



Access Broadband over Power Line (BPL) Test Procedures and Equipment Authorization

Andy Leimer

Equipment Authorization Branch

**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**



Access BPL

- Access BPL: Certification required
 - CCS installed and operated on an electric utility service
 - 1.705 MHz and 80 MHz over medium voltage lines or over low voltage lines
 - Located on the supply side of the utility service's points of interconnection with customer premises
- Measurement guidelines – R&O (FCC 04-245 Appendix C)
http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-245A1.pdf
- Refer to TCB Workshop Material:
 - Feb.05
http://www.fcc.gov/oet/ea/presentations/files/feb05/BPL_Test_Procedures_AL.pdf
 - Oct. 06
http://www.fcc.gov/oet/ea/presentations/files/oct06/Oct_06-BPL_Updates-AL.pdf
- Goal is to add Access BPL to PBA procedures
 - Ongoing proceeding
 - TCBs can currently approve In-House BPL (Equipment Class JPB) and CCS



Radiated Emissions

- Emission limits
 - AC-Line Conducted: not required
 - Radiated limits
 - < 30 MHz Intentional radiator limits [15.209]
 - 1.705-30 MHz: 30 uV/m at 30 m)
 - Must be measured with a loop antenna
 - Scan from 1 to 4m antenna height, H & V polarization
 - Alternative procedure – measure at 1m antenna height and add 5 dB correction factor to measured data
 - > 30 MHz Unintentional radiator limits [15.109] Class A and Class B Limits
 - Class B radiated limits apply to low-voltage “drop” lines
 - Scan from 1 to 4m antenna height, H & V polarization
 - Alternative procedure – measure at 1m antenna height and add 5 dB correction factor to measured data

- Field strength measurements are “in situ”
 - Three typical overhead line installations and three typical underground line installations



Radiated Emissions (Cont.)

- The measurement procedures for medium voltage lines and low voltage lines are identical. Medium and low voltage lines (if applicable) must both be tested
- Significant medium voltage line emissions seen as a function of wavelength down the medium voltage line
 - Refer to Published KDB 384352
- Ensure that maximum or near-maximum RF injection duty factor is achieved
 - Data communications must result in at least 20 Hz minimum burst rate as specified in Part 15.35 (Note). Otherwise, use a peak detector
- Underground Lines – measured at 16 radials



Radiated Emissions (Con't.)

- Test at 0, 1/4, 1/2, 3/4, and 1 wavelength down the line from device, based on the mid-band frequency. Adjust if necessary in accordance to the R&O Test Procedures.
 - Slant range distance up to 30m
 - Overhead line distance correction based on Slant Range distance - measurement antenna to the closest part of the EUT
 - 40 log(range) below 30 MHz
 - 20 log(range) above 30 MHz
 - Recommended minimum horizontal distance from pole or line is 10m
- Loop antennas: 1m antenna height, maximized from parallel to line to 90 degrees (perpendicular to line)
- Bicon antennas: Scan from 1 to 4m antenna height, H & V polarization
 - Alternative procedure – measure at 1m antenna height and add 5 dB correction factor to measured data



Interference Mitigation

- Device must have notch capability
 - Amateur Bands
 - User definable frequencies
 - Typically a bench test verification
 - No test procedure defined
- User's Manual must explain interference mitigation technique and how to set the parameters
- Power-up default conditions must be explained
 - Default power setting
 - Notches and/or band selections to meet interference mitigation requirements



Questions and Answers

Thanks!