

ADDITIONAL MAIN.NET BPL TESTING AT THE CHELAN PUD'S PESHASTIN, WA
TEST SITE ON MARCH 29,2005

Introduction: The purpose of the subject tests was to get follow-up measures of potential BPL interference to/from the HF Ham Bands. The Chelan County PUD had invited "Main.Net" to demonstrate its BPL System as a solution for providing wideband digital service in the more remote areas of the County. The PUD and Main.Net had installed the system with 13 repeaters along portions of School, River View and Lynn Streets in Peshastin, WA (47 degrees, 34 minutes, 38 seconds North; 120 degrees, 36 minutes, 82 seconds West). At the time of the tests two users were connected to the system. To assure that the BPL system was active, Bob Shane of the PUD, connected a laptop computer to the network and cycled through canned files sending and receiving data. During the tests Main.Net activated their HF Band-Stop Filtering. The PUD is currently extending their service to the Peshastin HI-UP Growers' operation a few blocks west of the current BPL installation.

Test Procedure: Rich Cole (N7PZT), Al Hagen (W7HDD), Jim Shultz (W7JBP), Ken Rau (K7YR) and Gary Nelson (WA2BRB) conducted the on-site tests with Bob Shane of the Chelan PUD. A Main.Net operator located back East, remotely (via the Internet) turned on the HF Band-Stop Filtering function during the tests to allow before/after testing. The tests were conducted with two mobile Ham systems. The N7PZT mobile system consisted of an ALINCO DX 70 Transceiver fed by a tunable Screw Driver antenna. The K7YR mobile system consisted of an ICOM 706-MK 2G driving an SG 500 amplifier, that on transmit provided 500W output, which in turn fed an SCG 235 auto tuner and an SGC 303 whip antenna. The Noise (QRN) measurements were made with the BPL System operating with and without the HF Band-Stop Filtering. For the subject tests, the mobile systems were situated 10 Meters away from the power line and about 10 Meters apart as viewed in "plan view".

Results: Attachments 1 and 2 depict the measured noise (QRN) levels, for the two mobile Ham systems respectively on the various HF Ham Bands (except the new 60 Meter Band). The "S" signal level measures were made with the BPL system running without Ham Band-Stop Filtering turned on. The indicated levels are a measure of the ambient noise level plus the BPL system noise. As can be observed from the Attachments, there is some variation in measured levels between the two Ham Systems. This is attributed to the differences in their respective receive systems and the 10 Meter separation between them during the tests. Since the measurements were made essentially in near field of the power lines which were radiating the BPL energy, this latter effect is not considered unusual. The BPL signal was detected on all Ham Bands from 160 Meters to 10 Meters. However it was strongest on the Bands from 80 Meters through 17 Meters.

The Ham Band-Stop Filtering was then activated and "S" level measurements made with the canned messages alternately exciting the BPL system and then standing down. Figure 3 depicts the difference (Delta) in measured levels between the two states. The entries for each band in Attachment 3 indicate the measured differences for each of the two mobile Ham Systems. As can be observed from Attachment 3, even with the BPL Ham Band-Stop Filtering activated, the BPL signals were found to be up to 10 dB above the ambient noise level. Discernable BPL signals were measured to be above the ambient noise levels on the Ham bands from 80 Meters through 17 Meters.

The final tests involved measuring the impact on the data rate in uploading/downloading canned data from/to the laptop connected to the BPL system when the K7YR Mobile system transmitted a 500W carrier sequentially on each of the Ham Bands except for 30 Meters where the power was limited to 200W. The transmitter was turned off during the test in each band until the quiescent data rate could be determined. Attachment 4 depicts the result. As indicated the quiescent data rate on each band was nominally 330 Kbps. But, when transmitting, the data rate dropped to “0” on the Ham Bands from 80 Meters to 20 Meters. On these bands the Main.Net Home Plug Modem and laptop had to be restored to operation after each test while on the Bands above 20 Meters the BPL system automatically restored itself.

The tests were repeated on 80, 40 and 20 Meters but with 500W PEP SSB transmissions. The data rate results were the same as for the 500W carrier tests described above.

SUMMARY/CONCLUSIONS: The Main.Net BPL system, even with it’s HF Band-Stop Filtering activated, does cause objectionable noise (QRN) on several of the HF Ham Bands for Ham stations located nearby the BPL service area. Previous measurements indicate that this interference potentially extends out to 2 to 3 blocks from the power lines. Further, Ham transmissions from nearby Ham Stations would likely render the PBL system inoperable during periods of operation.

In conclusion, as the PUD is considering deploying the BPL systems only in remote areas of Chelan County, the feasibility of such deployments must consider the proximity of current and potential future Ham Stations also located near the planned deployment area. Ham operation is an FCC licensed activity to which BPL systems can not legally cause interference or restrict operation.