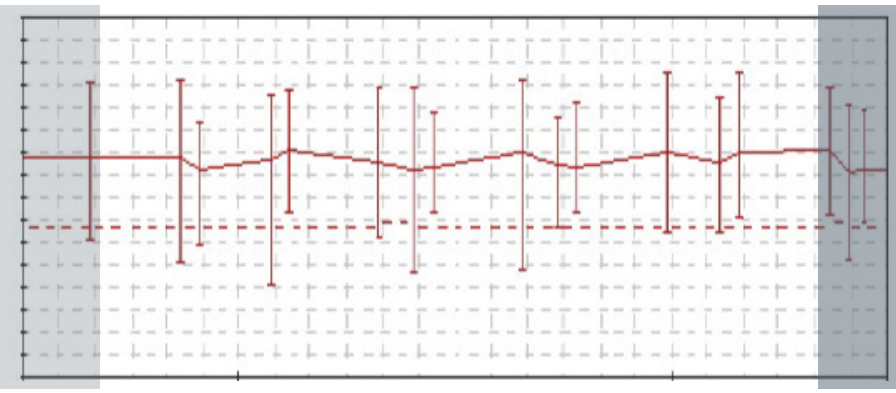

The Storm Before the CALM: Quieting Loud Commercials in the Cable Environment

Application Note

Introduction

The Commercial Advertisement Loudness Mitigation (CALM) Act was signed into law on December 15, 2010, authorizing the Federal Communications Commission (FCC) to regulate the volume of TV spots for the first time, including punishing those who make or run commercials that exceed the new loudness standards.

Under the new law, U.S. broadcasters, content providers, advertisers, cable operators, satellite TV providers, IPTV providers and other "multichannel video program distributors" (MPVD) as the FCC describes them, must all strive to tone down annoyingly loud commercials so that a consistent audio loudness is maintained from program to interstitial material. Failure to comply with the CALM Act could result in potentially significant fines.

By no later than December 15, 2011, the FCC must adopt rule for the law's enforcement and cable operators will have one year from this date (December 15, 2012) in which to come into compliance with the CALM Act[1]. However, operators can petition for a one-year extension if they can show a "financial hardship." This extension can be increased up to two years if operators can again show that they need additional time.[2]

In particular, the burden of complying with the CALM Act will fall most heavily on the shoulders of cable operators. Unlike TV broadcasters, cable operators will have to monitor the volume of commercials on a large number of channels. They will also have to show that they have taken concrete steps to identify the offending spots, measure their sound levels and turn down the volume on them.

This will be a daunting task as most cable operators do not currently have an easy way to identify all of the national and local commercials they run on their systems, let alone identify, measure, log and isolate the loudest ones.

Tektronix®

CALM Act Overview

The law mandates that the FCC adopt the Advanced Television Systems Committee's (ATSC) recent audio loudness recommendations for digital television, effectively turning the standards-making engineering group into a quasi-regulatory authority. Citing these standards, known as A/85 Recommended Procedure ("ATSC A/85 RP"), the law then directs the FCC to enforce the standards and establish the procedures for assessing fines for violations.

ATSC A/85 RP and ITU-R BS.1770: What They Are and How They Work

Both ATSC A/85 RP and the ITU-R BS.1770 measurement algorithm play central roles in the FCC's enforcement of the CALM Act; therefore, it is vital that cable operators understand them both and their roles in complying with the CALM Act.

The FCC said it best in a recent public document stating, "Congress' directive to us in the CALM Act is clear: incorporate by reference into our rules and make mandatory the ATSC A/85 RP to prevent TV broadcast stations, cable and DBS operators, and other MVPDs from transmitting "loud commercials" to consumers."[3]

ATSC A/85 RP was published in November 2009 to provide guidance to the TV industry – from content creators to distributors to consumers – about digital television audio loudness management. It was amended in May 2011 with the addition of Annex J, which regards "the courses of action necessary to perform effective loudness control of digital television commercial advertising[4]." Specifically, it provides guidance to cable and DBS operators and other MVPDs when they transmit digital programming content, including commercial advertisements, to consumers.

More importantly, the ATSC A/85 RP has adopted the International Telecommunication Union Radiocommunication Sector ("ITU-R") Recommendation BS.1770 measurement algorithm as its loudness measurement standard and sets forth various techniques for MVPDs to control the loudness of digital programs.

ITU-R BS.1770 provides a numerical value indicating the perceived loudness of the content. This numerical value is then encoded into the audio content by the content provider, broadcast station or MVPD as a metadata parameter called "dialnorm." The programming – along with the dialnorm – is then delivered to the consumer and the AC-3 audio decoder in the consumer's home receiver will automatically adjust the volume based on the dialnorm value to eliminate spikes in loudness at these transitions.

However, as straightforward as this approach appears, avoiding excessive loudness variations during content transitions on a channel (i.e., when an ad runs) or when changing channels, requires that the dialnorm value correctly identifies the perceived loudness of the content it accompanies. If the dialnorm value is incorrect, the AC-3 audio decoder in the consumer's home receiver won't be able adjust the volume to eliminate loud volume swings during these transitions.

Recognizing this issue, the ATSC A/85 RP assumes compliance with the ATSC A/53 DTV Transmission Standard, which requires that the dialnorm value be accurately encoded and carried with the audio content. If all broadcast stations and MVPDs measure content with the ITU-R BS.1770 measurement algorithm and transmit dialnorm values that correctly identify the loudness of the accompanying content, then consumers will not have to adjust the volume between programs and commercials due to loudness variations.

[1] FCC online Encyclopedia http://www.fcc.gov/encyclopedia/loud-commercials-0

[2] FCC document FCC 11-84, page 19, section III, subsection C: "Financial Hardship and General Waivers", paragraph 38

[3] FCC document FCC 11-84, page 22, section IV: "Conclusion", paragraph 45

[4] FCC document FCC 11-84, page 4, section II: "Background", paragraph 4

Complying with ATSC A/85 RP Requirements

ATSC A/85 RP specifies two primary options for cable operators to control loudness and comply with the CALM Act.

The first is to employ equipment, such as a loudness measurement device and/or software, a file-based scaling device or a real-time loudness processing device.

Section 2(c) of the CALM Act states that an operator will be "deemed to be in compliance" with the FCC's rules for implementing the CALM Act if the operator "installs, utilizes, and maintains in a commercially reasonable manner the equipment and associated software" necessary to comply with the ATSC A/85 RP.

The second option is to ensure that their content suppliers deliver the content in accordance with the operators' loudness specification (i.e., a fixed "target" loudness value or the correct dialnorm value).[5]

Though obviously an attractive option for operators as it doesn't require any new equipment purchases, relying on content suppliers (i.e., HITS, programmers, local off-air broadcasters, etc.) is problematic because operators will not be able to respond effectively should the content suppliers set their dialnorm values incorrectly.

Equipment Options for CALM Compliance

Cable operators have not traditionally measured the audio levels of their programs, rather they have just manually measured the audio level of a single program for a short period of time for other regulatory compliance purposes. As a result, operators have mainly used audio measurement tools designed for the single-channel world of broadcasters, not the vast, much more complicated multi-channel cable environment.

Though functional and proven, single-channel loudness monitors are not ideal for the 100+ multi-channel cable environment. The cost and effort to deploy, configure, manage and power a sufficient number to monitor an operator's channel lineup and ads is cost-prohibitive.

Fortunately, an emerging class of high-density loudness monitors (100+ channels) more ideally suited to the cable world is now available. Just one of these real-time monitors can enable an MSO to keep tabs on the audio levels of hundreds of channels simultaneously.

[5] FCC document FCC 11-84, page 14, section III: "Discussion", subsection 2: "Other Ways to Demonstrate Compliance", paragraph 23

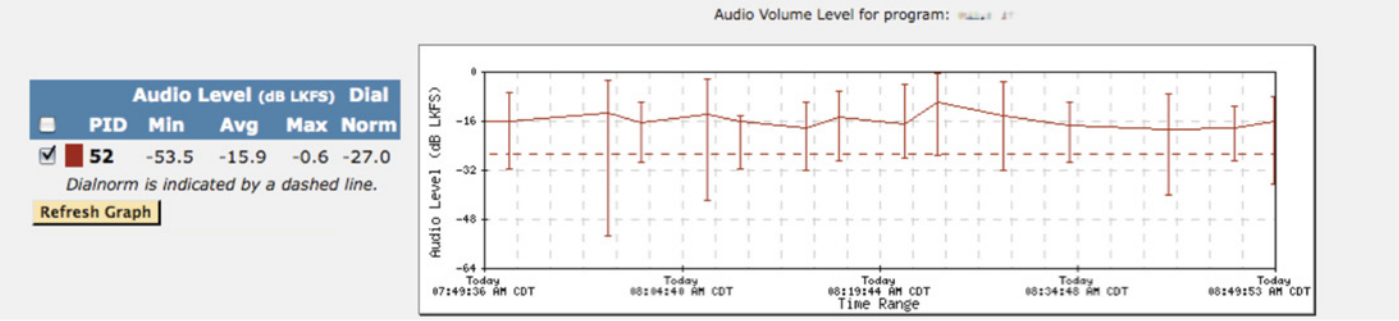

Figure 1. Representation of program content audio constantly louder than the dialnorm set.

Ideal Characteristics of Loudness Monitors

One of the defining characteristics of these new monitoring systems is the ability to analyze and report audio loudness using the dB LKFS (Loudness, K-weighted, relative to Full Scale) measurement, which is based on the ITU-R BS. 1770 audio standard. The scalable system enables operators to track not just a single program at a time, but hundreds of programs with commercials based on LKFS measurement in real-time automatically and simultaneously.

Another critical capability of these new monitoring systems is to support various audio alert settings and thresholds, as well as to generate various audio loudness reports to satisfy different users and use cases. Many top U.S. MSOs are already using monitors with this capability to track audio loudness levels for all of their programs in real time and to generate summary reports.

Additionally, alert thresholds must be established to stipulate when the loudness alarms should be triggered. If the thresholds are set too low, too high or otherwise incorrectly, they can't perform as intended and catch the problem. What's worse, incorrectly set thresholds could result in false positives – incorrectly identifying a commercial with properly set volume as being too loud.

Next generation monitoring systems must also enable operators to identify excessively loud program segments or commercials via alerts and reports, validating viewer complaints and meeting FCC requirements for documentation.

The screenshot in Figure 1 above is an example of such reporting. It shows that the mean audio level (solid line) consistently stayed at a much higher level (11dB louder) than the dialnorm value (dashed line) for an hour-long stretch. The candlesticks in the graph show the audio's dynamic range -- the range of how loud or quiet the audio was.

The system must also enable cable operators to look back historically to determine if any claims or suspicion of loud commercials are valid or not. This information can also help operators find and troubleshoot the root cause of the problem, resolve it and prevent the problem from happening again.

Finally, the monitoring system must maintain all of this important information in its database and then present it in an intuitive fashion. This can save cable operators tremendous time, money and headaches as they gear up to meet the new law's audit requirements.

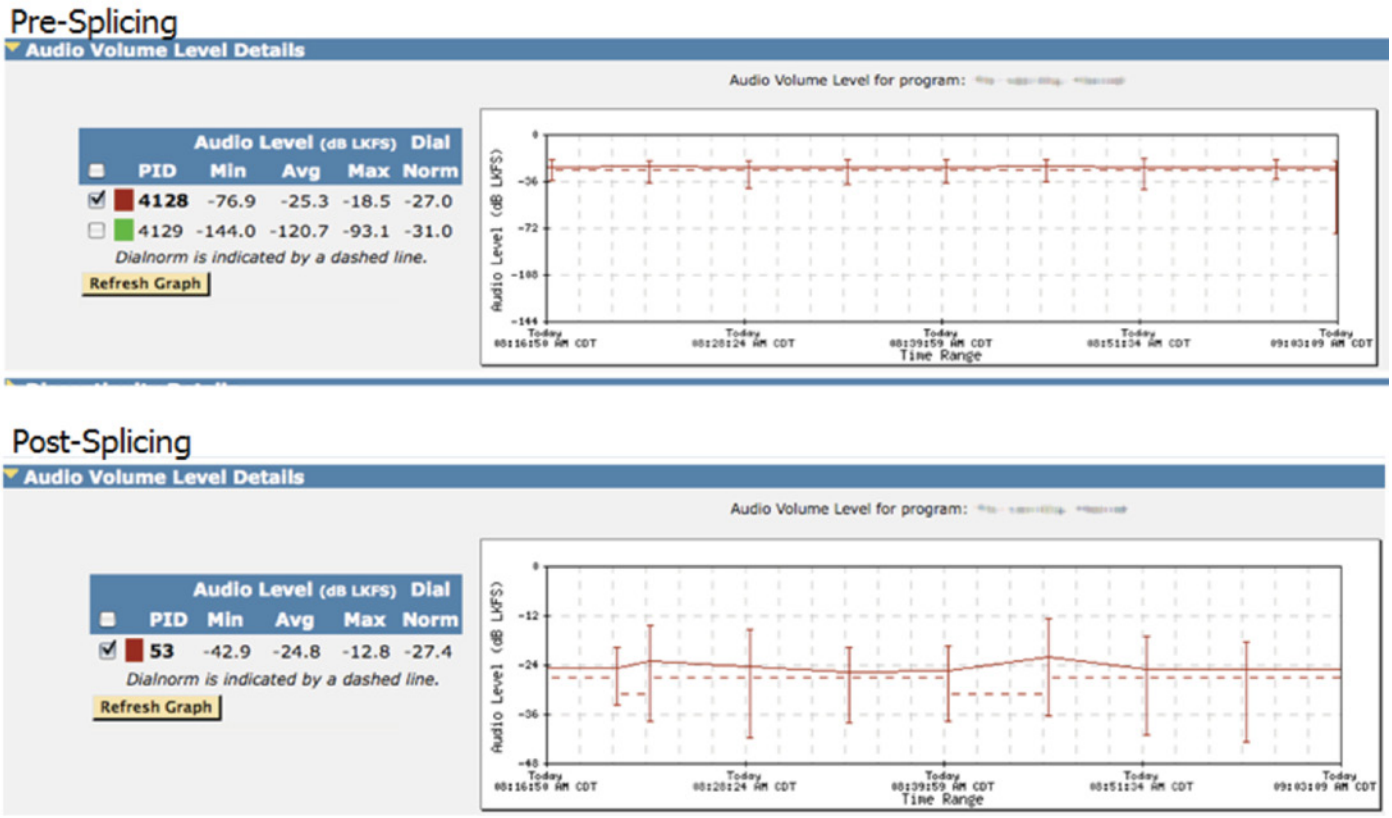

Figure 2. Pre- and Post splicing of the same content showing how dialnorm fluctuated, but the measured audio remained the same. This would be representative of a loud commercial.

Beyond "Paper" Compliance: Limitations of Dialnorm

While MSOs have relied on dialnorm values for Dolby AC-3 digital audio technology to control noise levels, this method is far from foolproof. The problem is that some advertisers and programmers have set the dialnorm values of their content incorrectly and as a result, the loudness of certain program segments or commercials can suddenly spike or viewers can experience dramatic changes in sound levels when switching between channels.

In Figure 2 above, the two screen shots illustrate what happens when the dialnorm value (dotted line) is set to a constant value before the ad splicing process, but then is changed to a different value for two specific program segments after the ad splicing occurs.

Indeed, as Gary Traver, the former chief operating officer of Comcast Media Center, told CED magazine earlier this year, some dialnorm levels aren't even close to where they should be. "We talked to a variety of networks and found some were aware and very focused on continuity of levels, while others weren't," he said. "Some intentionally set higher variances."[6]

[6] CED magazine article "CALM Promises Less Noise", http://www.cedmagazine.com/articles/2011/02/CALM-promises-less-noise.aspx

How the FCC Will Identify Violations

The FCC plans to rely on consumers to be their "eyes and ears" for determining when overly loud commercials are airing. This gives the FCC a veritable army of monitors and is a model they – and viewers – are already familiar with as the FCC has used this approach in the past for catching indecent or otherwise objectionable content.

The agency is striving to make it as easy as possible for consumers to register complaints about loud commercials. They plan to update the FCC website so complaints can be submitted via the Internet and they will accept complaints via fax or postal mail. Consumers who want assistance filing their complaints can even call a toll-free line for help.[7]

Individual complaints will be evaluated to determine which indicate a possible CALM Act violation. The FCC will typically forward individual complaints to the appropriate operator so both parties can be aware of a potential problem and take action to address it and to respond to their subscribers appropriately.

Complaints will be tracked – along with MSOs responses to them – to identify any trends that may require the FCC to take enforcement action.

When appropriate, the FCC will investigate and require the operator to respond to the alleged violation(s) with a detailed explanation of its actions. If the operator responds that it did not violate the rules, the FCC will expect it to provide sufficient records and documentation to demonstrate compliance.

Should the operator acknowledge a violation, the agency will require an explanation of why the violation occurred and what corrective actions the operator will take to prevent future violations.

Penalties and Enforcement

Though it has yet to determine amounts, the FCC does intend to use fines as its primary method for enforcing compliance with the CALM Act.[8]

The agency is currently open to suggestions from cable operators regarding a base amount for violations.

Timetable

Technically, all cable operators must be in compliance by December 15, 2012, though Section 2(b)(2) of the CALM Act does allow for a one-year waiver for operators that can show it would be a "financial hardship" to obtain the necessary equipment to comply.

Furthermore, the FCC may grant an additional one year waiver for smaller operators as it will interpret "financial hardship" broadly and because it recognizes "that … smaller cable systems may face greater challenges budgeting for the purchase of equipment to comply with the bill than … larger cable systems."[9]

Demonstrating Financial Hardship

To request a financial hardship waiver in order to push off its compliance date for one year, an operator must provide the FCC with the following:[10]

- Financial statements or other evidence of the operator's financial condition
- Estimates for purchasing the equipment necessary to come into compliance
- A statement detailing why its financial condition justifies delaying compliance
- An estimate of how long it will take to get into compliance

Despite its need for documentation, the FCC promises to interpret "financial hardship" broadly, and will not require waiver applicants to show negative cash flow. Rather, that the operators assertion of financial hardship be reasonable.

The FCC is also open to suggestions from operators – particularly smaller operators – as to how this waiver process can be further streamlined.

For operators missing the deadline for filing a waiver request, the FCC will consider requests citing "extraordinary circumstances" though it does not define what constitutes an "extraordinary circumstance."

[7] FCC document FCC 11-84, page 18, section III: "Discussion", subsection 4: "Complaint Process", paragraph 34: "Filing a Complaint"
[8] FCC document FCC 11-84, page 19, section III: "Discussion", subsection 5: "Enforcement", paragraph 37
[9] FCC document FCC 11-84, page 19, section III, subsection C: "Financial Hardship and General Waivers", paragraph 38
[10] FCC document FCC 11-84, page 19, section III, subsection C: "Financial Hardship and General Waivers", paragraph 39: "Financial Hardship"

A Break for Small Operators?

The FCC plans to be as considerate as it can with smaller operators and based on the several models they're considering, it appears as if the majority of U.S. cable operators qualify as "smaller operators."[11]

The models being considered include:

- The Small Business Administration (SBA) defines a "small cable operator" as having 1,500 or fewer employees. Based on this, 939 of the 955 cable operators in the U.S. in 2007 qualified as small cable operators.
- The FCC's own rules define a "small cable company" as one serving less than 400,000 subscribers nationwide. As of 2008, 804 out of 814 total operators qualify as small cable companies under this standard.
- The Communications Act of 1934, as amended, defines a small cable operator as "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed $250 million." Based on available data, 804 cable operators meet the criteria for being a small cable operator.

Though the FCC will cut small operators some slack in the short term – particularly in terms of accepting "financial hardship" waivers – the agency is committed to enforcing the CALM Act and operators of all sizes should come into compliance as soon as they can conveniently do so.

Conclusion

In short, the CALM Act will pose some major new challenges for cable operators as they struggle to turn down the volume on loud TV commercials. Operators will have to grapple with audio tracking, measuring and reporting issues they have likely never faced before.

But, with the right type of audio monitoring system installed, cable operators can tackle these challenges head-on and start lowering the volume on those blaring commercials. The key now is to grab the bull by the horn and start putting those solutions in place right away.

Identifying the best solution for complying with the CALM Act is not a simple task. Recognizing a golden opportunity to sell product, many companies without a background in monitoring are loudly touting their "solutions." Operators will be best served by taking the time to investigate the various solutions on the market and to check the pedigree of the vendors to ensure their core competence is relevant to complying with the CALM Act.

Wasting time, money and effort with inadequate solutions is simply not an option for operators with December 15, 2012 fast approaching.

[11] FCC document FCC 11-84, page 31, Appendix C: "Initial Regulatory Flexibility Act Analysis", section C: "Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply", paragraph 7: "Cable and Other Program Distribution"

Abbreviations and Acronyms

ATSC – Advanced Television Systems Committee

ATSC A/85 RP – A/85 Recommended Practice

CALM Act – Commercial Advertisement Loudness Mitigation Act

FCC – Federal Communications Commission

ITU-R – International Telecommunication Union Radiocommunication

ITU-R BS.1770 – an ITU-R loudness measurement algorithm

LKFS – Loudness, K-weighted, relative to Full Scale

MVPD – Multichannel Video Program Distributor

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900
Austria* 00800 2255 4835
Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Belgium* 00800 2255 4835
Brazil +55 (11) 3759 7627
Canada 1 (800) 833-9200
Central East Europe and the Baltics +41 52 675 3777
Central Europe & Greece +41 52 675 3777
Denmark +45 80 88 1401
Finland +41 52 675 3777
France* 00800 2255 4835
Germany* 00800 2255 4835
Hong Kong 400-820-5835
India 000-800-650-1835
Italy* 00800 2255 4835
Japan 81 (3) 6714-3010
Luxembourg +41 52 675 3777
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
Middle East, Asia and North Africa +41 52 675 3777
The Netherlands* 00800 2255 4835
Norway 800 16098
People's Republic of China 400-820-5835
Poland +41 52 675 3777
Portugal 80 08 12370
Republic of Korea 001-800-8255-2835
Russia & CIS +7 (495) 7484900
South Africa +27 11 206 8360
Spain* 00800 2255 4835
Sweden* 00800 2255 4835
Switzerland* 00800 2255 4835
Taiwan 886 (2) 2722-9622
United Kingdom & Ireland* 00800 2255 4835
USA 1 (800) 833-9200

*** If the European phone number above is not accessible, please call +41 52 675 3777**

Contact List Updated 10 February 2011

For Further Information
Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit **www.tektronix.com**

07/12 EA/WWW 21W-28130-0

Tektronix®