



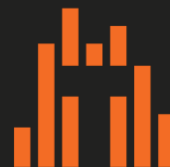
LOVE WHAT YOU HEAR

Sound your best on the digital dash.

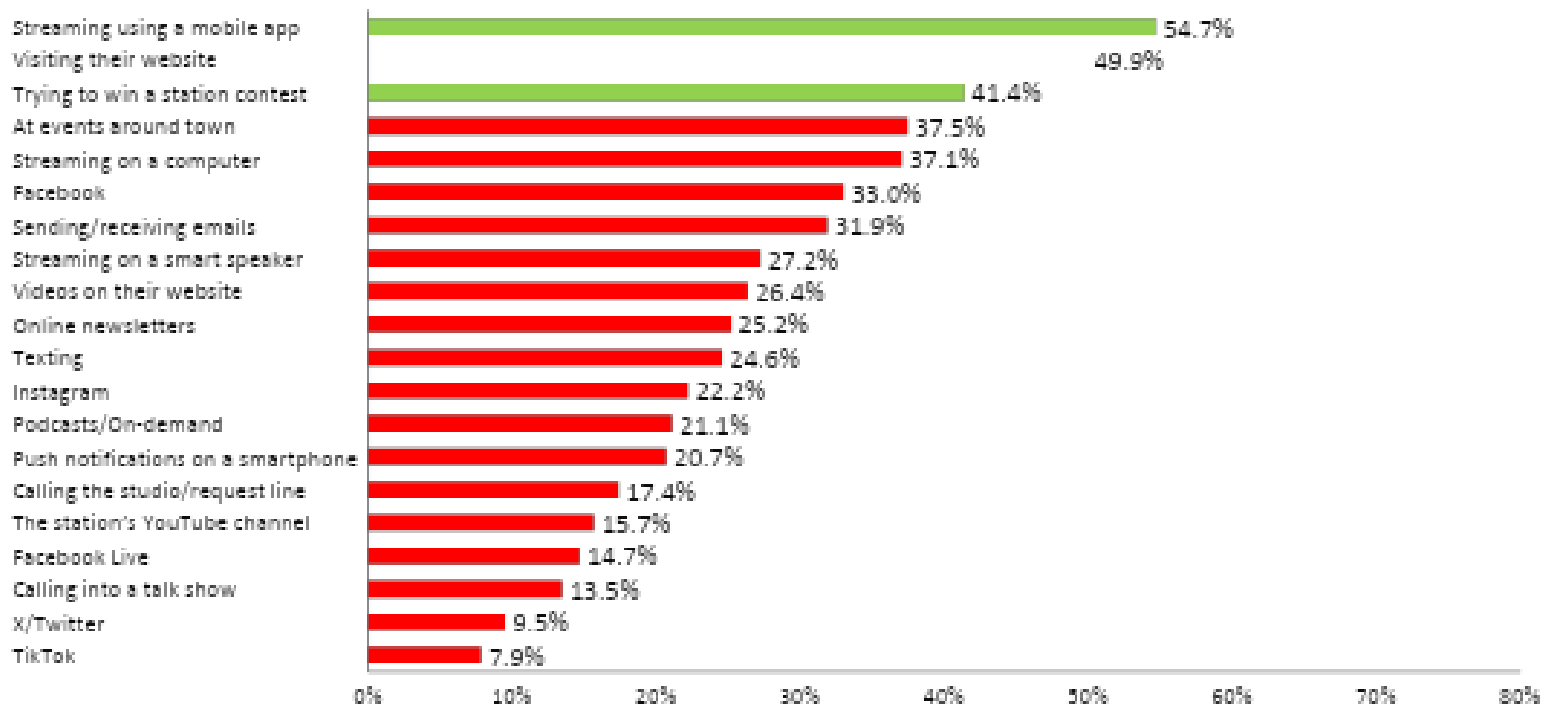
Paul Kriegler Director US Canada Omnia Sales

09/15/26

Wisconsin Broadcasters

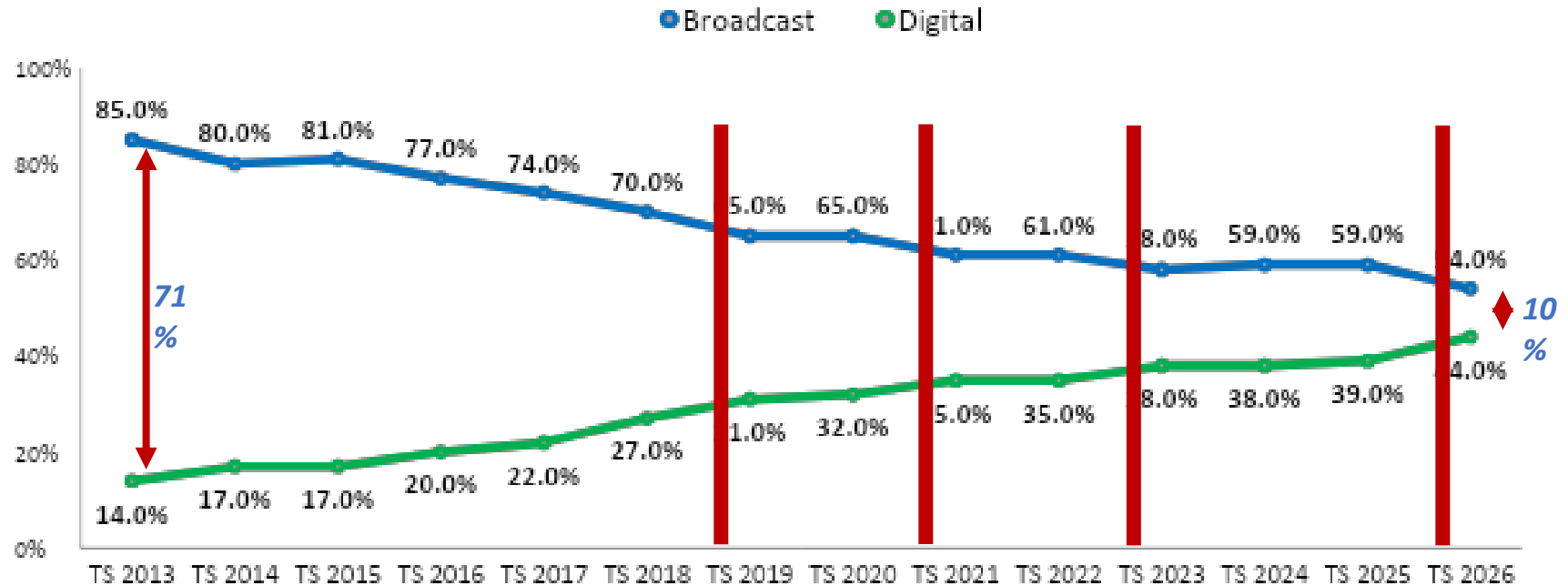


The Most Regular Touchpoints With P1 Stations Occur on the Mobile App, On the Website, and Via Contests



% who “frequently” or “occasionally” access/interact with their P1 station in each way (besides listening on a radio)

P1 Station Listening Platform Trend: Broadcast vs. Digital



% of time spent with P1 station in a typical week via
broadcast platforms (an AM/FM radio at home/school/work or in a vehicle)
vs. digital platforms (computer, mobile, smart speaker, podcasts, smart TV)



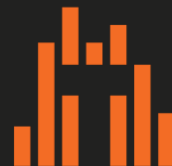
Jacobs
media strategies

“

Radio is widely available in new vehicles, but it's not as easy to find or use. Stations that prioritize on-screen content, quality streams, mobile apps, and HD Radio can improve discoverability and compete more effectively on today's dashboard.

”

— Fred Jacobs, President, Jacobs Media



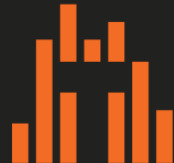
Broadband and your station met on the dash...



“DTS AutoStage, combines broadcast radio, streaming audio and metadata and combines it into a sleek dashboard experience: , has been deployed by five car manufacturers with eight more expected to adopt it in the next 12 months. “

In 2026, 10 million cars have this on their dashboard, especially in the luxury car and SUV markets \$65,000 +.

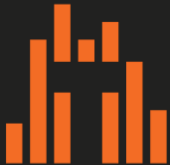
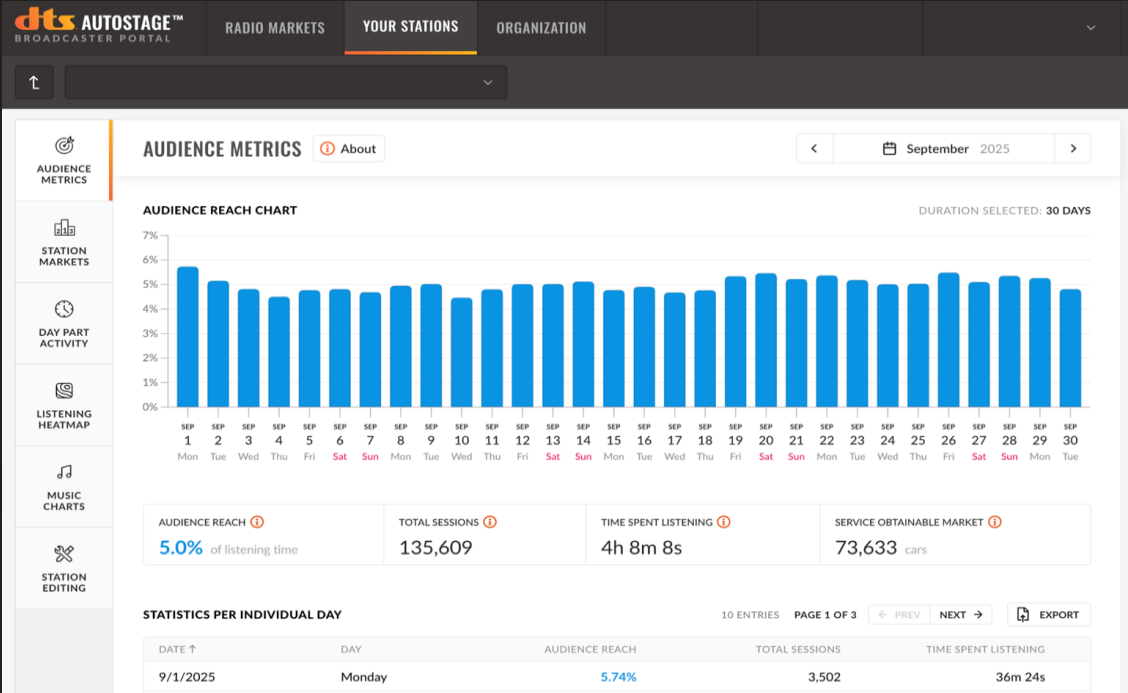
Makes radio perform like any pureplay platform on the dash - AND seamlessly sync levels and failover to a station's stream when signal becomes weak.



11/1/25

DTS Autostage announced a new suite called the “DTS Autostage Broadcasters Portal.

“Broadcasters will be able to track audience shifts next day, with trend reports available by days, weeks, months and quarters, as well as hour-by-hour for selected days. Listening metrics include time spent listening, share, occasions, and cume.”



WADO-AM	Regional Mexican	Univision Radio	0.1	0.1	0.1	N/A
WFAN-FM-STR	Sports	Audacy	0.9	0.8	N/A	N/A
WINS-FM-STR	News	Audacy	0.6	1.0	N/A	N/A
WMTR-AM	Oldies	Beasley Media	N/A	0.1	0.1	N/A
WNEW-FM-HD2	Other	Audacy	N/A	N/A	0.1	N/A
WNYE-FM	Public Radio	New York City Dept. of Info Technology &	0.1	0.1	N/A	N/A

In New York 1.0 share AQH Share 6+ is worth between 2-3 Million.
-NY Interconnect 2020



But wait, there's more....

- **Gracenote (owned by Nielsen) controls your station logos on a number of dashboards.**
- **RadioDNS...on BMW Porsche and Audi dashboards. Syncs metadata, your stream and shows your station logo.**



What we are going to talk about:



Normalize Normalize Normalize! Automation and your stream!



Give the radio what it is expecting.



Stop overmodulating.

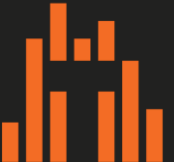


Processing: What settings work best?



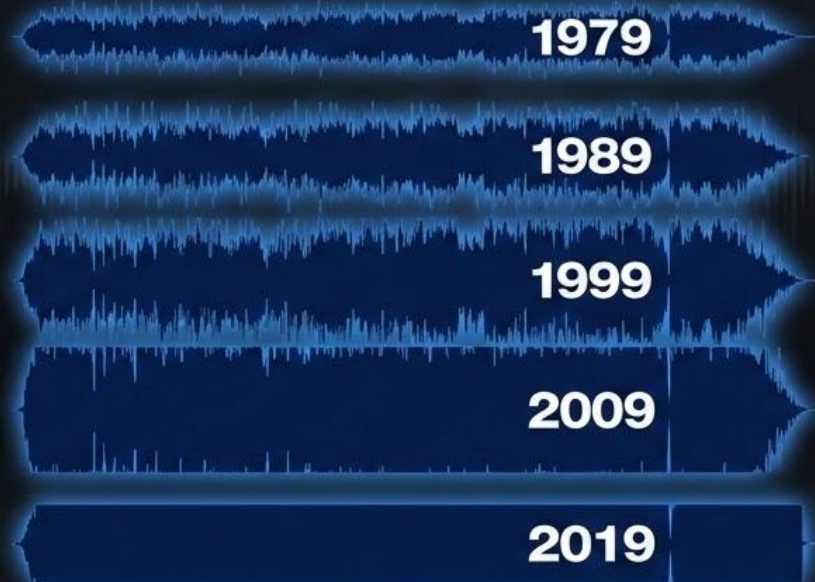
**We're down to apps on the
dashboard?**

Now what?



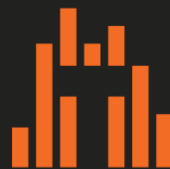
THE RECORD INDUSTRY LOUDNESS WARS

In 2020, the Journal of General Internal Medicine published a paper suggesting that increasing loudness of music may be a risk factor in hearing loss. Over **1 Million songs** were analyzed. Popular recorded music **increased 1.2db every decade** - on average. Some songs today are at **-3 LUFS!!!**



NORMALIZATION ADDRESSES THIS

- **Purpose:** The main goal is to normalize your library and set a loudness target (check default settings -16 LUFS is a good place for starters). Life suddenly becomes easier for your audio processing downstream.
- **Method:** Can be automated by most all automation systems, or software can handle this prior to ingest. Audio is preserved - only a gain change. Often the change is **ONLY** to the metadata of the audio file itself. (depending on the system)
- **Application:** Essential step to ensure good quality audio, and consistent levels - replaces producers and board operators that are no longer “watching their levels.” (goes hand in hand with replacing codecs, mp3’s in your library)

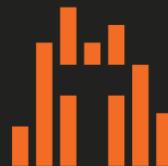


STREAM NORMALIZATION

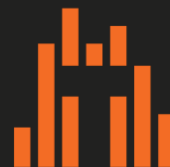
LUFS, or Loudness Units Relative to Full Scale. The best way to measure loudness in the modern media world: TV, Radio Podcast, Streaming, HD, etc.

**LOUDNESS TARGETS FOR
STREAMING PLATFORMS CHART**

Platform	Peak	Loudness	Dynamic Range
Spotify	-1.0 dBTP	-14 LUFS	>9DR
Apple Music	-1.0 dBTP	-16 LUFS (± 1.0 LU)	>9DR
Apple Podcast	-1.0 dBTP	-16 LUFS (± 1.0 LU)	>9DR
Amazon Music	-2.0 dBTP	-9 to -13 LUFS	>9DR
Spotify Loud	-2.0 dBTP	-11 LUFS	>9DR
YouTube	-1.0 dBTP	-13 to -15 LUFS	>9DR
Deezer	-1.0 dBTP	-14 to -16 LUFS	>9DR
CD	-0.1 dBTP	> -9 LUFS	>9DR
Club Play	-0.1 dBTP	-6 to -9 LUFS	>8DR
SoundCloud	-1.0 dBTP	-8 to -13 LUFS	>9DR



LOUDNESS TARGETING QUALITY



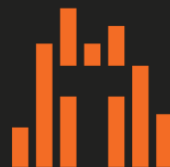
LOUDNESS TARGETING

Improved Sound Quality: Codecs perform better at lower loudness levels. Less distortion - cleaner sound.

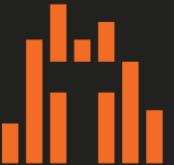
Consistent Listening Experience: Ensures a uniform audio level across different programs and advertisements and assures that today's digital dashboard has a proper level to work with - when switching from FM/HD to your stream. Listeners listen longer to content that is comfortable and enjoyable to listen to, free from abrupt volume changes.

Compliance with Industry Standards like SB576. Youtube Spotify Pandora all use loudness targeting. In parts of the world, it's the law. CALM act for TV, etc.

Ensures best quality on the DASHBOARD.....

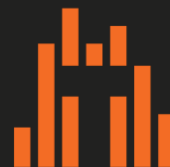


WHAT HURTS YOU ON THE DIGITAL DASHBOARD (IN 2026)



TRANSCODING (OF ANY TYPE)
**MP3 (256KBPS) TO WAV FILE>LOSSY STL OR IP-"CODEC
BOX">SATELLITE: 192 STEREO AAC**

NOT GIVING THE RADIO WHAT IT IS EXPECTING:
**RUN DUAL SIDEBAND STEREO OR MONO, PROPERLY
MODULATED.....**



OVERMODULATION



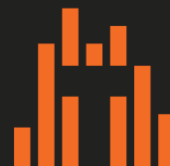
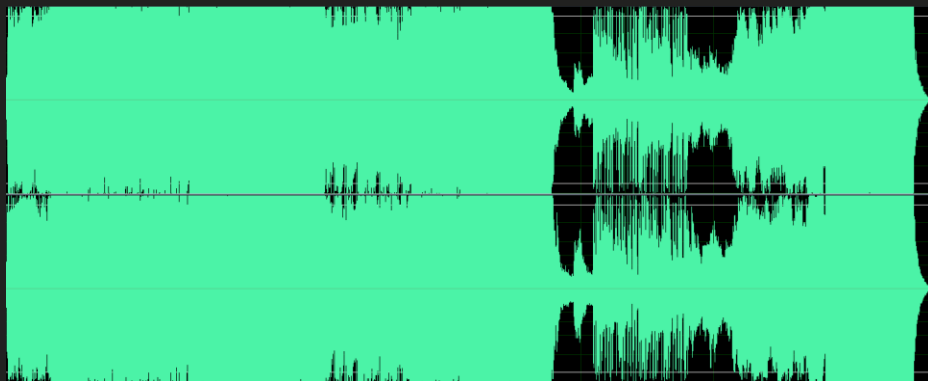
- » Most dashboard FM chipsets and software will clip and overload at 110-115% (software-based). Remember: the 'radio' is often just an FM chip in the car.
- » The “Cabin Experience”-software will reduce your over-load, over-modulated signal to match the last station *or stream* level. Being the loudest thing on the dash is counter-intuitive.



PD: MAKE IT LOUDER!!!

Be careful comparing FM broadcast loudness against other stations in the market
- make sure you do it with a radio that doesn't use DTS. Tail-chasing possibility!

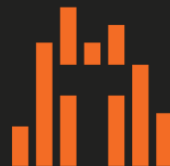
The loudness wars aren't ending, just changing. It's STILL a processing war. The war is to sound good, transparent, clean, use good engineering practice, fewer codecs, clean source material.



WHAT'S THIS ALL ABOUT?

Preventing tuneouts.

Time Spent Listening



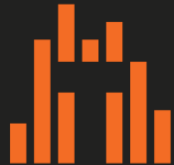
“Behind the Sound - Audio Processing and the Subtleties of Listener Retention”

-Frank Foti 6/5/26

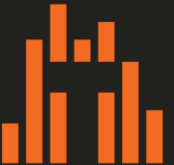


Two processing uglies: THD and IMD

(THD) is typically the sound one hears where the audio appears “broken”. In an audio processor, THD is affected by the level of clipping which is employed for competitive loudness. Too much clipping may help burn a hole in the dial, but the quality will usually suffer.



(IMD) is created when a dominant portion of the audio spectrum affects another portion of the spectrum. A simple example of this is the basic audio compressor. When set to very fast attack and release rates, the compressor will modulate the resulting audio to the point where it sounds busy. Because the compressor is operating at or near the frequency of the audio, and it is adjusting so fast - the listener's ear *perceives it as an annoyance.*



IMD: A Short Tutorial

Unlike Total Harmonic Distortion (THD) which can be tested with a single frequency, IMD requires two or more frequencies occurring simultaneously. Figure 1 shows three signals in the frequency (spectrum analyzer) domain.

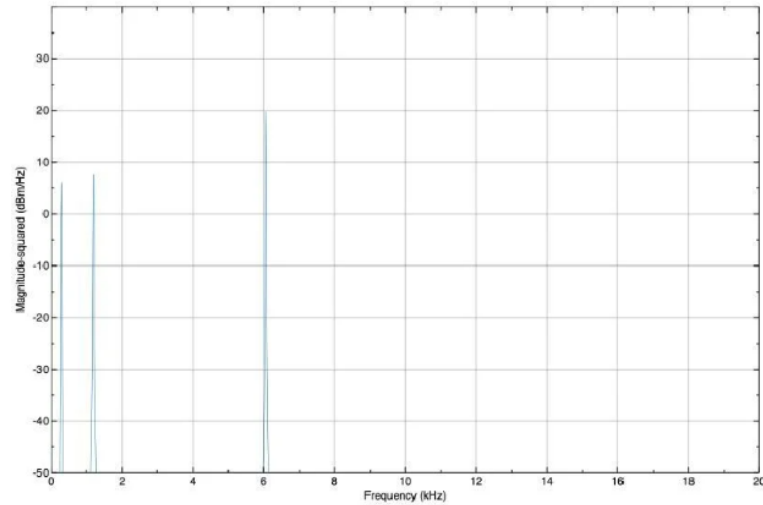
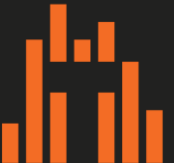


Figure 1. Fundamental Frequencies: 300 Hz, 1200 Hz, 6000 Hz.



Clipper-induced IMD →

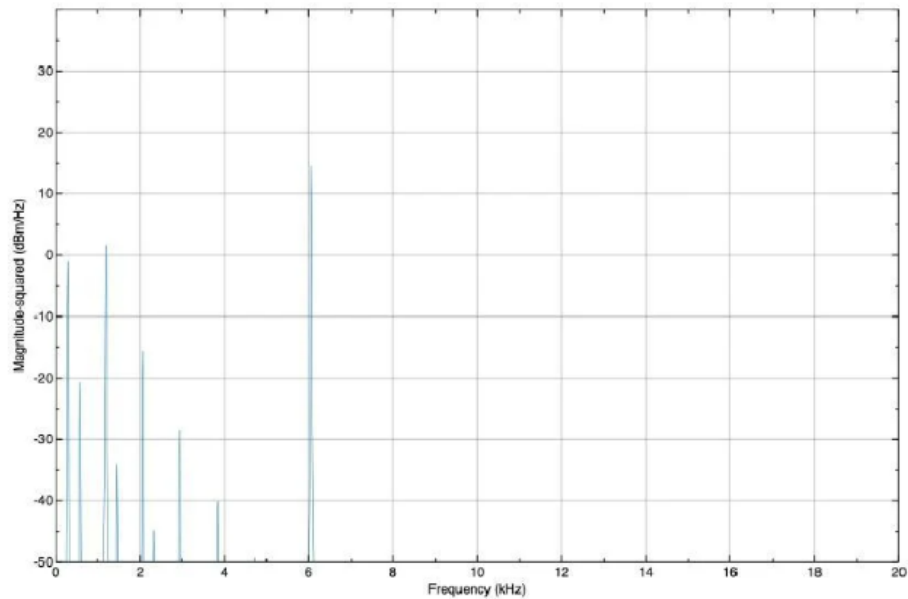
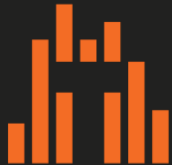


Figure 2.



FFT clipper advancement: Managing the Spectrum

The Fast Fourier Transform (FFT) enables precise frequency spectrum management by processing audio within specific "bins." These bins, defined by powers of two (e.g., 1024 bins, or 2^{10}), allow the system to analyze and control audio information in the frequency domain with high granularity. BUT... transparent audio transients will suffer. Low THD but still some IMD smearing.



A NEW APPROACH TO REDUCE CLIPPER-INDUCED DISTORTION

After considering the main benefit of the FFT, Frank Foti created a new approach devised in the time domain. This replicating the benefits of FFT filtering. It employs new elements to suppress clipper-induced distortion, resulting in excellent THD and IMD suppression, and preservation of transparency.

(Clemenza)

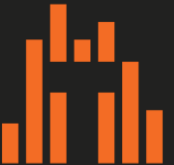


Figure 3 shows the result of a new clipper system that employs advanced THD control. Note that the upper harmonics are gone, but the IMD remains in the lower spectra.

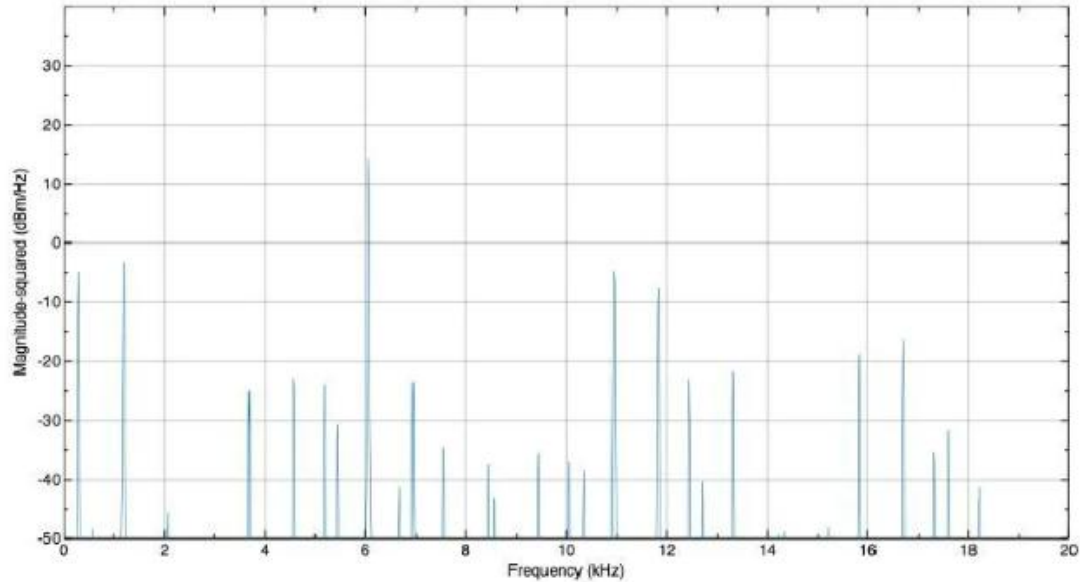
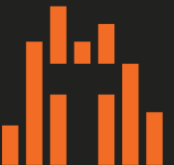
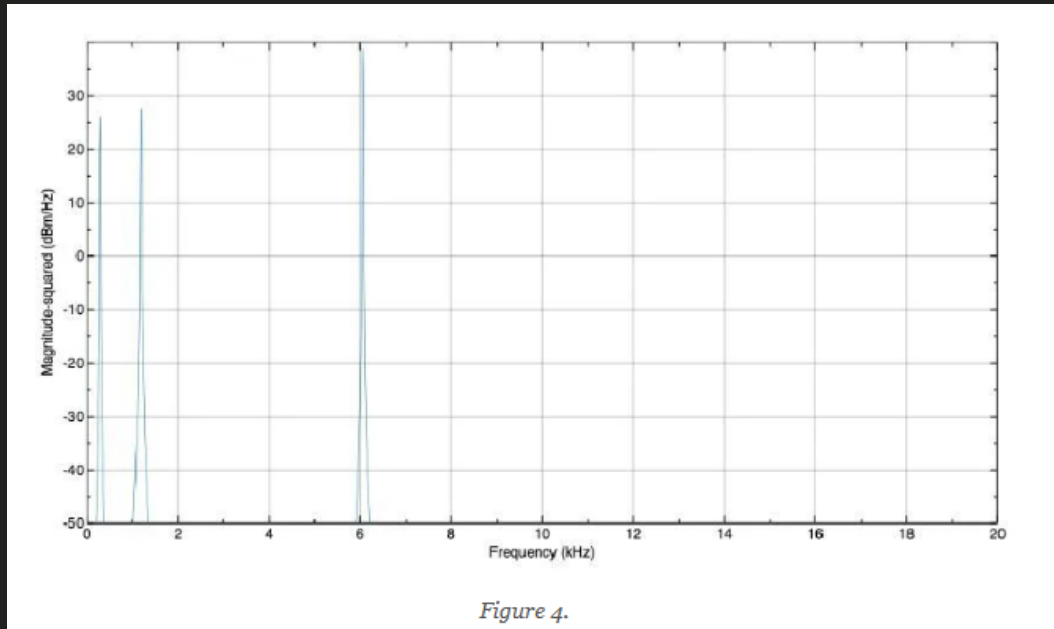


Figure 3.

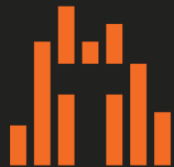


The removal of spectral clutter allows the brain to relax, even with competitively generated signals from the final limiting system, below in Fig. 4.



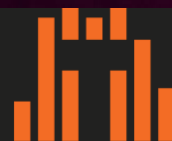
Frank Foti:

“The recently-introduced Omnia.XII FM/HD audio processor employs this new clipper, along with brand-new algorithms in the dynamics (compressor and limiter) sections, which monitor and reduce distortion. The end result delivers high quality, competitive loudness, without sonic annoyances that other systems create, while raising the bar for improving listener retention and increasing TSL. You’ll hear the difference, and your listeners will too.

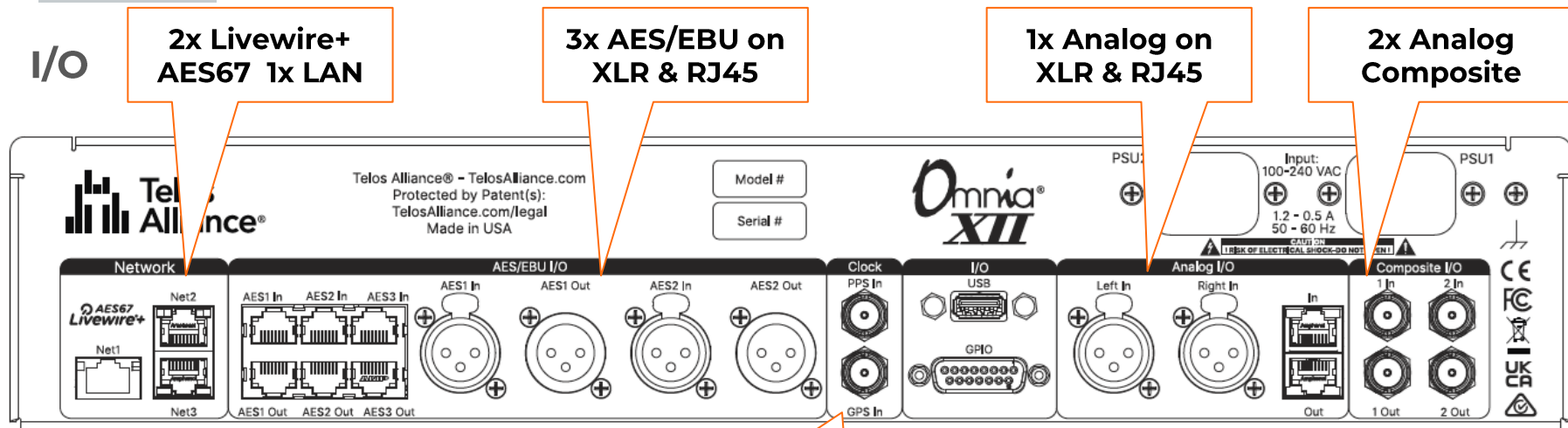




Meet Omnia XII

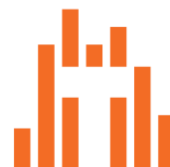


Omnia XII Rearview



Omnia®
XII

PPS or 10 MHz External
Clocking Capability



Options:

- FM/HD-1 standard
- HD-2 and HD-3 optional (v1.5)
- Z/IPStream streaming processing and encoding (v1.5)
- Comprehensive dynamic RDS standard
- Advanced RDS with UECP optional
- Optional Nielsen, Kantar, or Ipsos integrated watermark software
- Insertion point for external Nielsen encoder
- Linear MPX over IP standard, uMPX additional



Options:

- Nielsen, Kantar, or Ipsos Watermark Encoding
- Advanced RDS License (UECP)
- Stream receiver supports Super Hi-Fi HLS+ with up to 24 hours of backup playout including metadata routing to RDS
- Declipping(v1.2)



**Units shipping from Cleveland. Demos available
through me, and all US dealers.**

Paul Kriegler
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