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Radio TechCheck

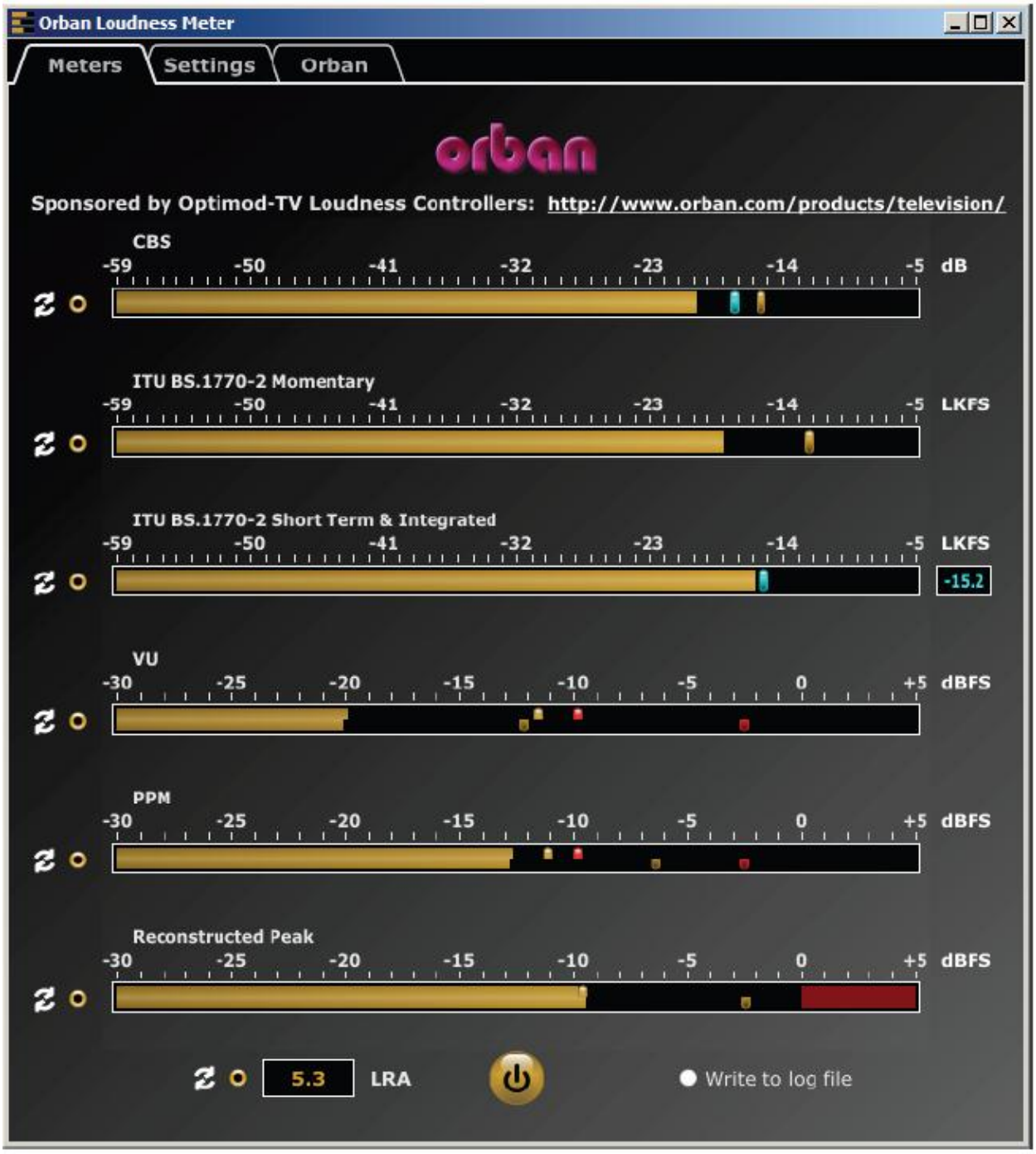
NAB NATIONAL ASSOCIATION OF BROADCASTERS

The Weekly NAB Newsletter for Radio Broadcast Engineers

A Useful Tool to Gain Familiarity with Audio Loudness

Controlling audio loudness will always be an issue for radio and television broadcasters. Loudness is a subjective phenomenon and ultimately subject to the maxim that "you can't please all the people all the time." Loudness metrology however has come a long way. For TV broadcasters, the FCC Regulations to implement the Commercial Advertisement Loudness Mitigation (CALM) Act begin to take effect December 12, 2012. The requirements these regulations place on stations were summarized in the *December 19, 2011 issue of TV TechCheck*. The *September 10, 2012 issue of TV TechCheck* detailed "best practices" for television broadcasters developed by the NAB TV Technology Committee, with NAB Labs support. But beyond regulations placed on television broadcasting, it is highly advisable for both radio and television engineers to develop a personal understanding of the perceptual side of loudness. Meters can only approximate a listener's subjective response to audio signals with varying types of content whose amplitude is dynamically changing. Even the NAB best practices document admits "*w*hile the main effort of the station should be to manage the content so as to avoid loudness complaints through use of proper measurement, mixing and adjustment; it is recognized that perfection is not possible."

At the recent IEEE Broadcast Symposium held last week in Alexandria Va., Robert Orban, Founder and Chief Engineer at Orban, presented a paper titled "Measuring Automatic Loudness Controller Performance with the ITU BS.1770-2 and Jones & Torick Loudness Meters." In his talk, Orban described his lengthy experience with various algorithms for measuring subjective audio loudness and conclusions he has reached about the pluses and minuses of different approaches. For those interested in their own investigation of matching loudness measurements with personal judgments, Orban makes available multi-method louodness meter software, available free for both Windows and Mac environments. The Orban Loudness Meter Version 2.0 accepts two-channel stereo inputs and simultaneously displays a number of different metrics as shown in the screenshot below:



- The CBS meter is a “short-term” loudness meter that displays the details of moment-to-moment loudness with dynamics similar to a VU meter. It uses the Jones & Torick algorithm developed at the CBS Technology Center [Bronwyn L. Jones and Emil L. Torick, “A New Loudness Indicator for Use in Broadcasting,” J. SMPTE September 1981, pp. 772-777].
- The ITU-R published Recommendation ITU-R BS.1770 in 2006: “Algorithms to measure audio programme loudness and true-peak audio level.” In 2011, this was updated to BS.1770-2, which adds gating so that the meter ignores silence and is weighted toward louder program material, which contributes most to a listener’s perception of loudness.
- The implementation of the VU meter reaches 99% (–0.09 dB) of steady-state when presented with a 1 kHz tone burst with an “on” duration of 300 ms and an “off” duration of 500 ms or more.
- The implementation of the PPM can be switched for 5 ms or 10 ms attack times.

- Two true peak-reading meters are provided. A red bar appearing in the VU and PPM meters reads the peak values of the internal 48 kHz digital samples within the meter. The Reconstructed Peak meter oversamples 8x and extrapolates the peaks of the signal after D/A conversion, as specified in the BS.1770 standard.

Detailed technical descriptions of the CBS algorithm and the ITU BS 1770-2 standard can be found in the “read me” file on the Orban download page for the meter along with additional details on the implementation of the other conventional meter components. The Orban Loudness Meter can be downloaded for free at www.orban.com/meter .

Call for Speakers Deadline Extended to October 29

How are you and/or your company changing the face of Media and Entertainment? Submit your session ideas for this year's Broadcast Engineering Conference and help the industry keep up with evolving platforms, devices and consumer expectations for increased mobility, interactivity, customization, and an all-encompassing entertainment experience.

The deadline for submissions has been extended to October 29.

The next issue of *Radio TechCheck* will be published on October 15, 2012.