

Advisory Note to Production Sound Engineers

Operational Practice 59 Measurement and Management of Loudness in Soundtracks

Frequently Asked Questions

Operational Practice 59 (OP59) outlines the measurement and management of audio loudness and is provided as a tool to assist measuring compliance with Operational Practice 48 (OP48) when producing sound tracks for television advertisements.

Q1. For the production of soundtracks for television, are the specifications for loudness in the ITU-R Recommendations referenced for short term, long term or momentary loudness characteristics?

A2. The primary form of a BS.1770-3 and BS.1771-1 meter is an integrating meter suitable for measuring the finished product e.g. a 30 second commercial or a 90 minute movie. This form of meter gives a single number for the average loudness of the entire length of the item. This is NOT intended as a production tool to be used for mixing. Its purpose is to *normalise* the finished soundtrack to a standard loudness value. “Short term” and “momentary” loudness meters are available, and audio producers may find them useful, but they are not essential for compliance with Recommendation BS.1770-3 or OP-59.

Q2. What is the reference level for setting an acceptable loudness characteristic in a television soundtrack?

A2. -24LKFS¹ is the target loudness measurement for an acceptable loudness level in a television soundtrack, where the LKFS unit specifies

“L” for loudness,

“K” indicating the unique filtering of the meter algorithm, and

“FS” for full scale (digital).

Q3. What would be the loudness measurement on a BS.1771 loudness meter of a soundtrack with excessive loudness?

A3. If a soundtrack measures -18LKFS, this means it is 6 loudness units (LU) “louder” (further up the scale) than the -24LKFS target. For this soundtrack to comply with OP-59, the level of all channels would need to be lowered by 6 dB. Alternatively, the soundtrack could be remixed for an average loudness 6 LU lower.

¹ Refer also Recommendation ITU-R BS.1864 *Operational practices for loudness in the international exchange of digital television programmes* at <http://www.itu.int/rec/R-REC-BS.1864-0-201003-I/en>

Q4. What would be the loudness measurement on a BS.1771 loudness meter of a soundtrack with a low loudness characteristic?

A4. If a soundtrack measures -28LKFS, this means it is “softer” (further down the scale) than the target.

Q5 How does this relate to the specification of -20dBFS?

A5. -20dBFS is the alignment level for digital soundtracks specified in OP48 and referenced to SMPTE RP.155. This alignment level (line-up level) which is 20dB below full scale digital i.e.: the onset of digital clipping can be equated to zero VU on audio level meters. Loudness target measurements relate to the dBFS scale; in BS.1770, 0 **LKFS** is equal to 0 **dBFS** @ 1KHz on two front channels.

Q6. How do the specifications within the ITU-R Recommendations relate to the EBU method which is described as using *foreground* audio or an *audio anchor*?

A6. The European Broadcasting Union (EBU) has developed a series of Technical Recommendations for its public broadcasters on loudness measurement. They have adopted the ITU-R Recommendations but made some modifications for their public broadcaster’s requirements. These include the recent “-2” amendments to BS.1770 which includes the feature of “gating”. Gating is applied in the measurement of *program* loudness to take account of loudness measurements in television programs. It takes into consideration what is referred to a *foreground* sound and gates out passages of background sound.

Q7. How do the specifications within the ITU-R Recommendations relate to the DIALNORM value which uses dialogue as the anchor element?

A7. The Dolby Digital / AC-3 coding scheme is applied to mono, stereo and 5.1 channel transmissions. Within this coding scheme is a metadata element called “Dialnorm” (dialogue normalisation) which controls the attenuation of the audio signal in the Dolby Digital decoder in the DTV receiver. The DIALNORM value should be set to equal the measured loudness value. The decoder will then attenuate this level to -31 LKFS at the audio output.

Q9. What method of loudness measurement should be applied to live broadcasts?

A9. The ITU-R Recommendations and Report BS.2054 can be applied to program material and inserted material like advertisements / television commercials equally

Q10, Within Recommendation BS.1770 there is a weighting parameter applied - RLB2. Other weighting parameters which have been established are LEQ A, LEQ B, LEQ C, and LEQ M. Which weighting should be used for television soundtracks?

A10. Within Recommendation BS.1770 consideration is given to giving emphasis to the frequencies at which the human ear is more sensitive to loudness. This is applied by the use of filtering. The weighting parameter within BS.1770 which should be applied is

RLB2 –the BS.1770 loudness weighting curve which includes a high frequency boost and suitable for measuring surround sound. It is better known as K weighting.

Other loudness weighting parameters are

Leq(A) - is the method that is specified by the ATSC for measuring *dialnorm*.

Leq(B) – is applied for lower frequencies and lower listening sound levels

Leq(C) – is applied for even lower listening levels than the B-weighting where additional low frequencies are included.

Leq(M) – is the method that is specified for Movie soundtracks

where the term “Leq” relates “L”oudness to an “eq”uivalent amount of energy in an audio signal.

However these are not applicable to BS.1770.

Q11, Will OP48 remain in force?

A11, Compliance with OP48 is still required. After 1st January 2013 application of OP59 will imply that the audio level requirements of OP48 have been met.

For any further queries on OP59, please contact engineering@freetv.com.au

Thank you.