



CineSoundPro



# LOUDNESS

With the enactment of the CALM Act, maintaining proper volume levels has become a serious issue for distributors and potentially content creators, as well

**BY DAVID WILLIS**

**At the start** of the new millennium, the term “loudness wars” was coined to address the habit of sound engineers and content producers who had begun to crank up the volume of content to its maximum output in order to reach full impact regardless of tone, fidelity and even context. Despite a clear loss of fidelity, the human ear naturally picks out the loudest noises just as the brightest colors attract the attention of the eye, so sound engineers have been aware that pumping up the volume results in more attention from the listener. Certainly, it’s easy to argue that the most volume will attract the most attention, but that can come at a cost as audio consumers scramble to change the audio level of their television set every time a program is interrupted by a commercial.

The “loudness wars” problem was so prevalent that in 2008 the Commercial Advertisement Loudness Mitigation Act (CALM) was introduced to give the FCC power to keep the audio from commercials from overriding the volume of the accompanying broadcast. In a nutshell, the problem is that content with a narrow dynamic range—for example, commercials and even a lot of pop music—were being enhanced through the systemic pushing up of the volume level, which definitely boosts loudness, only without

regard for resulting distortion. The goal was simply to increase apparent loudness as much as possible.

“That means that in the music industry during the last 15 or 20 years, most of the music that has been mastered has basically more or less been destroyed at the source because the mastering engineer has been more interested in bumping up the loudness than making the best possible sound,” explains Thomas Lund of TC Electronic, who has been lobbying for an international loudness limit for many years now. “So we actually have some of our music heritage that has been sort of destroyed because you can’t go back and find nonprocessed tapes or recordings anymore.”

For these reasons and others, the International Telecommunications Union wanted to address the situation by looking for open loudness standards that could be utilized internationally. They asked a number of professional audio companies to develop and submit a set of loudness models for comparison, resulting in the adoption of BS.1770. The BS.1770 loudness model—“algorithms to measure audio program loudness and true-peak audio level”—was developed as an open-source model without patents, which created an even playing field for audio engineers. BS.1770 is now in its third iteration as BS.1770-3, and it has been deployed in broadcast organizations throughout the world. There have been competing models, as well, like loudness models that emphasize speech over non-speech, for example, but the proprietary concerns and relative simplicity of the BS.1770 model have kept it in the forefront as technologies change.

Lund continues, “Our concept is that if we have a transparency all the way from production over ingest and broadcast, then you can use less and less transmission processing. The ideal situation would be that production engineers design precisely what the consumer or

home listener hears, but if we have different elements of the downstream signal path, where we don’t observe the same international standards, this becomes impossible. Because if you measure it one way in one part of the chain, and a different way in a different part of the chain, then you can easily counteract what was done upstream, or you start having an unbalanced system where you correct something that shouldn’t be corrected, and vice versa. If we use the same measurement all throughout the chain, then it’s a transparent pathway, even from logging all the way back to the production. So if you know that a particular news program, for instance, is systematically too loud or too soft or too dynamic so there’s too much difference between loud and soft, then you can go back to the content creators and say, Hey, guys! Try to bump up the level of bass, or turn it down, or whatever they need to do to be a little more in line with what the end user wants to hear.”

Several companies have recently introduced powerful hardware and software solutions that help distributors adhere to the CALM Act while also maintaining the proper dynamic range of programming and advertising content.

Lund’s TC Electronic offers several metering solutions, as do Sony and many more, like iZotope’s Insight metering suite. “Basically, in response to all the growing buzz with the loudness standards that are being enacted around the world,” explains Brett Bunting from iZotope, “the idea was to create one tool that would offer all the necessary metering tools that you would need in one package to prepare a program for broadcast. Insight is a comprehensive audio metering suite, mainly relevant to post-production and broadcast applications, and basically the tools that it offers are loudness measurement, as well as loudness over time, as well as true peak

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measurements, stereo and sound field measurements, and then some spectral tools like a spectra-analyzer and a spectrogram."

Ultimately, to conform to the CALM Act, as well as the BS.1770 model, there's a concept known as the target level. In most of the world, the target level is -24 dB, with a plus or minus tolerance decibel level of two.

"There's a +/-2 dB tolerance, and if

you follow that guideline in production and have what's called a program loudness optimized at -24, then you can be sure that no downstream processing will affect your program, or at least that's how it should ideally work," says Lund.

The principal benefit to a reasonable target level like -24 dB is that dynamic soundtracks with action films, for instance, or music with a large dynamic range of highs and lows can be accommodated for. For example, feature films like *The Dark Knight* or *The Matrix* can

be set at the target level without any dynamics processing at all, and hence, no introduced compression or distortion. In the past, the entire audio track to a film could be squeezed at a late stage in order to render at the appropriate loudness, only to find itself flat and lifeless as a result. The concept of using target loudness is that you can compare two versions of your project at equal loudness—one that's heavily compressed and one that's relatively uncompressed, but with a lot of transients—then you can listen and objectively determine which is better. And then you can create your final output accordingly, knowing that it adheres to a standard such that it won't get mashed somewhere during distribution.

While the CALM Act is primarily aimed at television broadcasters, there are implications for all manner of content producers. As the world moves away from the traditional model of broadcast and cable TV appointment viewing to watching programming on mobile devices, the very nature of program distribution is fundamentally changing.

Says Lund, "Personally, my main objective is actually to try to stem the loudness wars, and this is one way of doing it. If the guys producing commercials or feature films or music find out that it doesn't really matter how much they push the production—because the more they push it, it will just be turned down even more later on, but the distortion will remain—then they end up having something that's more distorted at the same loudness as everything else. That's a bad trade-off. If we have this normalization in broadcast, it's a way of making sure that programs are measured based on loudness rather than on peak level. If you have that normalization—hopefully, Apple will make a default in iTunes; they already have a system that can do some of this, and Apple has been very up front with this and has had a very audio-friendly attitude—then we have it in broadcast, and maybe it will be implemented with some of the streaming services, as well. Then suddenly all of the reasons for pushing commercials, pushing music, pushing feature films vanishes, and we hopefully can get better audio at the end."

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