



Radio Club of America
2013 Technical Symposium
Saturday, November 23, 2013 - 8:00am - 4:00pm
Peabody Hotel, Orlando, FL

Final Agenda

- 8:00-8:15 Introductions by Technical Symposium Chair, John Facella
- 8:15-9:15 **“Review of the Top 10 Causes for LMR Systems getting FCC Violation Notices”**
David Eierman, Motorola Solutions
- 9:15-10:15 **“Combining Robotics, Amateur Radio, and Public Safety Emergency Services”**
Devlin Murray, KC2PIX, and Chris Blackwood, KD2CXC
Warren Hills High School, Warren County, NJ
- 10:15-10:30 Break
- 10:30-11:30 **“Enhanced Audio Quality Test Methods for Digital LMR”**
John S. Evans, LMR System Technology, RF Communications Division,
Harris Corporation
- 11:30-12:30 **“Critical Drivers that Limit Capacity in Wireless Broadband Long Term Evolution (LTE) for Public Safety and Mission Critical Applications”**
Robert A. Lopez, P.E., RCC Consultants, Inc.
- 12:30-1:30 Lunch break
- 1:30-2:30 **“Economic survival of AM Commercial Broadcast stations subsequent to disasters utilizing rapid-deployment of Near Vertical Incidence Skywave (NVIS) propagation antenna techniques”**
Carl S. Zelich, AA4MI, Radio Club of America
- 2:30-3:30 **“The practicalities of applying mobile broadband in a public safety environment”**
Scott Quintavale, Tait Communications, Inc.
- 3:30-3:50 **“Open Forum”** - technical discussion on any other topic of interest to the audience
- 3:55-4:00 Wrap-up and evaluation forms

DETAILED DESCRIPTIONS OF ALL SESSIONS FOLLOW

DETAILED DESCRIPTIONS:

8:15-9:15: "Review of the Top 10 Causes for Land Mobile Systems getting FCC Violation Notices"
By: David Eierman - Motorola Solutions

Synopsis: This will be a review of FCC Enforcement Notices of Violation issued over past several years related to Part 90 land mobile radio systems. We will cover:

- Why was notice of violation issued?
- What technical or operational rules were being violated?
- How was the issue resolved?
- What to do if you receive a visit from FCC Enforcement?
- What to do if you receive a notice of violation?
- We will then have a general discussion of lessons learned and actions to be taken to avoid these issues, and other interference issues, at the time of frequency coordination, licensing, or implementation.

Bio: David Eierman is a Principal Staff Engineer with Motorola Solution's North American Government Affairs Spectrum Strategy Team. David received BSEE & BAAS degrees from the University of Delaware in June 1976. David has over 37 years' experience with Motorola in Land Mobile radio systems. He spent 4 years designing systems for State & Local Government and Business/Industrial customers in the mid-Atlantic area and over 15 years designing nationwide systems for Federal Law Enforcement and the Department of Defense customers. Since June 1996, David has been providing technical support on spectrum, standards, and regulatory issues to field engineering, sales, product marketing & development groups. He has been actively involved in digital standards development, VHF/UHF re-farming, 700 MHz implementation, TV clearing, 800 MHz re-banding and 4.9 GHz allocation efforts. He is also involved in many customer and industry organizations, as well as spectrum advisory committees, including ITU, TIA/Project 25, NPSTC, APCO, & LMCC.

9:15-10:15: "Combining Robotics, Amateur Radio, and Public Safety Emergency Services"
By: Devlin Murray, KC2PIX, and Chris Blackwood, KD2CXC
Warren Hills High School, Warren County, NJ

Synopsis: These students, members of the "721st Mechanized Contest Battalion" high school radio club, have invented a device that allows for rapid set-up of communications after a disaster. Their device uses robotics, and they will show a video of how it works.

10:30-11:30: "Enhanced Audio Quality Test Methods for Digital LMR"
By: John S. Evans, LMR System Technology, RF Communications Division,
Harris Corporation

Synopsis: Coverage is the most critical requirement in Land Mobile Radio Systems. Coverage is typically verified by listening tests. If the radio audio quality in strong signal is not optimized then coverage testing in weak and faded signals will be judged poorly in comparison to the actual signal strength provided. For decades, the venerable 1 KHz tone and SINAD testing have been the primary tools for testing audio levels and radio audio quality. This presentation examines two additional test methods: Pseudo-Speech and PESQ and their application to LMR audio quality testing.

Pseudo speech (P-Speech) is used to measure audio levels averaged over various speakers. The test signal is generated by summing 32 calls initiated by 4 male and 4 female speakers. The resulting signal is similar to background noise in a room full of people. The interesting property of the P-Speech signal is the DVSI vocoders used in APCO P25 radios passes the signal though with < 1 dB loss in Active Speech Level. Note that real background noise and artificially generated noise (e.g. 'pink' noise) cannot be used because those signals are attenuated by the DVSI vocoder whenever noise suppression is enabled. PESQ is used to evaluate the degradation in audio quality compared to a known reference. PESQ was standardized by the ITU-T to predict Mean-Opinion-Scores (MOS) tests without having to actually conduct the MOS test. But PESQ is not a good predictor of MOS scores for the DVSI vocoders and the PESQ score for a given sample can vary widely over the range. Harris has devised two techniques to harness the PESQ score and make it very repeatable and a good indicator of degradation in audio quality due to radio imperfections and also RF signal quality.

11:30-12:30: “Critical Drivers that Limit Capacity in Wireless Broadband Long Term Evolution (LTE) for Public Safety and Mission Critical Applications”
By: Robert A. Lopez, P.E. - RCC Consultants, Inc.

Synopsis: LTE is a single frequency broadband technology that allocates bandwidth dynamically and shares spectrum in time among multiple users. Traffic patterns for emergency responders are driven by incident types and how those incidents are managed; whether it involves an airplane crash, train derailment, major fire at a high rise building or hazardous toxic spill. Accurately predicting traffic congestion scenarios, within areas most likely to experience particular type of emergencies will help dimension a broadband network more accurately in terms the density of cells needed for both coverage and capacity, that is, minimum data rate per user at cell edge.

1:30-2:30: “Economic survival of Amplitude Modulated Commercial Broadcast stations subsequent to natural and/or man-made disasters utilizing rapid-deployment of Near Vertical Incidence Skywave (NVIS) propagation antenna techniques”
By: Carl S. Zelich, AA4MI, RCA

Synopsis:

Service: Conserve reliable service. When a broadcast tower crashes in a devastating disaster, all other means of communicating with the general public as well as police, firemen, EMTs, hams, cell phones and the government officials is no longer available/reliable. However, NVIS can and will be the ONLY direct information source because it does not require ANY intervening relays/repeaters/landlines. It is DIRECT because it uses the ionosphere to direct reach the serviced populations.

Speed: The technique described will allow immediate implementation. A functional/operational station can be transmitting even before an evaluation of costs and mechanical restoration of the tower can begin. Also FCC authorization will be given to allow reconstruction/safety of the general public on a temporary basis.

Cost/Benefit: Interview any station owner/operator and the first response you will get is of financial survival. For an investment of \$1000, the station can continue to generate revenue income while a destroyed tower is removed and replaced.

Wireless Industry importance: The AM broadcast band stations are struggling to exist in competition with the other wireless modalities (FM, satellite, cellular, etc.) to exist. This method may very well save their existence. This method has never been suggested as a solution.

2:30-3:30: “The practicalities of applying mobile broadband in a public safety environment”
By: Scott Quintavale - Tait Communications, Inc.

Synopsis: In recent years, there has been much interest in the application of new mobile technologies such as LTE in scenarios required by Public Safety. The mission critical communications that first responders rely on are required to perform to the highest levels to enable successful completion of the task being undertaken. In this presentation, we explore the way in which modern wireless communications systems are evolving to meet the demands of public safety. We ask what are the strengths and weaknesses of the technology by asking the hard questions about coverage, capacity and application performance.

NOTE: All presentations will be posted at the RCA Website after the Technical Symposium for the next 12 months, and then will be archived but available to the public after that:
<http://radioclubofamerica.org/drupal/node/209>