

## League Views BPL Manufacturer's Interference Abatement Efforts with Interest

NEWINGTON, CT, Mar 22, 2006--A demonstration at ARRL Headquarters of [DS2](#) BPL equipment suggests the manufacturer is working to minimize--if not altogether eliminate--interference from its products on amateur bands, ARRL Laboratory Manager Ed Hare, W1RFI, says. Hare met with two DS2 officials earlier this month to discuss the company's improved approach to Amateur Radio band notching techniques. Based upon his observations during a demonstration of DS2's latest generation G2 technology, Hare says he's cautiously optimistic. A spectrum analyzer check of the modem's output showed the G2 modem could attain a notch depth of up to 40 dB.



**Lab testing:** ARRL Laboratory Manager Ed Hare, W1RFI (center), views spectrum analyzer trace of DS2 G2 modem with DS2 Vice President of Technology and Strategic Partnerships Chano Gómez (right) and Product Manager Eduardo Lluna, EA5ETP (left).

During his presentation, DS2 Director of Strategy and Standardization Victor Dominguez said that the manufacturer had improved the depth of the notches in its chipset.

Two days later, Hare had an opportunity to see a DS2 system in Houston. Some quick tests showed that although close-in notching wasn't much better than other systems', BPL noise dropped below the ambient noise level deep into the notches. Hare and Dominguez subsequently agreed to have DS2 staff work with ARRL to investigate the company's notching improvements.

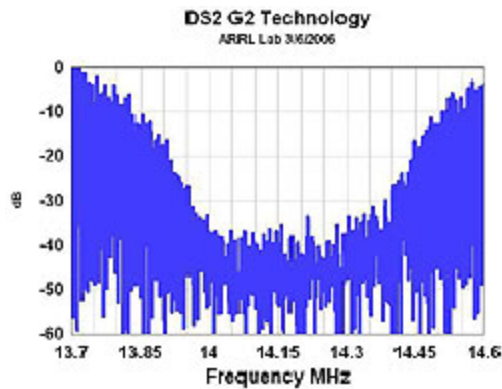
On March 9 DS2 Vice President of Technology and Strategic Partnerships Chano Gómez and Product Manager Eduardo Lluna, EA5ETP, brought a pair of modems using DS2's latest-generation G2 technology to ARRL Headquarters. Gómez directs DS2's US office in California. Lluna is based in Valencia, Spain. After a tour of Headquarters, the trio got down to work in the ARRL Laboratory's screen room, where the G2 modems were set up. The spectrum analyzer

"While there's no certainty that *all* BPL products using this technology could achieve 40 dB of protection within notched spectrum, our tests show the capability to do so is there," Hare commented. "This may not prevent all interference problems, but a 10 to 15 dB improvement over the notching used by many BPL systems in place today would be a significant improvement."

In its October 2005 [Petition for Further Rule Making](#) in the BPL proceeding, ARRL cited BPL systems using Main.net and DS2 chipsets as among those that lack fixed, permanent notches in the ham bands and "have caused numerous cases of harmful interference to stations in the Amateur Service."

### Texas Demonstration Inspires Invitation

Hare says he was intrigued by a demonstration of DS2's latest technology he witnessed last September during a United Power Line Council ([UPLC](#)) event in Texas.



**Figure 1:** The notch depth in this test shows that BPL noise is reduced by about 40 dB in the amateur bands. "This demonstrates that the DS2 G2 chipsets are capable of protecting the amateur bands by 40 dB in a properly designed product," says ARRL Laboratory Manager Ed Hare, W1RFI. "In this case, guard bands were programmed into the notch to ensure that the notch depth across the entire amateur band was 40 dB."

demonstrate that DS2's chipsets are Amateur Radio-friendly. "We have made a huge effort to ensure that the 40 dB programmable notches in our OFDM chipset provide adequate protection," he said.

According to Lluna, several vendors already have deployed DS2-based equipment in the US, "and this gives them the mechanism to avoid interference problems completely." Feedback from the ARRL "has been invaluable" in achieving that goal, he added.

### Exchange of Ideas

Afterwards, Hare, Gómez and Lluna discussed BPL and electromagnetic compatibility (EMC) issues and potential solutions to head off most cases of interference. "We had a solid exchange of ideas about the technical aspects of interference problems and how improved notch depth could be combined with other techniques to prevent and correct interference," Hare said. "The DS2 staff has a good grasp of the technical issues involved and believes many of them ultimately can be implemented in deployed systems."

ARRL CEO David Sumner, K1ZZ, concurred with Hare's cautious optimism. "We very much appreciate this dialogue with DS2, and we are looking forward to turning talk into action and solutions," he said.

results in Figure 1 for the 20-meter band were typical of all bands measured, Hare said.

"It is good to see testing that shows this implementation of technology has improved," Hare remarked. He said Gómez has offered to release application notes or other information outlining how DS2 has been able to configure its modems to achieve a 40 dB notch depth across entire amateur bands.

The DS2 modems also were tested at Maxim Memorial Station W1AW, where they were plugged into outlets in separate parts of the building and set to transmit data. Hare listened on a number of ham bands and on adjacent spectrum. Inside the ham bands, the signal was inaudible, he said.

"Although this was encouraging as a reasonable quick-look test of DS2 modems on premise," Hare cautioned, "testing on a BPL installation using overhead power lines would present a more realistic situation from which to draw firm conclusions." Gómez offered to look into ways such tests might be arranged.

Gómez said he's happy to be working with ARRL to