL Building Blocks

- MV Couplers
- BRU - Regenerator
- CAU – Customer Access Unit
- LV Couplers integrated into CAU power connection

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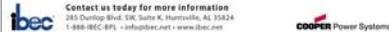
Coupler Data Sheet

**INTRODUCING IBEC'S
SBZ-01 BPL COUPLER**
Overhead Medium-Voltage BPL Coupler/Surge Arrester
The Most Cost-Effective Solution in the Industry



Manufactured Exclusively for IBEC, Inc. by Cooper Power Systems

Contact us today for more information
285 Dunlap Blvd, SW, Suite K, Huntsville, AL 35824
1-888-IBEC-BPL • info@ibec.net • www.ibec.net



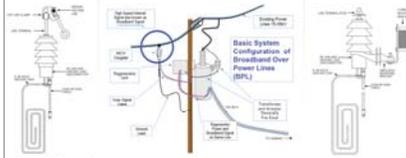
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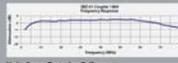


Coupler Data Sheet



Specifications
Overhead Medium-Voltage BPL Coupler/Surge Arrester

BPL Coupler and Surge Arrester in One
Input Impedance: 50 Ohm (Open Unbalanced Case, P-Type Female)
Line Impedance: 450 Ohms
Ground Lead/Case Isolator
Complies for IEEE C62.11 and IEEE C62.00-4
Compliant with Draft IEEE P1676
60-62 Hz Power Line Certified



Dimensions:

10kV	15kV	18kV	21kV
13 in x 2.2 in	16 in x 2.2 in	18 in x 2.2 in	21 in x 2.2 in
Weight: 2.2 Kg, 4.8 lbs	Weight: 2.8 Kg, 6.2 lbs	Weight: 3.8 Kg, 8.4 lbs	Weight: 4.8 Kg, 10.6 lbs

Units Surge Tested as Follows:
20 current surges of 10 kA crest, 4.0 μs wave shape followed by
2 current surges of 40 kA crest, 8.0 μs wave shape
2 current surges of 100 kA crest, 4.0 μs wave shape
20 current surges of 20 kA crest, 200 μs duration not tangential wave

Handling Insulation Withstand Ratings:

10kV	15kV
89 kV Impulse (1.2/50 μs)	126 kV Impulse (1.2/50 μs)
55 kV Dry (1 Min)	82 kV Dry (1 Min)
44 kV Wet (10 Sec)	67 kV Wet (10 Sec)

Ratings Available for a Full Range of Medium-Voltage Systems
Coupler Protective Characteristics

Rating	Front-of-wave Protection Level		Maximum Discharge Voltage (kV crest)					
	1.0 kA	3 kA	5 kA	10 kA	20 kA	40 kA		
10	4.60	37	28	29	35	34	38	43
15	15.3	69	53	55	57	64	70	77

Contact us today for more information
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The BPL Coupler

A common
piece of
network
gear ...



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The RF Link makes the Arrester a Coupler



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The RF Link fits neatly around the normal arrester disconnector



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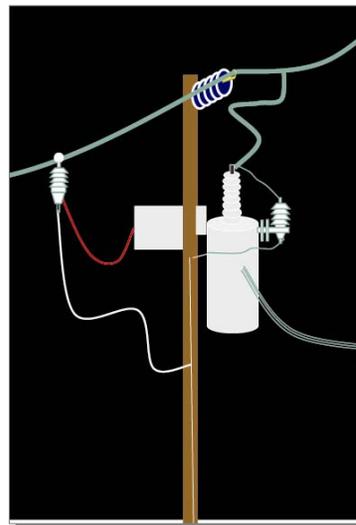


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The Coupler on the Surface

- Cost effective means of coupling the power system and broadband signal
- An easy to install device
- A commonly used device already proven on distribution networks for many years



Coupler Info Sheet

UltraSIL™ Housed Distribution Class MOV BPL Coupler Installation Instructions

Service Information
S235-35-3

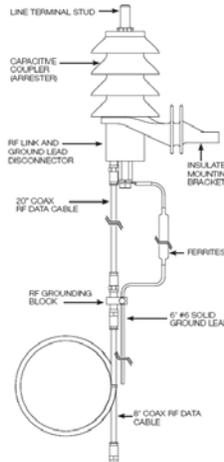


Figure 1. UltraSIL housed BPL coupler - X-arm mounted.

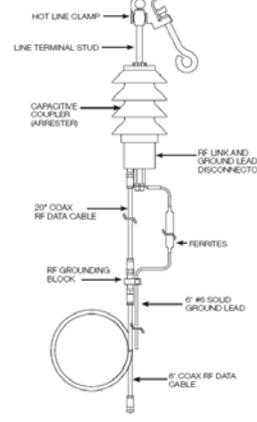
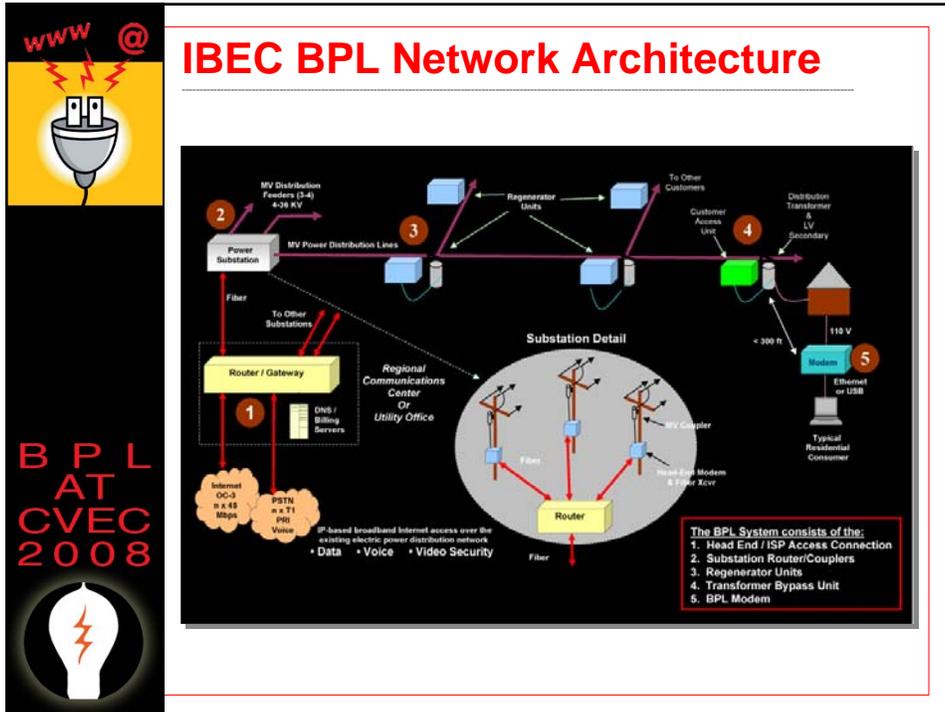


Figure 2. UltraSIL housed BPL coupler - hot line mounted.

IBEC BPL Network Architecture



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BRU: Broadband Regenerator Unit



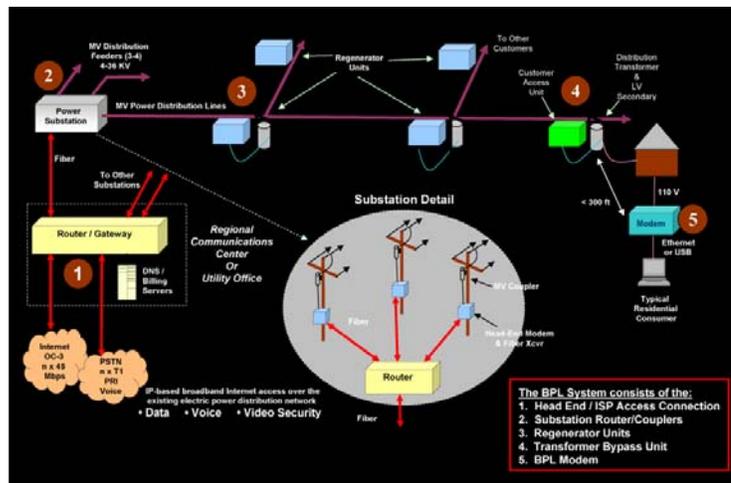
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IBEC BPL Network Architecture



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CAU: Customer Access Unit



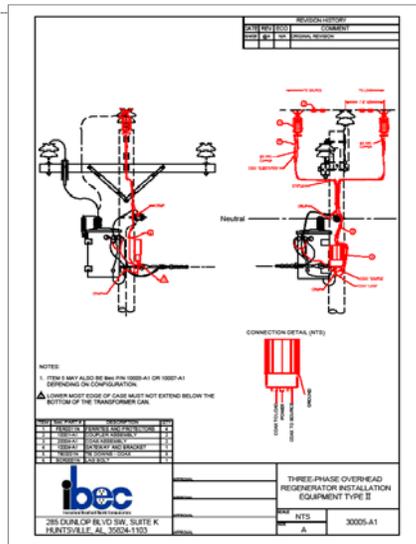
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Overhead Installation DWGs



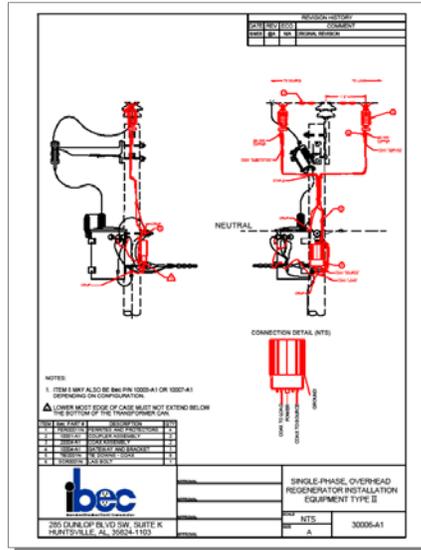
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Overhead Installation DWGs



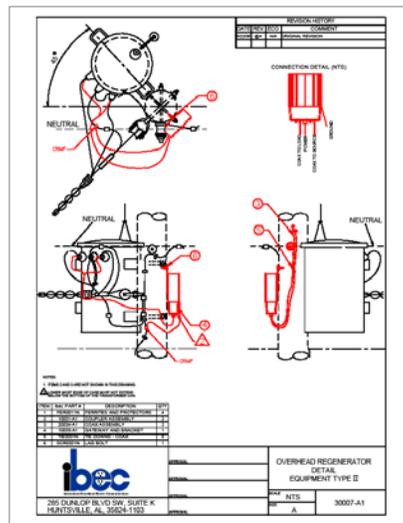
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Overhead Installation DWGs



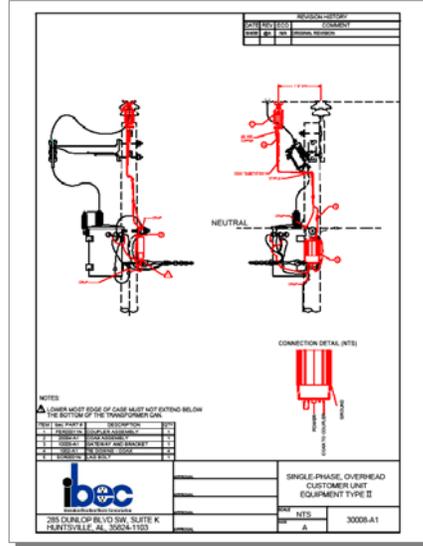
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Overhead Installation DWGs



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Overhead Installation



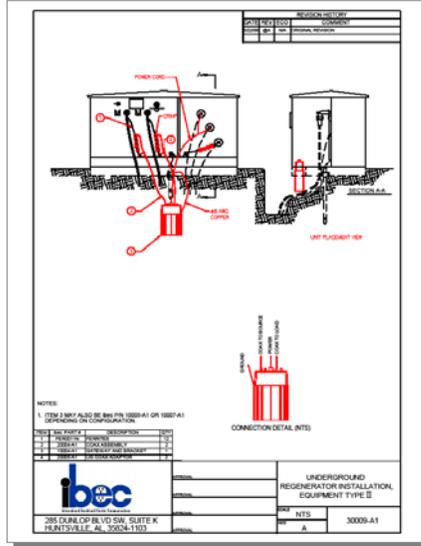
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Underground Installation DWGs



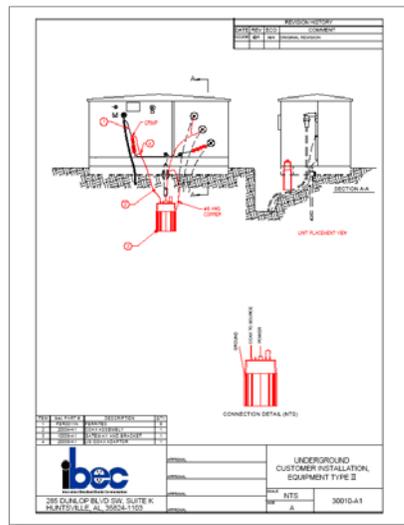
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Underground Installation DWGs



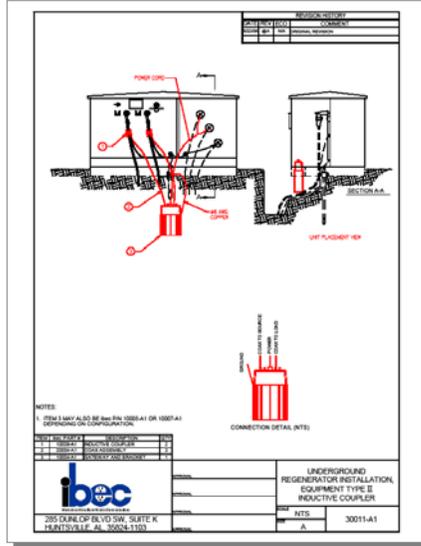
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Underground Installation DWGs



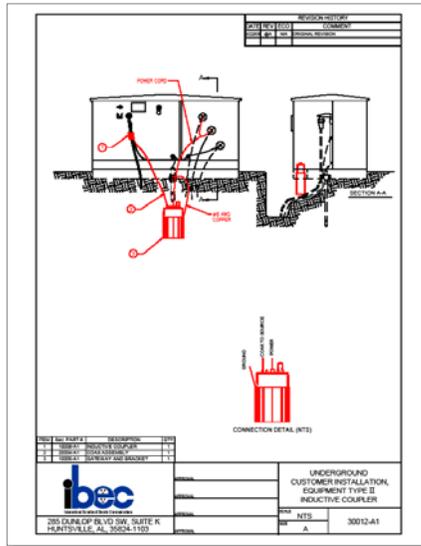
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Underground Installation DWGs



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Underground Installation



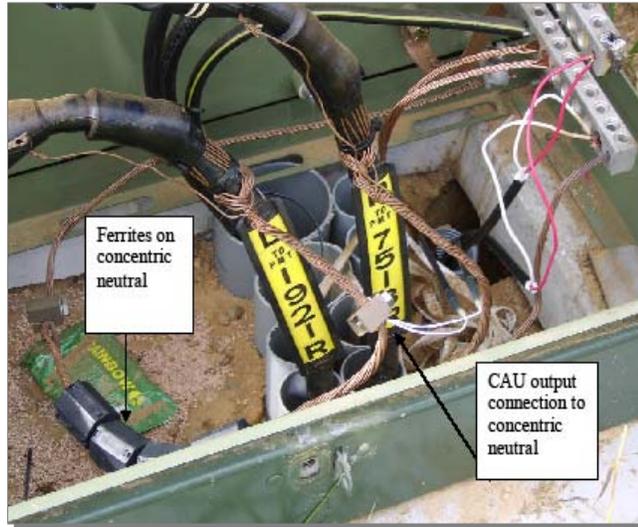
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Underground Coupler (Natural Feed)



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Underground Coupler (Donut Type)



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Equipment and EMC

- Electromagnetic Radiation Levels set by FCC part 15 G
 - ~ Certification Test Procedures outlined in Report & Order
 - ~ Test Reports submitted to FCC for each equipment model
 - ~ FCC grants certification of equipment/coupler combination after review
 - ~ IBEC equipment has completed certification testing
- IEEE Draft Standard P1775
 - ~ EMC Testing and Measurement Methods for BPL equipment
 - ~ Normative reference for making radiation measurements
 - ~ Defines methods for measuring susceptibility to interference



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IEEE P1675 Draft Standard

- Standard for BPL Hardware
 - ~ Defines Service Conditions
- Requirements, Ratings & Tests for Couplers
 - ~ Overhead and Underground
 - ~ Inductive and Capacitive
 - ~ Specific sections added for IBEC Arrester/
Coupler
 - ~ Mechanical Strength
- Safe Installation Procedures
 - ~ Overhead
 - ~ Underground
 - ~ Medium Voltage
 - ~ Low Voltage
 - ~ Defers to local codes and utility customs

