



TECHNICAL COLUMNS

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BROADBAND: INTERFERENCE REPORT CARD

By **RON HRANAC**

Three years ago I wrote an article about signal leakage and interference to over-the-air users, specifically amateur ("ham") radio operators ("Signal Leakage & Harmful Interference," July 2000 Communications Technology). I mentioned at the time that I had just been appointed to serve on the American Radio Relay League's (ARRL's) RFI Task Force. My role as a member of the RFI Task Force has involved serving as a liaison between the cable industry and ARRL for cable and ham radio-related interference issues. I continue in that role today, although the RFI Task Force has been renamed the ARRL EMC Committee.

Why have a liaison between hams and the cable industry for interference problems? Occasionally an interference situation occurs where local resolution isn't possible. When this happens, the ham operator contacts the ARRL for assistance (sometimes it goes all the way to the Federal Communications Commission, which usually refers it back to the ARRL). The ARRL in turn contacts me, and I get in touch with folks I know at the cable operator's corporate headquarters. In almost every case, the response is immediate, and the problem is sorted out to the mutual satisfaction of both parties.

Most reported interference is leakage that affects the 2-meter ham band (144-148 MHz). Channel 18's 145.25 MHz visual carrier falls in that band, and signal leakage may interfere with ham communications. If leakage exists, it's likely that ingress does, too. That is, when the ham transmits on a 2-meter frequency, his or her signal may interfere with one or more cable channels, especially Channel 18. As well, a ham transmitting on any of the so-called high frequency (HF) bands (frequencies in the 1.8-29.7 MHz range) may interfere with a cable network's upstream signals.

Status report

So how are we doing? Pretty good. The following is an excerpt from the EMC Committee's latest semi-annual report to the ARRL Board of Directors:

"As a whole, the cable industry is doing a reasonable job at adhering to the FCC's regulations about leakage and interference. ARRL has received few reports of problems, indicating that most systems are either clean or are addressing complaints effectively. The few cases ARRL has been involved with have been addressed through Mr. Hranac, the cable-industry member of this committee. He generally refers the report to the senior technical management of the involved cable company, who then in turn helps the local system resolve the reported problem. The advent of digital cable has not created any major new problems, although the increasing use of the HF "talkback" channels may be responsible for one or two reports that appear to involve HF. The Committee is watching these cases closely, to ensure that no industry-wide problems are at hand."

On average, I deal with an interference problem every couple months or so. Most are pretty simple, and are usually fixed by replacing one or more bad drops in the affected neighborhood. One case involved a cracked feeder cable near a line extender. Another case turned out to have nothing to do with the cable network or drops. The interference was coming from the telephone company's network, and was affecting frequencies in the lower part of the HF band (~3.5 MHz).



Don't ignore problems

Has everything been roses? No. There was one case last year in which local system personnel made an initial visit to the affected ham's residence, but the interference persisted. Subsequent calls were for the most part ignored. When the system's corporate headquarters got involved, the system still did nothing. It wasn't until the ham decided to pursue things with the FCC that things got moving. We definitely don't want the Commission breathing down our necks. Cooperation at the local level is definitely the best way to go.

(12) of the FCC's rules is very clear about just how much RF is allowed to leak out of our networks. For frequencies less than and including 54 MHz, and over 216 MHz, the leakage limit is 15 microvolts per meter ($\mu\text{V}/\text{m}$) at a 30 meter (about 100 feet) measurement distance. For frequencies over 54 MHz up to and including 216 MHz, the limit is 20 $\mu\text{V}/\text{m}$ at a 3 meter (about 10 feet) measurement distance.

Most leakage measurements are made in the midband, so the 20 $\mu\text{V}/\text{m}$ spec applies. Any signals leaking out of any part of the system—headend, distribution network or drops—over 54 MHz through and including 216 MHz must not have a field strength that exceeds 20 $\mu\text{V}/\text{m}$ at a distance of 3 meters from the network. Here's the rub: Even if your system meets this spec, you still may be responsible for fixing leaks that are much lower in amplitude! Don't believe me? Take a look at §76.613 in the FCC's rules. This clause covers harmful interference:

76.613 Interference from a multichannel video programming distributor (MVPD).

(a) Harmful interference is any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with this chapter.

(b) An MVPD that causes harmful interference shall promptly take appropriate measures to eliminate the harmful interference.

(c) If harmful interference to radio communications involving the safety of life and protection of property cannot be promptly eliminated by the application of suitable techniques, operation of the offending MVPD or appropriate elements thereof shall immediately be suspended upon notification by the District Director and/or Resident Agent of the Commission's local field office, and shall not be resumed until the interference has been eliminated to the satisfaction of the District Director and/or Resident Agent. When authorized by the District Director and/or Resident Agent, short test operations may be made during the period of suspended operation to check the efficacy of remedial measures.

(d) The MVPD may be required by the District Director and/or Resident Agent to prepare and submit a report regarding the cause(s) of the interference, corrective measures planned or taken, and the efficacy of the remedial measures.

Translation: Even a puny 5 $\mu\text{V}/\text{m}$ leak that is deemed to be causing harmful interference **MUST** be fixed! And just what is harmful interference? If the interference merely breaks squelch on, say, a scanning-type receiver, it's not considered harmful interference. But it is harmful interference if over-the-air communication is seriously degraded, obstructed or interrupted.

What if you get a call from a ham operator complaining about possible signal leakage interference to his or her radio communication? How should you handle it? Here are two checklists for you and your system staff:

What not to do

* Tell the ham operator your system complies with the FCC's 20 $\mu\text{V}/\text{m}$ signal leakage rules and your plant's perfectly legal.

* Ignore him or her.

* Don't return phone calls.

* Get confrontational.

What to do

* Take the complaint seriously.

* Respond in a timely manner.

* Work with the ham to resolve the interference complaint.

* Educate your customer service reps, installers and techs about the seriousness of interference complaints.

Bottom line: Cooperation is key to resolving interference complaints.

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