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Advanced Television Systems Committee

FILED/ACCEPTED

JUN 22 2011

Federal Communications Commission
Office of the Secretary

April 8, 2011

Via Electronic Mail

MB 11-93

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, D.C. 20554

Re: CALM Act and ATSC A/85

Dear Ms. Dortch:

On February 1, 2011, representatives of the Advanced Television Systems Committee, Inc. (ATSC) gave a tutorial for FCC staff members on the Recommended Practice "Techniques for Establishing and Maintaining Audio Loudness for Digital Television (A/85)" as it relates to the Commercial Advertisement Loudness Mitigation (CALM) Act. The attached document is an Executive Summary of the tutorial presentation.

ATSC is in the final stages of revising A/85 by adding a new "Annex J" suitable for the FCC's citation in their Rules pursuant to the requirements of the CALM Act.

ATSC has also started work on the development of a new "Annex K" that addresses loudness management for commercial advertising when using non-AC-3 audio systems.

We request that the Commission place this letter and the attached Executive Summary into the official record once the proceeding to implement the CALM Act is initiated and a docket for that proceeding is established.

ATSC will continue to provide periodic updates to the Commission on the progression of its work on A/85 as it relates to the CALM Act. If you have any questions concerning these matters, please contact me.

Respectfully submitted,

Mark Richer

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Attachment: Executive Summary of 2/1/11 Tutorial

Executive Summary of the ATSC DTV Loudness Tutorial
Presented on February 1, 2011

- The ATSC AC-3 Digital Television Audio System has 32 times the perceived dynamic range (ratio of soft to loud sounds) than the previous NTSC analog audio system. Although this increase in dynamic range makes cinema-like sound a reality for DTV, greater loudness variation is now an unintentional consequence when loudness is not managed correctly.

- The ITU-R BS.1770 measurement algorithm was developed to give professional users a repeatable, accurate tool to measure loudness by modeling the human hearing system. Presented in units of LKFS, BS.1770 is internationally accepted and is the audio loudness measurement standard that the ATSC' references in its Standards and Recommended Practices.

- Metadata, or "data about the (audio) data," is instructional information that is transmitted in the same bitstream along with the digital audio it describes.

- Dialog Level or "dialnorm" is a metadata parameter transmitted to the home that controls the loudness of the consumer's DTV equipment, specifically setting loudness levels, much like a hand on a volume control.

- When content is measured with the ITU-R BS.1770 measurement algorithm and dialnorm metadata is transmitted that correctly identifies the loudness of the content it accompanies, the ATSC AC-audio system presents DTV sound capable of cinema's range but without loudness variations that a viewer may find annoying.

- An essential requirement *(the golden rule)* for management of loudness in an ATSC audio system is to ensure that the average content loudness in units of LKFS matches the metadata's dialnorm value in the AC-3 bitstream. If these two values do <u>not</u> match, the metadata cannot correctly insure that the consumer's DTV sound level is consistently reproduced.

- Operators may achieve the requirement for average dialog loudness to match the dialnorm value using different techniques. The two primary modes of operation are the "fixed dialnorm approach" and the "agile dialnorm approach"

- In a fixed dialnorm system, the station or multi-channel video program distributor's (MVPD) AC-3 encoder is set to a single, constant dialnorm value for average dialog loudness, and content loudness is conformed upstream to match that target value. This method is straightforward and offers the greatest simplicity for the station or MVPD operator.

- In an agile dialnorm system, the AC-3 encoder is set to dynamically change dialnorm values for varying content loudness based on an established dial_norm value for the content as measured by a BS 1770 compliant device or software. Upstream dialnorm metadata accompanies the audio content through all distribution paths, ultimately adjusting the AC-3 encoder's dialnorm value. This technique provides more flexibility for the content provider but is more complex for the operator to implement than the fixed dialnorm approach.

❖ Controlling loudness in a fixed dialnorm system can be accomplished by the operator by:

- Providing and enforcing a program specification indicating a specific average content loudness target value, in units of LKFS, that must be delivered by all suppliers. As noted above, this target loudness value must match the dialnorm value in the operator's AC-3 bitstream in order for the system to correctly control the viewer's equipment and set loudness correctly

- Using an LKFS file-based scaling device at the content ingest point to measure content and adjust average loudness to the target dialnorm value

- Using an accurately set LKFS based real-time processing device at the content ingest point that adjusts average content loudness to the target dialnorm value

❖ Controlling loudness in an agile dialnorm system can be accomplished by the operator by:

- Ensuring that all delivered content is measured in units of LKFS and labeled with the correct dialnorm value matching the actual average loudness of the specific content

- Employing a file-based measurement and authoring device to set dialnorm to the average loudness (in units of LKFS) of the specific content

- Employing an accurately set real-time processing device to match content to specific loudness in units of LKFS. Apply a dialnorm value matching the average loudness of all content processed by this device

- The optimum ATSC audio experience is achieved when average content loudness in units of LKFS matches the dialnorm value in the AC-3 bitstream. This practice maintains the creative intent of the content supplier while managing the loudness experienced by the viewer.