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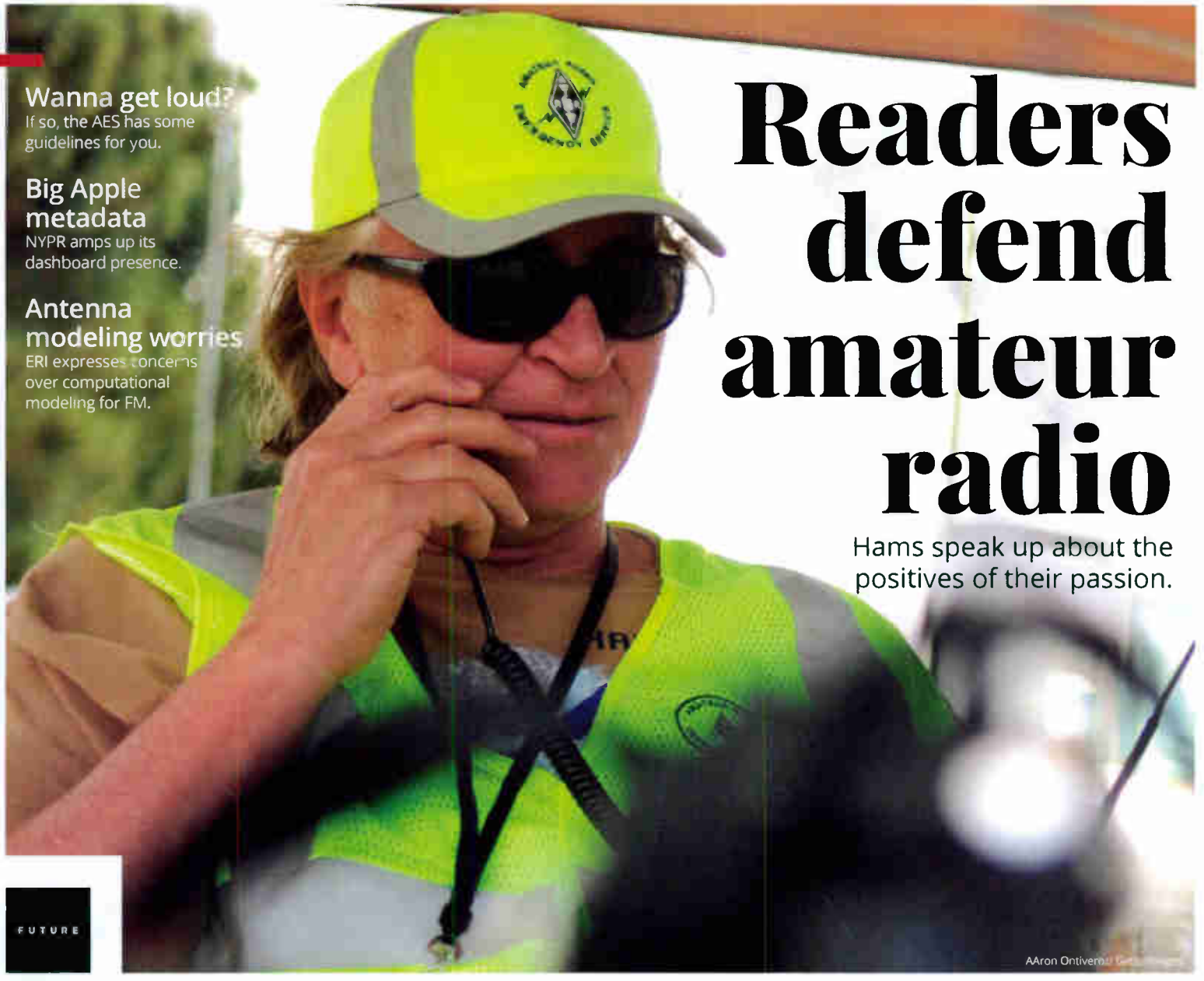

Wanna get loud?

If so, the AES has some guidelines for you.

Big Apple metadata

NYPR amps up its dashboard presence.

Antenna modeling worries

ERI expresses concerns over computational modeling for FM.

Readers defend amateur radio

Hams speak up about the positives of their passion.

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Leave time alone

Don't mess with a system that works

Paul McLane
Editor in chief

Someone dear to me got excited when she learned that Congress was considering making Daylight Saving Time permanent.

Excited, that is, until I told her that in wintertime here in northern Virginia, she'd find herself arriving at work each morning in the dark — even though she gets to the office as late as 8:30 a.m. She didn't like that so much. (Good thing she doesn't work in the U.P. of Michigan.)

Why mess with a system that works? That's my take on it.

I find it interesting that some folks get so worked up about this issue. One end of the day or another, changing the system is going to inconvenience someone.

Or if we do decide to change it, why not stay on Standard Time rather than on DST? Isn't that more natural?

Well ... none of it is natural.

Me, I kinda like the semiannual changing of the clocks; I find it a rare common ritual in our lives (well, almost common, looking at you, Hawaii and Arizona). It's a ceremony that makes us all briefly aware that the structuring of our daily lives by the hours is really arbitrary. And even though DST itself only began in the United States in the early 20th century, changing clocks somehow makes me feel just the smallest bit closer to folks who lived centuries ago, their lives ruled by the cycles of agriculture and of the sun.

All of which is to let you know that in this issue, Randy Stine reports on the reaction to the DST proposal among AM broadcasters.

Also, I'm happy to welcome Elle Kehres to the Radio World team. She is the new editor of our daily Radio World SmartBrief e-newsletter and will also work as a content producer across our platforms.

Elle is a journalist who has experience in print, radio, TV and web, and a graduate of the University of North Carolina at Chapel Hill. She most recently was assistant news director and reporter for WCHL(AM/FM) in Chapel Hill. She is based in our parent company's brand new office in Atlanta's Bank of America tower. Reach her at *elle.kehres@futurenet.com*.

Elle Kehres

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On the cover
John Wells of Amateur Radio Emergency Service District 10 at the scene of a 2012 fire in Colorado. See page 29.

Photo By AAron Ontiveroz/The Denver Post via Getty Images.

WEARABLES: Nielsen Audio recently updated clients about its Portable People Meter "wearables" initiative. It hopes that by adding several types of wearable measurement devices, panelists will find the experience better and Nielsen will get improved results. It told clients that its wearables have been vetted by rigorous lab tests, focus groups, dual "carry testing" and a former panelist test. It is evaluating its rollout plan.

SECURITY RISK: The Federal Communications Commission added three entities to its list of communications equipment and services deemed to be a threat to the nation's security. They include a familiar brand of anti-virus and cybersecurity products. The FCC expanded the list to include AO Kaspersky Lab, China Telecom (Americas) Corp. and China Mobile International USA Inc.

COMMENT SYSTEM: The FCC's Electronic Comment Filing System is getting a makeover. The commission in early April announced that the ECFS has undergone an initial system upgrade, the first of several planned improvements. This update transitions ECFS to a cloud-based platform, which will make the system scalable and more agile, according to the commission. In addition, reCAPTCHA functionality was added.

UPTON RETIRES: Rep. Fred Upton of Michigan announced he would not run for reelection. Among his many roles since coming to the House of Representatives in 1987, he has been involved in broadcast regulation; he also was one of 10 Republicans who voted to impeach President Donald Trump. NAB President/CEO Curtis LeGeyt said, "As the leader of the Energy & Commerce Committee and Communications Subcommittee, his focus on bipartisan governance produced meaningful results to help television and radio broadcasters better compete, innovate and continue serving our tens of millions of viewers and listeners."

DIGITAL RADIO: The Digital Radio Mondiale Consortium held its general assembly. Chairman Ruxandra Obreja described the consortium as "strong, very active and looking with confidence to the future."About 80 people attended the open session portion of the virtual event. They heard presentations from India, South Africa, Pakistan, Brazil, Denmark and other countries, including discussion of trials of DRM FM in India. "The encouraging activity of the India automotive group and the progress of the innovative education project were also some of the meeting highlights.

Photo of radio: mgkaya/Getty Images

Writer

Randy J. Stine

Radio World's lead news contributor profiled Xperi's Ashruf El-Dinary in our previous issue.

Extending Daylight Saving Time could hurt AM radio

Measure would sideline some broadcasters for part of morning drive time

The idea of making Daylight Saving Time a permanent fixture has been broadly discussed before but when the U.S. Senate adopted a bill to make it the law of the land recently, broadcast industry representatives quickly jumped up to protest.

The aptly named Sunshine Protection Act would extend Daylight Saving Time in the United States year-round but could have damaging programming and technical implications for many AM broadcasters. The outlook for the legislation in the U.S. House was unclear as of early April.

For 80 years most Americans have observed the tradition of resetting their clocks spring and fall. Reverting to Standard Time during winter months has benefitted AM broadcasters operating only during daylight hours and those with restricted nighttime coverage. The time shift allows earlier sign-on and full-power operating times.

However, a change to extend DST would impact the critical AM morning drive time on those stations and potentially hurt revenue generated by morning shows. Those stations would benefit from later sign-off times in November, December, January and February, but not enough to offset getting short changed on morning drive, according to some AM owners (see sidebar, page 6).

The FCC declined comment on the legislation and would not speculate on how it could affect U.S. AM broadcasters. The commission has spent the past decade touting its AM revitalization measures to save the senior band.

The National Association of Broadcasters said it was working with the bill's authors and the leadership of the House Energy and Commerce Committee to minimize potential impact on broadcasters.

Unpredictability of nighttime AM

Thousands of AM stations, many of them Class D stations, are required by the FCC's rules to reduce their power, use a more restrictive coverage pattern, or cease operating at night to avoid interference to other AM stations. Local sunrise and sunset times therefore are critical to thousands of AM broadcasters in the United States.

There are 1,965 Class D AM stations in the United States. Of those, 1,011 operate daytime only, according to the FCC.

Industry observers say that in the lower 48 states, AM operators in major cities across the Pacific Northwest would be especially sensitive to a shift to permanent Daylight Saving Time, given their northerly locations. For example, Portland, Ore., is farther north than Minneapolis.

Some Class D stations operate with presunrise authorization and postsunset authorization during some months with special authorization from the FCC, according to the commission. However, the rule is complicated, industry experts say, and because of a lack of suitable software, the commission has not granted new PSRA and PSSA authorizations for years.

A flip to permanent Daylight Saving Time would bring operating complications for AM broadcasters, said Ben Dawson, consulting engineer with Hatfield & Dawson, since the propagation mechanism for frequencies of the AM band is different between daytime and nighttime.

"The groundwave propagation that provides service during daylight hours is quite consistent, but the nighttime propagation mechanism that produces skywave coverage and interference is not. And it varies seasonally and during the nighttime hours," Dawson said.

A change to full-time DST — essentially moving the entire country one time zone east — won't reduce daytime operation hours but would cause morning power change or sign-on times to be an hour later in the winter, Dawson said.

Final blow?

Ben Downs, vice president and general manager of Bryan Broadcasting, which operates four AM stations, said the harm from a switch to year-round DST would go beyond daytimers. He estimates that over 75% of AM radio stations would be affected.

"All but about 1,000 of the 4,500 or so licensed AM stations either sign on, increase power or go to a less restrictive directional pattern at sunrise," Downs said. "AM radio comes alive at sunrise."

The band is already "living in a sea of noise and interference from digital devices and their inexpensive power supplies," Downs said; he thinks permanent Daylight Saving Time would be the final blow for many small-market AM stations.

"As we all know, most small-market AM stations do not operate with large profit margins. The sun rising brings AM radio to life for most. In the winter, listeners would find these stations — their news, information, entertainment and advertisements — would not even exist," Downs said.

KTBB(AM) at 600 kHz and licensed to Tyler, Texas, is another of the stations that would be hurt by year-round DST. The station, 5,000 watts by day and 2,500 watts at night, would lose approximately 40% of its Nielsen-defined metro between local sunset and local sunrise, according to Paul Gleiser, its president and owner.

"For about a four-month period, 40% of the market would not be able to hear it until after 8 a.m., and possibly as late at 8:30 a.m. That would effectively end KTBB's viability," Gleiser said. "A station that can't be heard very well before 8 a.m. has very limited revenue prospects."

Gleiser says he is fortunate to be able to simulcast programming on an FM that he purchased in 2015, one that covers the full market. "For operators of AM stations without such an alternative, 12-month DST is potentially fatal."

And Gleiser said he wouldn't expect the FCC to step in with an across-the-board modification of operating hours to help AM broadcasters if Daylight Saving Time is in effect year around.

"If, for example, the FCC permitted power increases at 6 a.m. rather than waiting for local sunrise, the resulting interference would be a major problem. I would expect zero help from the FCC," he said.

"Very concerned"

Randy Miller, president of Miller Media Group, owns two daytime AM stations with no presunrise or postsunset authority. WHOW(AM) is licensed to Clinton, Ill., while (WTIM) is 500 watts and licensed to Assumption/Taylorville, Ill. They serve critical roles in the community, Miller said.

"I am very concerned about this. Our expanded local newscasts air in each market at 7:10 a.m., which means they won't be heard. When severe weather, i.e. snow and ice hits, parents and children will not be getting any of the school closings we'll be broadcasting in the morning during the winter."

His AMs are paired with several FM translators but he worries about older members of the community that rely on the AM signal to monitor programming.

"Finally, our local advertisers will miss an opportunity to reach their potential customers during the morning, due to the 8:15 a.m. sign-on," Miller said.

The Sunshine Protection Act, sponsored by Sen. Marco Rubio, R-Fla., would especially hurt stations in the northern

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half of the U.S., said Steve Moravec, president of Phoenix Media Group Inc.

"Senator Rubio represents a state with some of the southernmost real estate in the country. For the northern half of the United States, the measure would create yet another problem for AM owners to overcome," he said.

Moravec, a former AM radio station owner who now concentrates on consulting and brokerage activities, says restricting or changing daytime coverage or full-power hours makes a mockery of AM service to the listening public and threatens the AM band's long-term viability.

"It's hard to sell morning drive at a premium if the audience can't hear the radio station," Moravec said. "Just imagine a heavy spot load during the holiday season and you can't go to full facilities until perhaps 9 a.m."

There also would be the added burden of Canada and Mexico needing to concur with any U.S. action, he says.

Veteran news and talk radio consultant Holland Cooke said many of his AM clientele have already essentially evacuated the band for the safety of FM through the use of translators.

"The smart ones are already pretending to be FM by rebranding themselves. Because AM is just so challenged, and this possible switch to year-round Daylight Saving Time will do none of them any good. To think you can successfully operate an AM station being invisible during most of morning drive is ludicrous," Cooke said.

> **"To think you can successfully operate an AM station being invisible during most of morning drive is ludicrous."**

Another AM radio advocate notes that translators generally are not available in larger markets, where the FM band is nearly full. There, AM operators cannot allocate an FM translator of any size due to spacing and interference requirements.

"A 250 watt translator is a rarity in large markets, with some translator operators operating with as little as one watt in order to conform to interference requirements. This leaves many AM stations in major markets without an FM simulcast as backup," he said.

Daylight Saving Time was implemented in 1916 in an effort to conserve fuel during World War I. Under the proposed law, the country would have until Nov. 20, 2023, to prepare for the change.

Rotella Raises Concerns on the Hill

Broadcasters in New Jersey are pushing Congress to consider the impact on AM broadcasters if Daylight Saving Time becomes permanent.

One suggestion: Give all AM stations a common, earlier "power up" start time that would stay the same all year long.

Paul Rotella, president/CEO of the New Jersey Broadcasters Association, wrote to the chairman of the House Energy and Commerce Committee about this issue. The chairman is a fellow New Jerseyan, Rep. Frank Pallone.

Rotella was commenting on the bill, introduced by Sen. Marco Rubio and recently passed by the Senate, that would make DST permanent and do away with the twice-yearly "changing of the clocks."

"If this legislation is adopted, many, if not most, AM stations will lose an hour of morning drive with no or reduced power," Rotella told Pallone, "and no one seems to be addressing the issue.

"Simply put, AM 'day timers' and 'directionals' will not be able to power up in the dead of winter until approximately 8:15 in the morning, thereby losing most of the precious and important morning drive time segment of their broadcast."

He said the FCC should not force AMs to "power down," especially if they can show they are not interfering with other signals.

The NJBA also would like FCC Chairwoman Jessica Rosenworcel to consider a change to the rules to permit that all AM stations have a common, earlier "power up" start time year-round. "This would be similar to the current Pre Sunrise-Authority (PSA) reduced power granted many AM stations, but broader in scope." Rotella suggests it be set for no later than 7 a.m.

"A simple solution would be for the FCC to offer some form of Pre-Sunrise Authority to most, if not all, daytime or directional AM stations. At least this would allow operation and provide service at reduced power."

Rotella said that in the long term, this might even encourage new approaches to spectrum allocations.

He notes that New Jersey broadcaster Larry Tighe suggested using spectrum just below the current VHF TV band for DAB. "He claims the swath of bandwidth is little used and while not ideal for a number of technical reasons, it is still far better that the limitations placed on AM radio as we know it."

Rotella said using spectrum between 45 and 54 MHz and digital technology with 50 kHz slices — "roughly 150 kbs or more than enough for stereo AAC 3 digital compressed audio" — AM broadcasters could migrate, and "the existing AM band could be used for new higher-power full-time broadcasts that could overcome the ever-higher noise floor."

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Writer

James Careless

Longtime Radio World contributor wrote recently about the BBC World Service's 90th anniversary.

Hubbard attracts listeners with localized podcast apps

Media company is trying the concept in Minnesota and D.C.

There are approximately 2 million podcasts available to listeners online, according to the business/tech site Earthweb.com. With so many sources demanding listeners' attention, it can be difficult for locally focused content to attract ears even in their home markets.

Hubbard Radio created PodMN, a podcast app built to spotlight homegrown content in Minnesota, and PodcastDC, for Washington. They are free on Apple's App Store and Google Play.

"Our goal is to give listeners in our Minnesota and D.C. markets access to a full range of local podcasts from their areas; not just Hubbard's own podcasts, but ALL local podcasts covering sports, news, true crime and everything else that is being produced here," said Jeremy Sinon, Hubbard Radio's VP of digital strategy.

Bottom
A sampling of podcast network sources available on PodMN.

Below
Jeremy Sinon

The UX

PodMN provides a surfable screen of linked icons under titles such as "Minnesota News," "Purple Daily" (the color of the Minnesota Vikings NFL football team), "Networks," "At the Movies" and so forth.

A click on "Categories" offers podcasts in the areas of comedy, news, sports, business, music, health & fitness, society & culture, history, arts, TV & film, fiction, true crime, science, education, government, leisure, kids & family, and technology.

In the True Crime category, the podcast "Midwest Madness" features two sisters talking "about true crime, cults, conspiracies and cryptids in the Midwest." (According to Merriam-Webster, a cryptid is an animal such as Sasquatch or the Loch Ness Monster that has been claimed to exist but never proven to exist.)

In designing the local apps, "our goal is to assist listeners in the discovery of smaller local podcasts," Sinon said. "When you open up the big podcast apps, you're going to see the big national-type podcasts, whereas the local stuff can get buried and hidden. As a company that produces a lot of local podcasts, it's an important mission for us to make local content more visible."

"This is why PodMN and PodDC focus on local, not national, podcasts," he continued. "This means not only including our own podcasts, but everybody else's as long as it is local and relevant. We feel like 'all boats will rise' in this scenario, including our own."

How podcasts are selected

The available podcasts are not randomly selected, nor an aggregation of every local podcast in those markets. "They're all hand-curated," said Sinon. "In the very beginning we started finding local podcasts through simple web searches. Once we started making relationships in the podcast community and making our brand known on a wider scale, we now have podcasters submitting their shows to us to be added to the app."

The existence of PodMN and PodcastDC has caught producers' attention. "We're at the point where people who are launching new local podcasts are reaching out to us and asking, 'Hey, can you add this to your platform?' This is great, because it shows that podcasters appreciate the opportunity we are providing to connect them with local listeners."

As new content comes on board, Hubbard Radio highlights its arrival to PodMN and PodcastDC users.

Big surprise

Two years into provisioning PodMN and PodcastDC, Hubbard Radio has learned a lot about podcast selection, content aggregation and listener preferences. But a surprise has been just how many podcasts there were to choose from

"When we first launched this, we thought maybe there'd be 70 to 100 podcasts for us to offer in the app," said Sinon.

"Instead, to date we've curated at least a thousand local podcasts for the PodMN app alone, and the number continues to grow. Now they're not all big podcasts: A lot of them are smaller, so they aren't necessarily going to bring big audiences to the app. But they're all visible and we give them access to a more level playing field on our platform than they've ever had on Apple, Spotify or any of the other big guys."

Sinon says the company views these as beta tests. "We'll see how they evolve and what we have yet to learn, we'll then make decisions from there on what's next."

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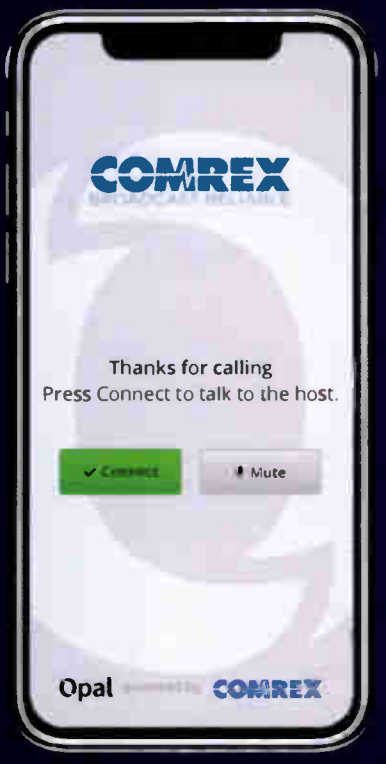

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John Bisset
CPBE
With more than 50 years in broadcasting, the author is in his 32nd year writing Workbench. He handles western U.S. radio sales for the Telos Alliance and is a past recipient of the SBE's Educator of the Year Award.

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Infrared pictures speed troubleshooting

Also, a handy way to obtain a list of Windows updates

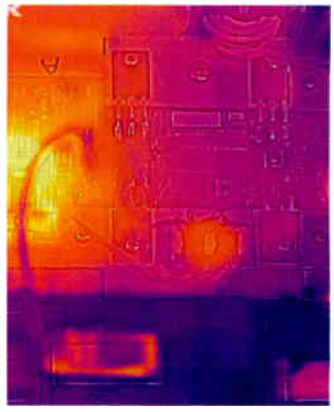
Jim Talbot handles engineering for WSYY(FM) "The Mountain 94.9" in Bangor, Maine. He has a FLIR ONE Pro add-on for his cellphone.

We've written about the benefits of this kind of tool before. Though the model he uses is expensive, it can make troubleshooting easy by identifying hot components quickly.

Jim had an audio board that contained multiples of the same op amp mounted on it. With the FLIR ONE Pro, he identified the bad chip quickly. Jim finds the tool just as helpful for troubleshooting hot spots on electrical panels and RF transmitter components.

Recently, Jim used his smartphone to troubleshoot several Nautel J1000 PA and modulator modules.

Despite seeing a difference in heat from the FETs, he could not feel any difference with his hand. Instead, it was the side-by-side comparison of the FLIR ONE Pro module pictures, shown in the images, that pointed to the trouble.



Be sure to check out the available versions of FLIR thermal cameras to find one that fits your needs and budget.

One feature of the "Pro" version is that you can see the components on the module you are measuring, not just the heat signature image. Where components are packed tightly on a board, this makes identification of the errant component easier.

Above Right
The two orange and purple images allow comparison of bad and good PA modules. Bright FET spots indicate high temperature.

Right
The FLIR One Pro attached at bottom is a pro-grade thermal camera for smartphones.

Stingers that sting

We've received a few comments about Frank Hertel's use of the term "stinger strap" in his EZ Fix for a failed antenna.

Frank says he always heard the term "stinger" used to define the component that carries the RF signal from the central RF feed connection point to the radiating antenna element(s).

> **"The IR add-on for your phone can help you identify bad chips and troubleshoot electrical panels."**

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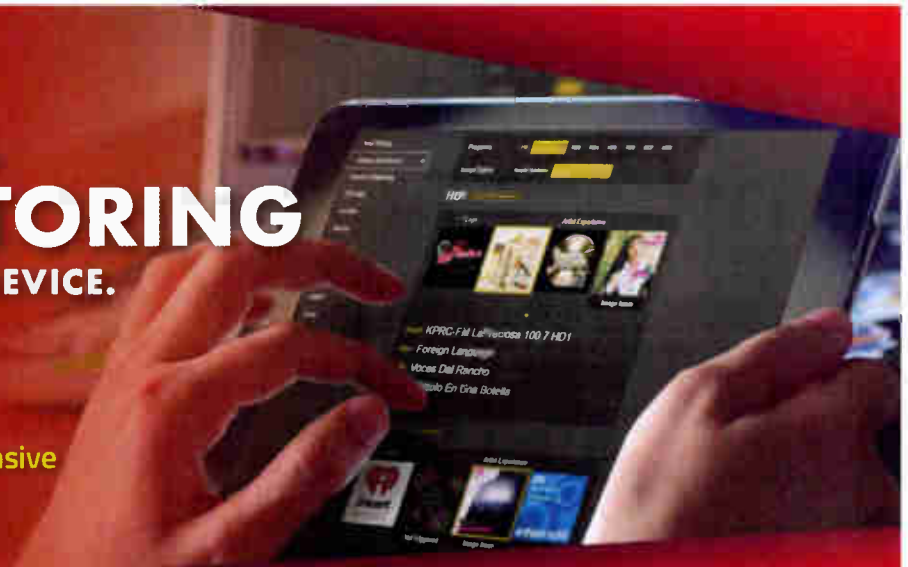

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Right
An emergency AM antenna from The Radio Source.

In AM, the stinger — strap, wire or copper tube — is the conductor that makes the connection between the antenna tuning unit (ATU) and the AM tower. Think of it as "stinging" the tower with RF energy.

In FM, some antennas use a "stinger strap" to connect the RF coax's "feed point stub" to a connection point on the FM antenna elements. In FM, these "stinger straps" are critical in their length, and the position at which they connect to the FM antenna radiating elements. Their connection provides the best 50 Ohm match, at the desired frequency of operation.

If you happen to touch the exposed "stinger" (wire or strap) while it is radiating, you will immediately burn a hole in your fingertip, leaving you feeling like you'd been stung by a nasty bee.

RF burns hurt all the way to the bone, and you'll be left with a white cauterized burned spot on the tip of your finger. There will be no bleeding, just intense pain.

Frank writes from personal experience. He takes the blame for getting burned but adds that he had "trusted" that someone else had turned off the transmitter before he touched the conductor. They had not.

Always use caution around live RF. At the worst it can kill you. At the least you may be reminded of the experience for weeks or months as the burn heals.

Take 555

Frank also shares a YouTube tutorial from the Element 14 online community, in which host Karen explains how the versatile and inexpensive 555 timer IC works. At YouTube, search "How 555 timers work."

Frank adds that Walter Jung published a book, "The IC Timer Cookbook," many years ago. It's still a resource for tinkerers and experienced circuit designers. Search for copies through online used bookstores.

An AM resource

Bill Baker is with Information Station Specialists in Michigan. He has teamed up with Scope+Focus principal Len Watson to provide emergency AM radio components and rentals for temporary applications.

Their website *https://theradiosource.com/products/amready.htm* describes transmitters, antennas, support structures and ground planes. The photo here shows one of their emergency AM antennas. The site also lists a number of AM stations that have employed these solutions successfully.

The company also maintains EventCast rental systems. These are small AM operations that include a transmitter, antenna and audio player to provide temporary broadcasts at events — "rental radio stations, ready to roll." The equipment gives the venue the ability to speak to arriving patrons using TIS rules. Learn more at *https://theradiosource.com/services/eventcast.htm*.

Testing with Ma Bell

I recently encountered some Windows update issues. Coincidentally, Workbench contributor Paul Sagi in Kuala Lumpur sent in the following note: "At a command prompt in Windows, type *systeminfo* followed by Enter. You'll get a list of system information, including Windows updates. Those are file names beginning with KB."

Paul also commented about our column back in March 2021 in which Marc Mann described a "Phone Phreaking Box" built with Radio Shack parts. For Paul the article brought back memories of Ma Bell calling his parents to complain about his "testing" of the phone system. Paul had discovered the phone numbers he could dial to obtain tones that he could use to test his own audio equipment. Very handy before he built his own signal generator!

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Streaming audio loudness guidelines explained

A new AES document recommends procedures suited to fixed and mobile listening

Internet audio streaming and on-demand playback have become ubiquitous, both in consumer media and professional audio applications. Today, it is a $10 billion industry.

Despite this popularity, the effects of excessive loudness or inconsistent loudness between sources continue to detract from the listening experience. This topic was the subject of a presentation at a recent AES seminar by John Kean, former NPR senior technologist, moderated by David Bialik of David K. Bialik & Associates.

It discussed a new AES technical document on loudness guidelines, TD1008. Kean's presentation was followed by a panel discussion among several members of the Drafting Group.

What's LUFS?

To measure and control loudness, engineers speak in terms of LUFS, or Loudness Units relative to Full Scale, as defined by the ITU-R BS.1770-4 Loudness Meter standard.

LUFS relates loudness units to the maximum level that a system can handle, which is always expressed as a negative number, i.e., –18 LUFS. The less negative the number, the higher the average level. An increasing number of pro audio devices and software are equipped with LUFS metering.

Table 1 of the TD1008 recommendations (shown on page 20) covers all audio distributed by streams and podcasts as well as on-demand music services. These include audio content that is either mixed speech and music, or all music, interstitials (e.g., advertisements) and even automated voice announcements. Content where speech is measurable serves as the –18 LUFS anchor, against which music, sound effects, etc. are mixed.

As discussed below, the document recommends that music content be album-normalized, if practical, or track-normalized to no more than –16 LUFS.

To reach the desired loudness, audio content is normalized in a downward direction if the content loudness is above the target loudness, or upward if it

Read the Document

The entire TD1008 document may be read online and downloaded from the AES website (*https://tinyurl.com/rw-loudness*).

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Table 1

Content		Distribution Loudness (LUFS)	Upper Tolerance (LU)	Loudness Measurement Method
Assorted [1]	Speech is measurable [2]	-18	+1	Dialog Integrated Loudness [3]
	Speech is not measurable See Section 5B	-18	+2 format-specific see Table 2	Integrated loudness
Music [4]	Track-normalized [5]	-16	+0.2	Integrated loudness
	Album-loudest track (e.g., on-demand music services, Section 5D)	-14 [6]	+0.2	Integrated loudness
Interstitial [7]		-18	+0.2	Integrated loudness
Virtual Assistant		-18	n/a [8]	Integrated loudness of assistant's voice preceding volume control

"In managing content loudness, distributors need to sensitively balance the requirements of listening environments against the aesthetic quality of their content."

Above
Table 1: Recommendations for loudness of internet audio streaming and on-demand distribution.

is below the target. The loudness of nearly all popular music is high, so only a downward gain is needed, requiring no further processing and effect on dynamics. There may be exceptions with upward normalization, such as content with a large peak-to-loudness ratio. Here, peak limiting may be best, or, if dynamic quality is affected, partial normalization may be necessary.

Music content is normalized for distribution in one of two ways. The first is "album normalization," which preserves the relative loudness between songs on an album. This is preferred because it respects the artist's intent for the way their music should sound. This technique is well-suited to on-demand or continuous music services.

Album normalization first measures the integrated loudness of each track on an album. The loudest track is then set to a loudness of -14 LUFS. The same amount of gain adjustment, up or down, is done to the remaining tracks of the album. The document notes that most popular music albums have loudness variation between songs of 2 to 3 LUFS.

Album normalization may be impractical in a radio-style production where songs are played out sequentially. In these cases, tracks are adjusted individually or "track normalized": Each song or audio element is raised or lowered by different amounts to a similar loudness. However, this alters the artist's intent by making some tracks sound louder or softer than they were intended.

Table 2 in TD1008 (facing page) provides simplified guidance on distribution loudness of track normalized content. News/talk and dramatic content is recommended at -18 LUFS, and popular music (track normalized) is recommended at -16 LUFS, which compensates for how the ITU Loudness Meter responds to voice and music. Mixed-format content and sports are targeted in the middle, at -17 LUFS. (These small differences require long-term measurement for accuracy.)

Distributors need to sensitively balance the requirements of listening environments against the aesthetic quality of their content. While fine arts programming may require reduced Integrated Loudness to help preserve the natural dynamics of a performance, popular music content requires no further processing, other than normalization

Meaningful metadata

Audio metadata that is embedded in the stream will play an increasing role in managing loudness. Development is in progress on the production, distribution and playback device fronts, but may require several more years for full adoption.

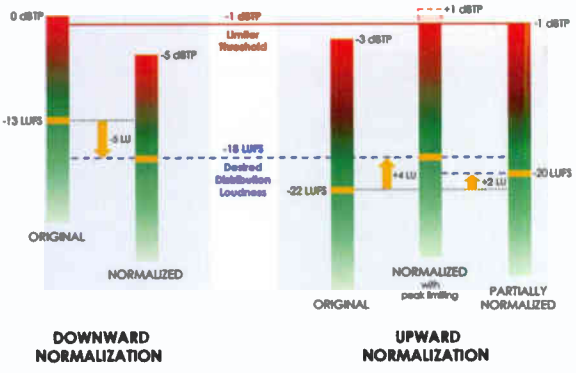
When metadata is used, the original content is distributed to the player non-destructively. Listeners receive the same content, but the players use that metadata to manage the loudness and dynamics of the audio according to the noise environment, capabilities of the playback device and listeners' needs.

Most new mobile devices and HTML5-compatible browsers can use audio metadata. Over time, newer devices with these features will replace legacy devices.

Techniques for audio metadata have been fully established in video services. Within a few years, audio services and devices will adopt this technology and can converge with video standards. Until metadata content is widely available, TD1008 recommends loudness procedures that are well-suited to current fixed and mobile listening.

Why it matters

There are benefits to broadcasters in following the TD1008 guidelines. Listeners will no longer need to readjust the volume from source to source, a long-standing annoyance. The guidelines help to preserve the artistic intent of the content, which may encourage longer listening.



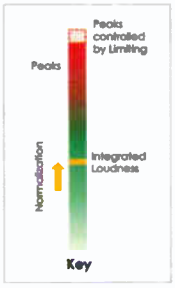


TABLE 2	
Format	Distribution Integrated Loudness
News/Talk	-18 LUFS
Pop music	-16 LUFS
Mixed format	-17 LUFS
Sports	-17 LUFS
Drama	-18 LUFS

Far left
Processes for downward and upward loudness normalization.

Left
Table 2: Examples of applications for radio, podcasting etc.

One question that is being raised is whether –16 or –18 LUFS will be loud enough for listeners. The seminar participants agreed that the AES recommendations consider the many limitations in gain and acoustic output of consumer devices to ensure that most smart speakers, car audio systems and mobile devices will perform well.

Nearly all commercial music content requires no further processing (other than normalization) to meet these guidelines. In high-noise environments headphones are a much better option than trying to raise distribution loudness by excessive audio processing.

Complying with the guidelines is easier than it might first appear; –18 LUFS for speech-oriented programming and –16 LUFS for track-normalized music programming can be achieved with a simple audio processor. For best perceptual balance with mixed content, some radio-style audio processors of high quality are capable of handling the speech and music targets intrinsically (check with your manufacturer, or do your own listening tests).

The AES Technical Committee for Broadcast and Online Delivery is developing a website about audio loudness that will be open to the public. The website will educate and demonstrate loudness techniques for audio distribution and content creation.

Writer
Paul McLane
Editor in Chief

NYPR amps up its dashboard presence

Consistent and reliable visual information is part of its digital strategy

New York Public Radio is building its digital future and working to assure its relevance in connected cars. The multi-prong strategy includes integration of Rapid software from Xperi's All in Media division.

The software allows stations to automatically collect or manually create rich visual content and publish it on digital radio platforms, FM, online and mobile.

NYPR owns two major FM stations in New York. They are news, talk and information flagship station WNYC and classical station WQXR.

"We know how visible and competitive the dashboard is, with rich graphics and data from Apple CarPlay, Android Auto, Sirius XM, TuneIn Radio," Chief Technology Officer Steve Shultis said in late 2021.

"Human nature loves bling, it loves eye candy. So you've got to have a logo, you've got to have depth of metadata to grab the customer and hold them there, just to be able to compete."

The right Humperdinck

AIM and its founder Chris Gould have assisted NYPR to create public-facing metadata and visual displays, integrated with its HD Radio systems and the public radio system MetaPub.

When the work is complete, listeners to the two FM stations who have HD Radios will see album art on the classical music station and other Artist Experience visuals on the news/talk station.

The Rapid software is a sophisticated cloud-based metadata distribution tool that acts as middleware, collecting information from the station website, automation system or third-party provider. There are other middleware systems, but this one has access to an unusual resource

"DTS now owns TiVo and Rapid as well as Xperi," Shultis said. "So once you sign the deal with them, you have access to all that metadata from TiVo, an incredible array of Artist Experience, metadata and album art. For us that is especially desired on the classical side."

Historically, he said, it has been difficult to align album art with classical music content; WQXR experienced match rates as low as 30%. Those problems led the station to turn off its Artist Experience metadata until a better solution could be found.

"There are so many versions of Beethoven's Symphony Number 5. And there's a German classical composer called Engelbert Humperdinck — we knew things were wrong

Above
The WNYC logo on the instrumentation panel of a car with DTS AutoStage.

Right
Steve Shultis

More Info
This story appeared in the Radio World ebook "A Call to Action: Radio's Existential Battle for the Dash."

when the audience was calling us saying, 'Oh, you've got the lounge singer Engelbert Humperdinck performing today.' That was embarrassing. And because we couldn't get the match rate we needed, we pulled the plug."

Shultis expects Rapid will solve such problems.

"It also can be your single source of truth for your metadata, assuring that you're using correct, consistent taxonomy across different areas of the radio station."

Rapid also is a scheduling tool.

"So if at 10 a.m. we air 'The Brian Lehrer Show' and at 12 p.m. we air the show 'All of It,' both of which are live shows, Rapid can hold those schedules and switch the metadata at the appropriate time. The producers can input specific metadata for their show as it's happening or do it prior. And then Rapid can push the metadata to the websites, the transmitter sites and wherever else it's going."

Rapid will also be embedded into an extensive new Digital Asset Management system that will serve the entire NYPR enterprise.

"Among many things, it will provide hierarchical storage management, a fancy term that just means if you haven't touched a digital asset in 30 days or so, it will move it to lower-tier storage that might take a little longer to retrieve, although you will have compressed proxies available immediately" Shultis said.

Above
WNYC's logo on the carousel tuning screen in a car with DTS AutoStage.

This approach will eliminate silos that have developed within the company, with various departments managing assets and metadata differently. The new DAM will also help the organization better manage its massive historical audio archive reaching back 85 years.

"Rapid serves as the cohesive distribution arm of our metadata, so it will hook into this new digital asset management system."

In short, NYPR is moving from numerous back-end systems to fewer — with the focus on a main storage system and a main distribution system — partly in an effort to present a more consistent face to listeners.

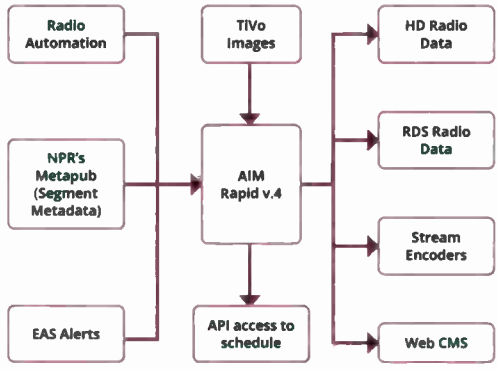
Shultis cites the example of the program "RadioLab." One episode may have four or more versions: the broadcast show, with breaks for underwriting; a podcast with breaks for different underwriting; a "members only" podcast that has no underwriting; and a streamed version. All have slightly different metadata needs.

"When a listener tunes in to a NY Public Radio station, whether it's in the car or on a podcast, the logos will be the

same; and now the metadata will be standardized, with the 'NY Public Radio look and feel.'"

Shultis also is a firm believer in "segment-level" metadata.

"More is better. When a person tunes into the middle of an interview, they say, 'Wow, this is a great interview, but who is it?' So instead of just presenting 'All Things Considered' the display will say something like 'All Things Considered, an interview with Paul McLane.' I would advise any engineer to go as deep as you can. The audience is hungry for that, and that's what our competition is doing."



Above
Conceptual inputs/outputs for Rapid. An iteration of this is used for each station.

Digital marketplace

New York Public Radio also supports DTS AutoStage as part of its digital strategy.

Shultis was drawn to it by its service-following feature, in which a receiver transitions from the OTA signal to the station stream if the vehicle leaves the coverage area.

"We're big on podcasting and streaming. We deliver over a petabyte of data per month of podcasts and streams of our programming. So when I heard about this idea through the NAB and Xperi, I was all over it," he said.

"This is especially important for people in New York City, who may commute an hour and a half by car from the suburbs, which can easily lay outside the coverage area of a metropolitan station. Broadcasters have tried to do this all along with single-frequency networks — to be able to fail over to your next repeater site to keep the listener engaged."

Shultis looks forward to seeing more cars on the road with DTS AutoStage. He is enthused about how WNYC and WQXR metadata show up on its display in a Mercedes S Class, an implementation that includes a useful carousel tuning view and that also presents the station logo to the driver directly behind the steering wheel as well as the center column screen.

Overall, Shultis has been vocal to his station leadership about the importance of managing their visual product.

"I just bought a basic-model Subaru. It's got a beautiful, wide flatscreen with HD Radio in it. Older, analog radio cars are dying away, and the HD Radio marketplace in the New York City DMA now has over 50% penetration of cars, so this is what we're doing to compete in that marketplace."

NAB sees benefits of directional FM modeling

But antenna manufacturer ERI expresses "serious concerns"

Writer
Randy J. Stine

The National Association of Broadcasters appreciates that the Federal Communications Commission wants to allow the use of computer modeling technology to verify performance of FM directional antennas. But NAB recommends that the commission keep in place a number of "guardrails" in the rules.

Meanwhile, antenna manufacturer Electronics Research Inc. says it still has serious concerns about the proposal and worries about possible inaccuracies in computer modeling.

FM radio is the only remaining broadcast service in the United States that requires physical measurements, thereby preventing manufacturers and broadcasters from relying on computer modeling to verify directional antenna problems.

Currently, applications proposing the use of directional FM antenna systems must include a tabulation of the antenna pattern through measurements performed on a test range of full scale or scaled model setup, commonly 4.1:1 or 4.5:1, according to the FCC.

The FCC adopted a Notice for Proposed Rulemaking in November based on a joint petition from antenna manufacturers Dielectric, Jampro Antennas, Radio Frequency Systems and Shively Labs and broadcaster Educational Media Foundation.

"We believe that giving license applicants the option of submitting computer models could provide meaningful relief to many FM broadcasters without jeopardizing technical standards or service to the public," the commission wrote in its notice.

The proposal would relax the requirement for directional FM antennas operated by full-service and low-power FM stations in the United States. The FCC says there are about 900 directional FM stations licensed in the nation.

The most common reason to use a directional antenna by a commercial full-power FM is to allow it to "short-space" to another FM station while maintaining contour protection to that station.

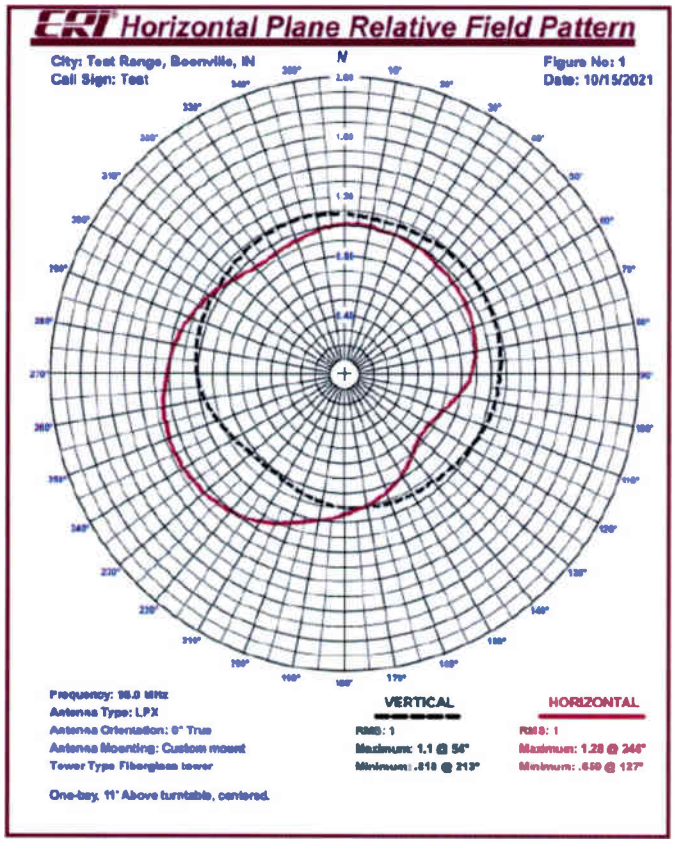
The NAB in general supports the NPRM. It told the FCC that "computational simulation of FM directional antennas is already mature and produce computer modeling can produce comparable accuracy to physical measurements," but still cautioned that "electronic modeling software is complex, can be subject to manipulation and limited by the accuracy and completeness of the input data."

NAB continued: "Computer models can provide meaningful relief to FM broadcasters without substantially jeopardizing technical standards or service to the public. This approach should also lead to lower costs for antenna manufacturers and their broadcaster customers and allow for greater flexibility in transmitter site selection by FM broadcasters as tower space become increasingly precious."

However, the association provided a list of requirements it would like to see maintained or newly, including a statement of the qualifications to the people responsible for the computer modeling and expansion of the rules to include specification of the mechanical and electrical properties of the antenna used in the model.

It also said the FCC should not require "in situ" measurements beyond ensuring the proper installation of the antenna and accept results from any appropriate electromagnetic modeling software. And because absolute accuracy is not achievable, the commission should not try to attain prediction accuracies that do not materially affect the interference environment.

Read more
You can view filed comments about this issue. At *www.fcc.gov/ecfs/search/search-filings*, type "21-422" in the "Specify Proceeding" field.



Above
An image from calibration tests on ERI's far-field full-scale FM antenna test range. ERI said the low level of range error shows that test ranges can be built in a manner that provides measured results as good or better than those from a simulation.

In addition, it asks for limits of 15 dB max/min in the azimuth plane and of 2 dB/10-degree rate of change in the azimuth plane (see sidebar).

To demonstrate the accuracy of computational modeling, Dielectric, one of the original petitioners, submitted to the FCC a set of 53 comparisons of predicted directional antenna patterns derived from computational modeling overlaid with drone measurements of actual television antenna patterns. They were taken from its recent TV repack projects.

Shively Labs reiterated its support of the proposal and said the FCC should adopt a period of discovery and study to determine the best methods and most acceptable way forward while maintaining or improving the accuracy of directional antenna pattern studies.

Guardrail detail

NAB says errors associated with computational modeling are likely to increase with the depth of nulls in an antenna pattern.

The association asked the commission to retain a limitation that directional antennas proposing a maximum-to-minimum radiation in the horizontal (azimuth) plane of more than 15 decibels will not be accepted.

"Most commonly, the purpose of employing a directional antenna by a commercial full-power FM station is to allow that station to short-space to another FM station, while maintaining contour protection to that station. The commission's short-spacing rules provide a lower limit on the distance to which a station may locate with respect to other stations," according to its filing.

NAB believes that the present 15 dB maximum-to-minimum ratio is adequate to allow for alternative transmitter sites within the spacing limits while minimizing the risk of interference.

The association also asks the FCC for a limit of 2 dB/10-degree rate of change in the azimuth plane.

"The pattern comparisons in the record demonstrate that the rate of change of the antenna pattern is critically dependent upon the accuracy of the data used in the model. Small errors in the physical dimensions used in the model can translate into larger errors in predicted antenna gain in a particular direction.

"Therefore, NAB recommends retaining the existing limitation that directional antennas that propose a radiation pattern in the azimuth plane which varies more than 2 decibels per 10 degrees of azimuth will not be accepted or authorized. This requirement helps ensure that modeled patterns will be realized in practice."

ERI's concerns

The majority of filed comments were supportive of the rule updates. But one antenna maker still had pause when considering the proposed changes.

Electronic Research Inc. said its experience has shown that computer models offer a good starting point. "Still, the final design of directional and nondirectional FM and television antennas should be completed and verified with measured azimuth patterns on either an antenna test range or in an anechoic chamber," ERI wrote.

It told worries that the proposed changes would allow computer studies to confirm compliance with no verification that the performance of the computer simulation is accurate and correct.

In addition, the company notes that the FM broadcast band has a history of changes and additions to the types of services authorized, the power levels at which they have been allowed to operate, and the criteria used to site new facilities through modifications to the table of FM allotments.

"The result has been an ever-increasing number of authorized facilities and a continuing impairment of fringe coverage," it said.

WorldCast Has Fresh Take on APTmpX

WorldCast Systems announced new versions of its MPX/composite compression algorithm.

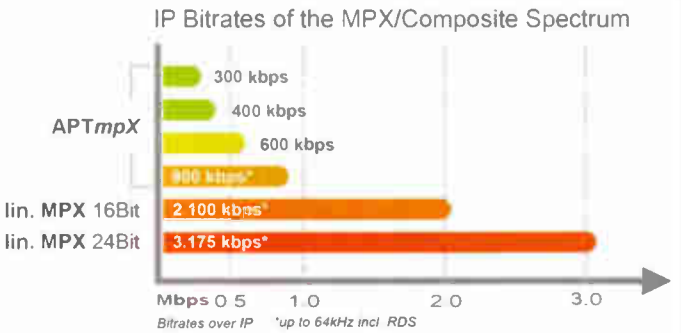
"APTmpX significantly lowers the hardware and distribution costs previously associated with standard FM network architecture," the company said in the announcement.

"Despite the advent of the internet and digital broadcasting standards, FM remains the world's most popular transmission format and a central technology in radio broadcasters' efforts to maximize their reach and audience. As a result, new technologies have had to be created to enable an FM-centric workflow to also work for internet delivery."

It said the initial version, launched in 2020, offered FM broadcasters access to high-quality signal compression for centralized FM MPX/Composite transmission.

"This provided a game-changing solution in the <900 kbps region," it continued. "However, the latest release of APTmpX takes this even further."

Three versions are available that offer levels of compression at 600, 400 or 300 kbps network bandwidth. "This dramatically widens the potential impact of the technology on the industry and means that the composite signal can now directly be transported with non-destructive compression from 600 kbps down to 300 kbps, all at the highest sound quality," it stated.



Gregory Mercier, director of product marketing, was quoted saying the new versions will particularly benefit broadcasters in areas of poor bandwidth penetration.

Info: http://worldcastsystems.com

The ERI filing included details and testing to support its position that the changes would be detrimental to the public and the FM broadcast service, with its history of station growth and increasing congestion.

Comments from Hatfield & Dawson Consulting Engineers, which has extensive experience using electromagnetic modeling software, were supportive of the FCC proposal but asked for clarification of several sections of the NPRM.

"The text of the Notice of Proposed Rulemaking provides a clear description of the method of determining antenna pattern information by use of a test range or of an anechoic chamber," it wrote.

"Some confusion may, however, result from the lack of a careful distinction between such test range or anechoic chamber measurements and measurements made in the far-field from operating antennas. This confusion may arise from the comparisons in the NPRM with the field measurement versus moment method procedure for proof of performance of AM directional antennas."

The FCC in 2008 approved the use of the "method of moments" computer modeling technique to allow AM stations to conduct proofs of performance of directional AM antenna patterns without the use of actual field strength measurements.

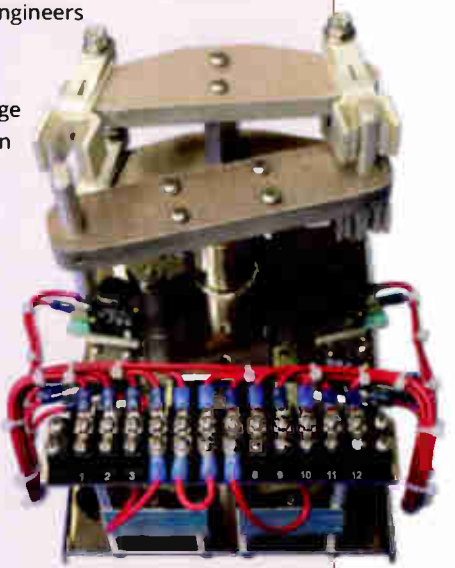
Broadcast engineers familiar with computer modeling say the MoM approach has provided considerable savings in time and money for antenna manufacturers and AM broadcasters.

Now You Can "Shop Kintronic"

Kintronic Labs opened an online store where engineers and other broadcasters can obtain specialized components.

The store can be accessed from the homepage of its website by clicking the Online Store tab on the main menu.

It launched with mica and vacuum capacitors, and is adding other products such as dehydrators, copper strap, RF contactors (shown), lighting chokes and other components.



Shoppers will need to create an account to check out. The company accepts most major credit cards.

"We recommend that resellers continue to purchase from us using the standard purchase order process."

Online purchases are currently limited to the United States.

The company started after founder Louis King in 1949 resigned from RCA, where he was an AM high-power transmitter design engineer, to return to his birthplace of Bristol, Tenn., to pursue his love of RF antennas and components.

Info: http://kintronic.com

BROADCAST EQUIPMENT EXCHANGE

When all else fails

AAron Ontiveroz/The Denver Post via Getty

I was disheartened to read Burt Fisher's disparaging comments on amateur radio in the March 16 Opinion section.

As an active member of the ham radio community and president of my local amateur radio club, I know that hams play an important role in serving their communities. In addition, most hams are dedicated to the craft and continuously seek to improve their knowledge, operating skills and ability to provide emergency communications.

As a prime example, I would point to amateur radio's response to Hurricane Maria, which hit Puerto Rico and destroyed its communication infrastructure.

The American Radio Relay League — the organization that represents hams — asked for volunteers to travel to the island to help get emergency communications up and running. A total of 50 hams were sought, but hundreds volunteered. Within days, amateur radio operators had restored vital communication links, providing an invaluable service in assisting recovery efforts.

In the case of our own club, we have an agreement to provide emergency backup communications for our local sheriff's department in the event its own radio systems fail. We also provide communications support for numerous community events and first-hand information from the field to the National Weather Service during severe storms.

Fisher wrote that hams no longer advance the state of the art of communications. Perhaps he's not aware of the many new technologies that amateur radio embraces, including a host of groundbreaking digital modes that provide reliable communications during marginal conditions.

Regarding his concern that operators don't have generators and backup power sources for use during emergencies, I note that most ham transceivers run on 12 volts and are easily powered by car batteries, even solar arrays. As we like to say: "When all else fails, there's amateur radio."

Finally, his letter raised the issue of today's licensing of operators. As an FCC Volunteer Examiner myself, I can tell you that we "VEs" take our job very seriously and adhere to rigorous rules and regulations when administering licensing exams. While the entry level exam for the Technician license is relatively easy, it also has very limited privileges. It is designed to build interest in amateur radio, with the intent that these operators will seek to upgrade to General and Amateur Extra class licenses, both of which require substantial knowledge of electronics, RF radiation hazards, FCC regulations and more.

No doubt there are hams who fall short of the mark, but I have found the vast majority to be decent, caring people who seek to build upon amateur radio's great heritage.

Bryan Jackson
President
East Greenbush (N.Y.) Amateur Radio Association

Above
From left, John Wells, Larry Olson, Christian Norris and Rob Strieby of the Amateur Radio Emergency Service District 10 man their station at the High Park fire incident command post hosted by the National Guard Armory in Fort Collins, Colo., in 2012.

Necessary and welcome

Yes there are idiots who give the rest of the amateur community a bad name. Many amateurs are taking steps to take these stations off the air.

The FCC has issued monetary forfeitures, such as the $25,000 fine to W6WBJ in 2016, but seem to be powerless to enforce collection of those fines and have these operators removed from the airwaves, as they did with others in the early 1970s.

Closing most of the monitoring stations such as the one outside of Livermore, Calif., certainly doesn't help enforcement ability.

As for wearing vests and interfering with emergency workers, that was a cheap shot hardly worthy of print. As president of the Amateur Radio Club of Alameda, Calif., I

How to submit
Radio World welcomes comment on all relevant topics. Email *radioworld@futurenet.com* with "Letter to the Editor" in the subject field.

can attest to the fact that not only do many of our members conduct emergency net operations nearly every evening of the week, they also work with local CERT teams, providing quality communication. Our assistance has been deemed necessary and welcome by officials in Oakland and Alameda.

Every June amateurs conduct a nationwide exercise known as Field Day, when we encourage amateurs to set up emergency communications under all manner of conditions. We use batteries, solar panels, generators and even hand-crank generators to keep the art of emergency prepared. We operate from mountain tops, schools, abandoned building and even emergency communication vans.

I am a (20-wpm) Amateur Extra class licensee. It was amateur radio that largely kept me off the streets and out of trouble with the police in my high school days. As for radiosport contesting, I contend that properly conducted, radiosport competitions constitute emergency preparedness training and have even written numerous WQ6X Contest Blogs to that effect

There is a new breed of radio amateur youth who are not only taking contest activities to the next level, they are developing new technologies to make things operate more of effectively.

For over 100 years, many things we take for granted in the broadcast industry were spearheaded by the amateur radio community, eventually co-opted by commercial interests.

As for the foxes guarding the henhouse, Volunteer Examiners administer the examinations only because the FCC abdicated its responsibility to do so. To the best of my knowledge, testing done by VECs is just as stringent as the FCC-administrated testing ever was.

Ron Fitch, WQ6X
President
Amateur Radio Club of Alameda

Fertile ground

I read with disdain the inflammatory letter about amateur radio. It contained falsehoods begging to be corrected.

Just because the rest of the amateur radio service is not snapping to and following Burt Fisher's edicts does not entitle him to distort the truth.

First, he should produce the name and callsign of the "five-year-old" who passed any of the amateur radio exams.

Second, he needs to look up the word "frequently." Profanity is likely more common on broadcast radio than on the amateur bands. In fairness, both are plagued by pirates.

The vast majority of amateur radio associations work closely with their local emergency management agencies, state and federal, and are welcomed as important elements of any emergency response.

If you were to ask FCC commissioners about their "successful" programs, the volunteer examination program for amateur radio continues to be one of their best.

I'm surprised that Radio World gave voice to such an extreme position.

I do agree, however, that is unfortunate that the FCC discontinued the First Class Radio Telephone operators permit.

Dolph Santorine, AD0LF

A cherished springboard

I'm chief engineer for a cluster of 24 commercial broadcast radio stations in northeast Pennsylvania and reaching into New York state.

I was licensed in amateur radio in 1974 as a Novice when I was barely out of my teens. I went on to achieve the General and the Amateur Extra Class license. I built my first 75-meter band receiver in 1974 from scratch, following a design in the ARRL Handbook. I etched the circuit board and stuffed it with hand-wound toroid coils and other components.

I made my first Morse Code contact with that receiver, worked an amateur station in Winnipeg, Manitoba. From that humble beginning I went on to build other pieces of ham gear.

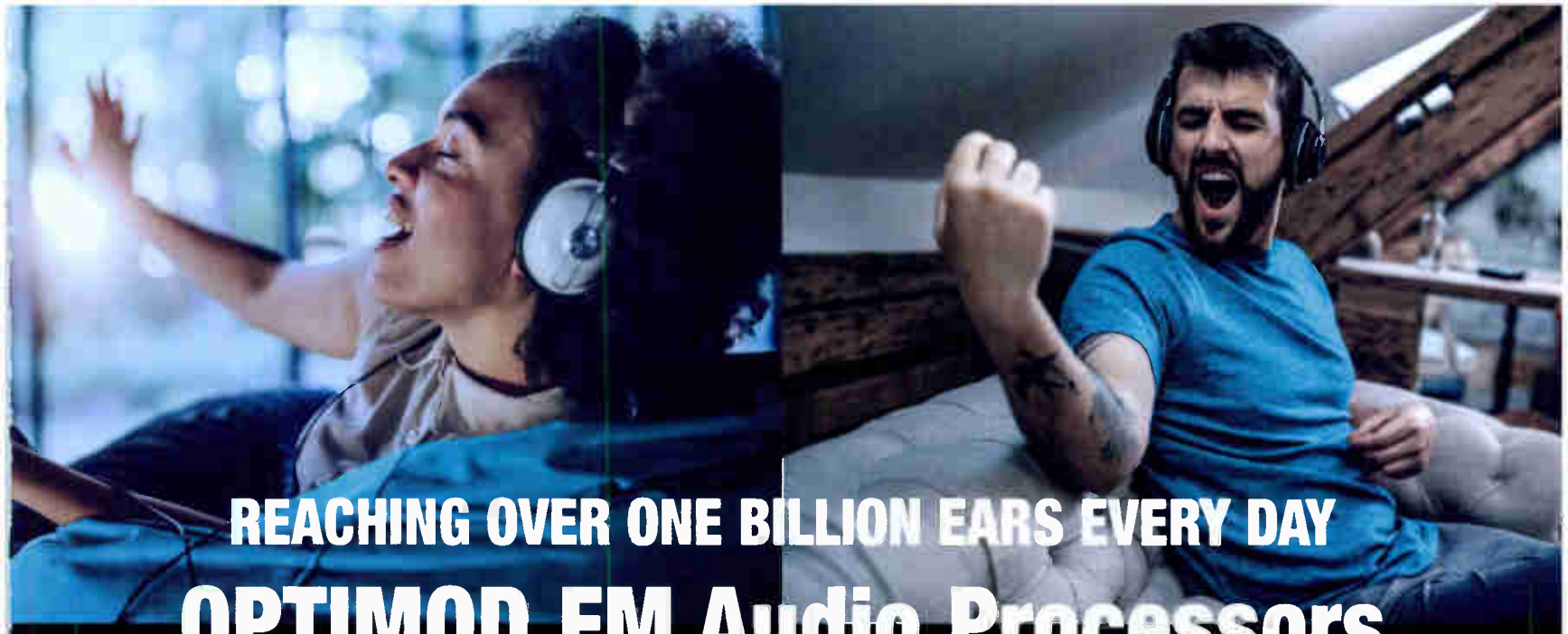
Amateur radio was a springboard to a lifelong career in telecommunications. I went on to achieve the Second Class Radio Telephone License and then on to the First Class Radio Telephone License. Eventually I earned NARTE certification as an EMC Engineer and ran a NVLAP-accredited and FCC-Listed EMC Test Laboratory. When that laboratory closed nearly 20 years ago I started working in broadcast engineering.

Certainly amateur radio has met one of its stated purposes: to encourage the growth of wireless experimentation and self-training. It is unfortunate that the author of the letter seems to be ignorant of the vast amount of educational material published by the Amateur Radio Relay League and the encouragement it provides in experimentation with and use of spectrum-sparing modes of communication. These used by amateur radio operators around the world.

We recently advertised an employment opportunity for an assistant to the chief engineer. The only qualified applicant, whom we ultimately hired, is a licensed amateur radio operator.

Love for the practice and art of radio should be encouraged in every way possible, including amateur radio, for the health of the broadcasting industry.

Craig R. Seelig, WA3ZCR



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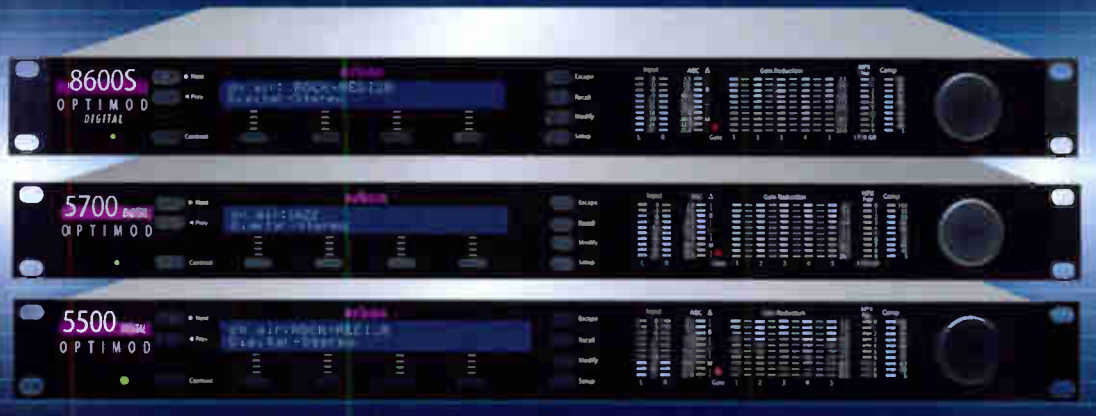

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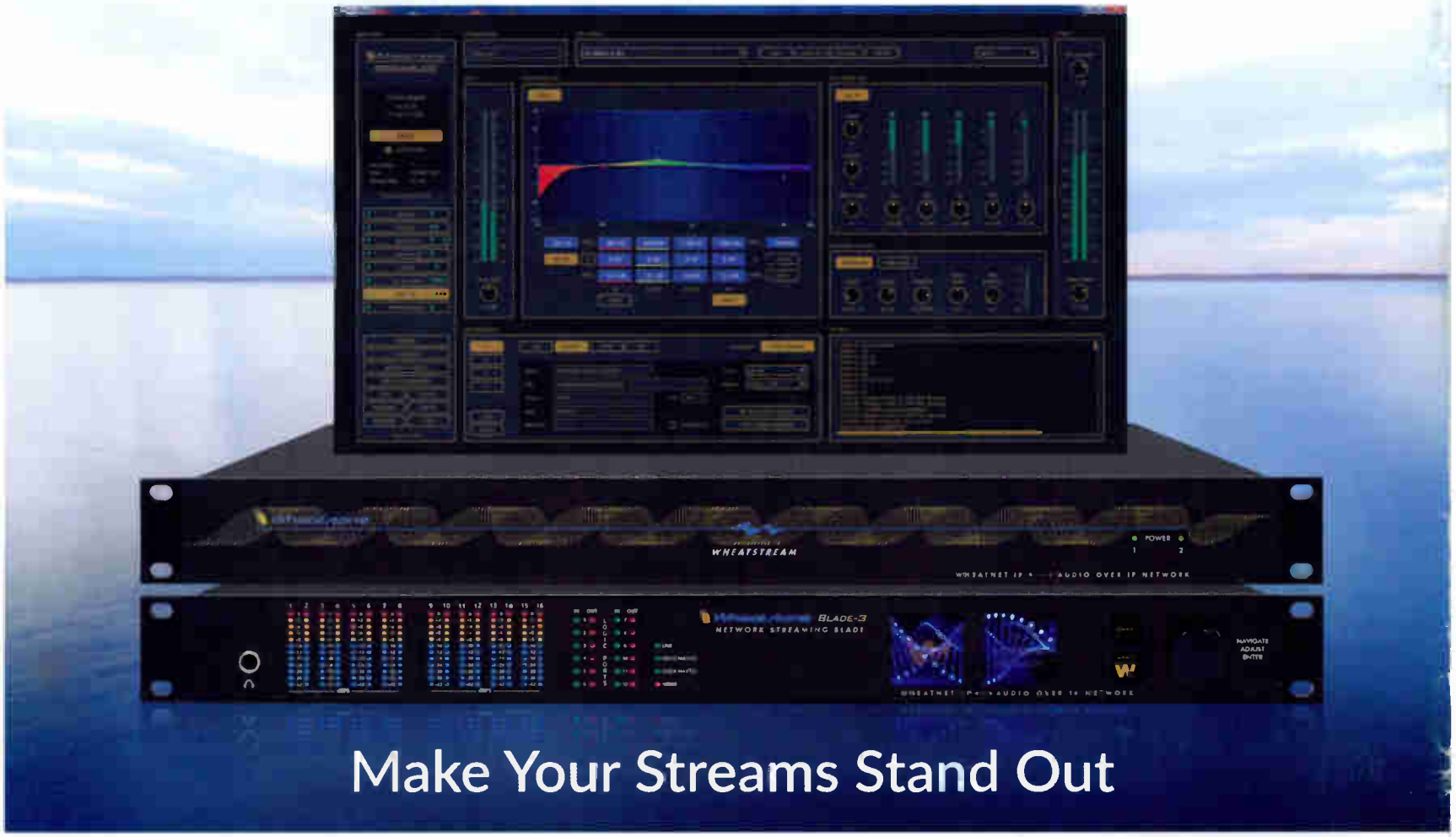

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