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Noise Inquiry Spurs Recommendations

Engineers concerned about spectrum noise wait to see what's next from the commission

SPECTRUM MANAGEMENT

BY STEVE JOHNSTON

Broadcast engineers are becoming more aware of the impact of environmental radio noise on reception. The recent efforts at "AM improvement" have highlighted this challenge to AM stations, and evidence is growing that

reception on FM and TV bands is being impaired as well.

The general public, however, is far less aware of our growing *noise pollution* issue. Listeners or viewers may not know *why* there is a reception problem; they just perceive the signal as "weak" and may switch to a competitor. Broadcasters are hearing a common pattern in listener complaints: "I used to get good reception, but not anymore..." I wrote about this in Radio World in a 2011 article titled "Johnston Laments FM Noise."

Other industries using RF wireless technologies report growing noise trouble as well. A recent IEEE Spectrum article was subtitled "Electronic Noise Is Drowning Out the Internet of Things." Designers of IoT devices are not getting the range they expect due to unexpectedly high background noise, it reported.

Recent broadcast engineering conferences have included presentations on the noise problem. The topic was extensively covered at last fall's IEEE Broadcast Technology Society Fall Symposium; four presenters focused on the subject of "man-made RF noise issues."

FCC TAC INQUIRY

Growing awareness of the problem of excessive radio noise in the environment last year led to the FCC's Technical Advisory Council forming a working group to study the problem. Inquiry ET-16-191, released in June 2016, sought public comments.

The responses came from about 100 individuals, companies and organizations,

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Corus Ventures Boldly Into HD Radio

Here's how one Canadian broadcaster is exploring the format

DIGITAL RADIO

BY JAMES CARELESS

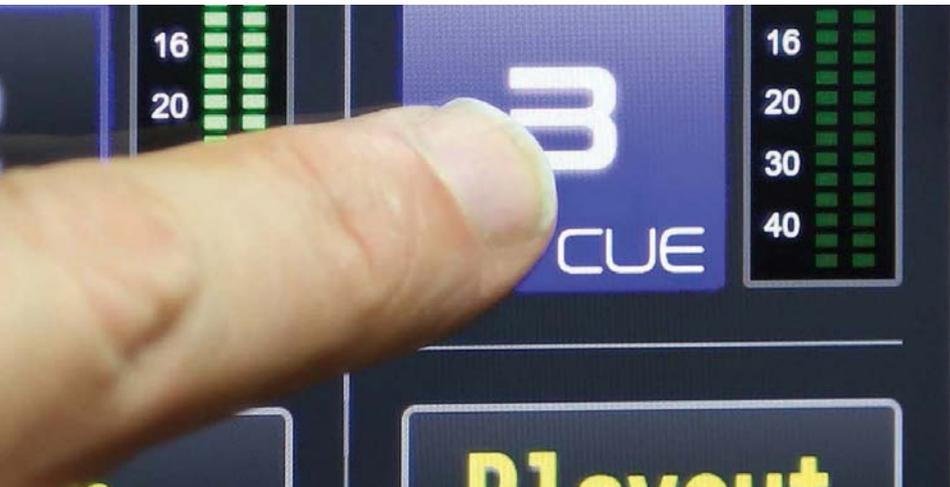
Although Canada does not have an official digital radio broadcast standard, Corus is now providing HD Radio broadcasts in Calgary, Toronto and Vancouver.

An operator of 39 Canadian radio stations plus numerous broadcast TV and cable/satellite-only TV channels, the company is using HD Radio over FM to deliver simulcasts of its existing AM stations in the three markets.

The AM stations being simulcast, using experimental government licenses, are:

- Calgary's CHQR, via CKRY(FM)'s HD2 channel;
- Toronto's CFMJ, via CING(FM)'s channel in nearby Hamilton, while CHML(AM) is on HD3;
- Vancouver's CKNW and CHMJ, via CFMI(FM) on HD2 and HD3, respectively.

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NOISE

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from a broad array of RF users including broadcasters, equipment manufacturers, consulting engineers, radio astronomers, amateur radio groups and users of other spectrum services such as cellular, GPS and public safety communications. Industries often blamed for interference were also represented. Fig. 1 lists some of those that offered comments.

Commenters cited radio noise sources such as power lines, modern lighting systems, switching power supplies, motor speed controllers and cable TV leakage. Several respondents pointed out that these devices needn't cause interference problems *if designed prop-*

erly. Unfortunately, too many seem to not meet that standard.

Twenty respondents had concrete suggestions for study methodologies. Nineteen comments specifically called for more effective enforcement of current regulations. And respondents were virtually unanimous in calling for an official noise study.

RECOMMENDATIONS

In December, the TAC Working Group recommending important steps for the FCC to tackle the problem of excessive ambient radio noise. The primary recommendation is that the FCC should issue a Notice of Inquiry or Notice of Proposed Rulemaking to resolve unanswered questions and take

What's Next?

- NOI / NPRM should be issued to resolve unanswered questions and take corrective action, if necessary.
 - Is observed noise due to noncompliant devices on the market?
 - Should radiated emissions testing be made below 30 MHz?
 - How should aggregation of emissions from arrays of individually compliant devices be regulated?
 - Should the distinction between Class A and Class B devices remain?
 - Should difference between Part 15 and Part 18 emissions limits remain?
 - Are current regulatory emission limits sufficiently low?
 - Should some classes of devices continue to be excluded from mandatory emissions testing?
 - Should an FCC label confirming emissions testing be required on every device?

Fig. 2: Some questions to be addressed to characterize the noise issue further.

corrective action. Fig. 2 shows some of the questions to be addressed to further characterize the noise issue.

In addition, the TAC Working Group raised several enforcement concerns:

- There is evidence that devices claimed to be "FCC compliant" were actually never tested, or the design was cost-reduced after they were tested, leading to non-compliance in delivered products.

- The FCC enforcement bureau needs to stop the manufacture and important of non-compliant switching power supply "wall warts," LED and CFL lights, and other products.
- The current FCC limits must be enforced effectively to stop the rapid rise in the noise floor across the spectrum before the problem becomes completely unmanageable.

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Background by iStockphoto/ingweb

Responding Entities

- NAB (Broadcast)
- SBE (Broadcast)
- DTS Inc. (Broadcast)
- Wisconsin Public Radio (Broadcast)
- V-Soft (Broadcast)
- Cohen, Dippell & Everest (Broadcast)
- LHW Consulting (Broadcast)
- Kintronic Labs (Broadcast)
- NPSTC (Public Safety)
- California Office Emerg Serv (Public Safety)
- Society of Amateur Radio Astronomers (Astronomy)
- Radio Jove Spectrograph (Astronomy)
- ARRL (Amateur Radio)
- GPSIA (GPS)
- Deere and Company (GPS)
- Exacter, Inc. (Power Lines)
- Shure Inc. (Wireless Microphones)
- Pericle Comm (Noise Hunter)
- CTIA (Cellular)
- AT&T Services (Cellular)
- Verizon (Cellular)
- American Lighting Association (Lighting)
- Philips Lighting (Lighting)
- NEMA (Lighting)

Fig. 1: A partial list of commenters to the FCC's Technical Advisory Council.

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CORUS

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“Our AM signals have been having an increasingly hard time penetrating the downtown areas of these three cities, due to the proliferation of taller buildings,” said John Coldwell, Corus’ director of radio technology.

“Using HD Radio via FM to simulcast into these areas, combined with the format’s superior sound, seemed a good solution to the problem, especially since HD Radio is being offered as an option in many new Canadian cars.”

A FAMILIAR RISK

Corus’s decision to experiment with HD Radio in Canada is not a risk-free venture. Broadcasters here felt burned by rolling out European-derived DAB (Digital Audio Broadcasting) coverage in major Canadian cities and, before that, AM stereo service. In both cases, according to common wisdom, the efforts died due to lack of affordable and widely consumer receivers, devouring millions of dollars in unrequited infrastructure investment.

Moving into HD Radio poses the same risk to Canada’s radio broadcast-

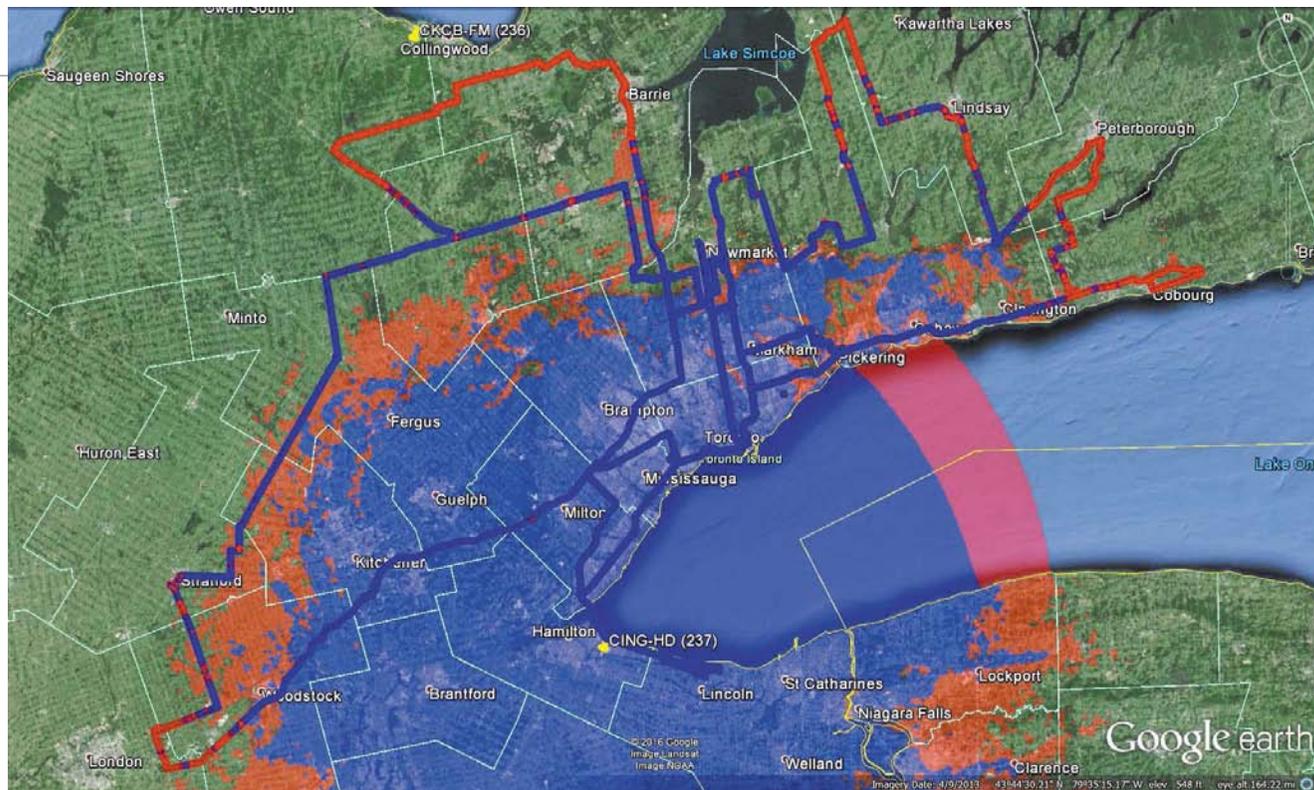


CKRY shares space on a master FM antenna near the top of this stick.

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Map shows HD Radio receiver signal locks in blue and non-locks in red. CING(FM)’s HD Radio signal blankets the “Golden Horseshoe” around Lake Ontario.

ers, save that this format is actually turning up in new North American-built cars. Further, proponents say, HD Radio simulcasts can help building-impaired AM stations penetrate the downtown core. Other major Canadian private radio groups are also experimenting with HD Radio via FM for AM simulcasts. Bell Media has HD Radio stations in Ottawa and Vancouver; Rogers Radio in Toronto and Vancouver. Two small private FM broadcasters, Brynes Communications and Durham Radio,

are serving their southern Ontario markets with HD Radio.

“Investing in HD Radio via FM is a gamble,” Coldwell of Corus said, “but it is one that addresses our AM reception problems effectively, adds the extra channels and on-screen program information that this format supports, and is in line with what our U.S. neighbors are doing.”

“This last point matters, because we cannot imagine any form of digital radio succeeding in Canada that is not

in line with what the U.S. is using.”

THE SETUP

Ideally, Corus would have been able to venture into HD Radio via FM by simply adding HD Radio upgrades to existing transmitters.

This proved to be the case in Calgary and Vancouver. In both cities, the company was able to inject HD Radio signals into existing Nautel NV-20 FM transmitter broadcasts without diminishing the

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NOISE

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On April 11, 2017, representatives of the Association of Federal Communications Consulting Engineers met with FCC Chairman Ajit Pai to discuss the problem of the rising radio noise floor, according to Tom King, president and CEO of Kintronic Labs and a member of the association. [See related article, page 29.]

These respected engineers reviewed the nature of the problem with the chairman and made a strong case for enforcement of regulatory limits on noise. The group’s recommendations covered both the rising noise floor issue and enforcement challenges.

AFCCE stated that:

- There has been no systematic study of RF noise since the 1970s.
- Many radio services are being compromised due to the rising noise floor.
- “Internet of Things” system performance is suffering due to the background noise.

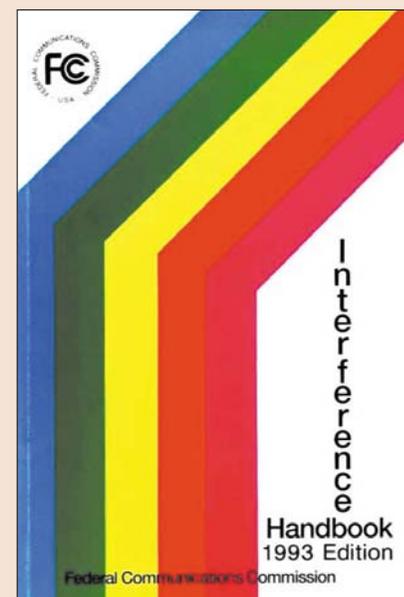
- The FCC should re-establish the random sampling program to test products for compliance.
- The FCC should stop turning a blind eye toward “at variance” practices.

GUIDANCE ... FROM 1993?

The AFCCE presentation made one final point: The commission’s current offering to consumers experiencing interference is the “FCC Interference Handbook.” This booklet is offered online but was last updated in 1993 and is long out of date. The group encouraged the commission to update this important document and create an online portal for submission of interference complaints.

“We are fortunate to have an FCC chairman who is pro-broadcast and appears to be receptive to our concerns.” Tom King said. But as of mid-June there’s no word so far from the commission in response to the recommendations of the TAC Working Group or the AFCCE representatives’ meeting with Chairman Pai.

Steve Johnston has 35 years’ expe-



The commission’s current offering to consumers on this topic is the “FCC Interference Handbook.” But it was published in 1993 — 24 years ago.

rience in broadcast engineering and now consults on projects worldwide. He was among those submitting comments on FCC Inquiry ET-16-191.