

September 26, 2011



Radio TechCheck



The Weekly NAB Newsletter for Radio Broadcast Engineers

AM Carrier Control Offers Power-saving Options for Broadcasters

For many years, international AM broadcasters have been using power-saving technologies that reduce the amount of power transmitted in the carrier portion of an AM radio signal while maintaining the quality and coverage area of the station. In a [Public Notice](#) released earlier this month, the FCC has now made it possible for AM broadcasters in the U.S. to benefit from this technology.

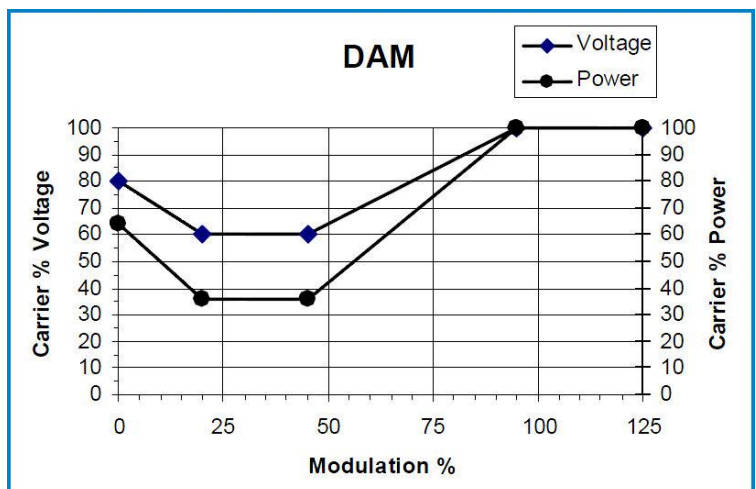
In the Public Notice, the Media Bureau establishes procedures for AM broadcasters to seek a rule waiver in order to use energy-saving Modulation Dependent Carrier Level (MDCL) technologies. The Commission suggests that easier implementation of MDCL algorithms and higher energy costs have recently made these techniques more attractive to domestic broadcasters.

This Public Notice follows a wave of interest in these technologies within the U.S. broadcasting industry, including technical presentations at recent NAB Broadcast Engineering Conferences. At the 2011 NAB Show, Chuck Lakaytis, director of engineering with Alaska Public Broadcasting gave a presentation entitled “*Reduce Power Co\$t of AM Transmitters using Carrier Control Techniques.*” In Alaska, energy costs are at a premium so these power-saving technologies are of considerable interest. In his presentation, Mr. Lakaytis said that many of the eleven AM radio stations in the Alaska Public Broadcasting system rely upon diesel generators for AC power, and the fuel for these is often delivered by barge (see photo of the “Crowley fuel tug” delivering fuel on the Tanana River) or aircraft.



Under experimental authorization, Alaska Public Radio investigated the use of MDCL technology on two stations, KOTZ (720 kHz, 10 kW, Kotzebue, Alaska) and KDLG (670 kHz, 10 kW, Dillingham, Alaska). According to Mr. Lakaytis, over a 90 day trial period, these stations experienced a power savings of 30% with no complaints about audio quality or loss of coverage.

In an earlier presentation, Tim Hardy, head of engineering with Nautel, spoke about “*Energy Conservation in AM Broadcast Transmitters Using Carrier Control Algorithms*” at the 2009 NAB Broadcast Engineering Conference. Mr. Hardy provided a brief history of the use of AM carrier control techniques followed by a technical description of how these techniques work. One technique he discussed, called Dynamic Amplitude Modulation (DAM) was commercialized by Telefunken (then AEG Telefunken, today Transradio) during the 1980s. The graph at right illustrates the principle behind DAM –



the carrier power is reduced the most at moderate modulation levels, increasing received loudness, and the carrier is increased at higher modulation levels so that distortion does not occur.

MDCL technology has also been a topic of discussion at recent meetings of the AM and FM Analog Broadcasting (AFAB) Subcommittee of the National Radio Systems Committee ([NRSC](#)). With this action by the FCC, the AFAB is now likely to consider developing an NRSC Guideline which would help broadcasters best utilize this technology. One outstanding question is whether MDCL technology can be effectively used on a station that is broadcasting an AM in-band/on-channel (IBOC) digital radio signal. A number of broadcasters and transmitter manufacturers have expressed interest in testing how well IBOC receivers work when presented with MDCL-processed signals. The NRSC is closely following this work and will review any test results made available.

Use of MDCL technologies will now only require a waiver of Section 73.1560(a) of the Commission's Rules, which sets upper and lower limits for an AM station's operating power. Details on how to request this waiver are included in the Notice. Some additional background information on MDCL technology is presented in the Public Notice as well, in particular:

- Transmitter manufacturers have developed different techniques to reduce carrier power as the audio content varies. During the 1980s, several European broadcasting and manufacturing concerns developed algorithms to reduce power consumption by radio transmitters. These algorithms, known variously as Dynamic Amplitude Modulation, Amplitude Modulation Companding, Adaptive Carrier Control or Dynamic Carrier Control, decrease carrier power by amounts up to 6 dB, with the power reductions applied at different modulation levels depending on the algorithm.
- Today, among manufacturers of AM transmitters for domestic use, Harris Corporation offers both Amplitude Modulation Companding (AMC) and Adaptive Carrier Control (ACC) features for all its current AM broadcast transmitters, and can add the feature to some older transmitters. Nautel Limited includes an option called Dynamic Carrier Control (DCC) on all NX series transmitters, and can also install DCC on other transmitter models.

The Commission states in the Notice that if other manufacturers of AM broadcast transmitters develop similar technology in the future, they will consider waiver requests for implementation using the same procedures described in the Notice. A telephone call to the Media Bureau last week revealed that the first request for a waiver under the terms of this Public Notice has already been received, for an AM station in California.

FEMA IPAWS Special Event - Prepared & Ready: The Final Stretch Before the Nationwide EAS Test

Save the Date for September 30, 2011 from 1:30 -- 3:30 p.m. ET

Please save the date for the final EAS Participant Virtual Roundtable discussion with government and industry leaders on September 30, from 1:30 – 3:30 p.m. ET. The discussion will involve a variety of topics and draft documents for feedback that will support updates to the EAS Best Practices Guide and Nationwide EAS Test Informational Toolkit.

Some examples include:

Television and Cable EAS Background Slate
Nationwide EAS Test Message Transcript Draft
Public Service Announcement Audio Sample
Nationwide EAS Test Data Reporting
Required Monthly Test Activities and Findings.

The meeting will be held on Microsoft Live Meeting 2007 (*This [link](#) will be active the morning of September 30*). Additional information is available [here](#).

FCC Extends EAS-CAP Compliance Deadline June 30, 2012

On Friday, September 16, the FCC released a *Fourth Report and Order (Fourth R&O)* in the EAS proceeding (EB Docket No. 04-296) which amends section 11.56 of the Commission's EAS rules extending the deadline requiring EAS Participants to be able to receive CAP-formatted EAS alerts as required by Part 11 from September, 30 2011 to no

ADVERTISEMENTS



later than June 30, 2012.

On May 25, 2011, the Commission issued the *Third Further Notice of Proposed Rulemaking (Third FNPRM)* which sought comments on a wide range of tentative conclusions and proposed rule revisions that would more fully delineate and integrate CAP into the Commission's Part 11 EAS rules. Among other things, the *Third FNPRM* asked whether the existing September 30, 2011, deadline for CAP-compliance is sufficient or whether the Commission should extend or modify it so it would be triggered by some action other than FEMA's adoption of CAP. The Commission received 30 comments and 12 reply comments in response to the *Third FNPRM*. The majority of commenters requested a further extension of the deadline. (See *TechCheck* from August 1, 2011.)

On July 29, NAB and a number of other broadcast organizations filed a petition asking the FCC to rule expeditiously on the deadline extension issue.

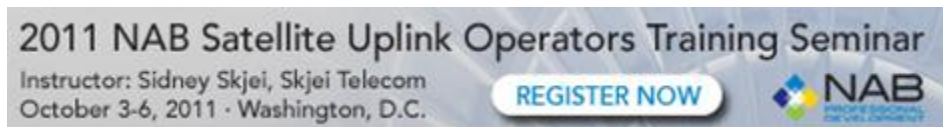
In the Fourth R&O the FCC stated that an extension of the current CAP compliance deadline is warranted and that they:


"agree with commenters that argue that until the Commission has completed its rulemaking process, it cannot meaningfully impose a deadline by which EAS Participants must "receive CAP-formatted alerts." No one can comply with section 11.56 yet, because the Commission has not finalized all the key technical specifics necessary for receiving CAP-formatted alerts. Without having these specifics, no EAS Participant can claim that it is currently capable of receiving CAP-formatted alerts, even if it has equipment that could receive such alerts under one or more of the technical specifications being considered by the Commission."

The fourth R&O is available on the FCC's Web [page](#).

61st Annual IEEE Broadcast Symposium Registration Open

The 61st Annual IEEE Broadcast Symposium is being held from October 19-21, 2011 at the Westin Alexandria Hotel in Arlington, VA. This year's Symposium will offer attendees an exciting, timely, and informative three-day program with tutorials on "Connected TV" and HD Radio in-band/on-channel digital radio technology, followed by technical sessions on Radio Engineering & RF Infrastructure, Network Distribution, Mobile DTV, DTV Implementation, and the Future of DTV. Broadcast engineering experts from around the world will be presenting at the Symposium. For additional information and to register visit the Symposium web site at <http://bts.ieee.org/broadcastsymposium/>.



2011 NAB Satellite Uplink Operators Training Seminar
Instructor: Sidney Skjei, Skjei Telecom
October 3-6, 2011 · Washington, D.C. [REGISTER NOW](#) 



 **NAB Broadcast Engineering Conference Proceedings**
A selection of papers from the 2011 NAB Show, with topics including cloud-based technologies, 3DTV and more. [Learn More and Buy >](#)



Announcing the Newest **NAB Member Benefit**
 **Agility Recovery** Prepare to Survive **Disaster Recovery · Space · Connectivity · Power**