

Technical Recommendation

CST - RT – 019 - TV – 2009 - V 1

February 9th 2009

*Methodology for evaluating sound dynamics
for television broadcasts*

1/ SUBJECT

The purpose of this document is to define the methodology for evaluating sound dynamics for programmes intended for television broadcast, fulfilling the criteria of the CST – RT 017 – TV RTB Broadcasters Technical Recommendations.

In particular, the aim of this recommendation is to specify the clauses of section A.2.2.3 « Dynamics » in the CST - RT 017 Recommendation.

2/ CONTEXT

2.1 AIMS

The constraints and the aims of sound broadcasting for television, which were the preliminary requirements when this document was drafted, are as follows:

- Respecting the work, in particular any artistic choices
- Guaranteeing comfortable listening for viewers by means of ensuring perfect intelligibility of the sound message in the various configurations (5.1, down-mix, stereo, mono)
- Guaranteeing the continuity of perception of the sound level in a sequence of programmes
- Optimising the use of metadata inherent to *Dolby Digital* and *Dolby Digital Plus* encoding.

2.2 GENERAL CONSIDERATIONS

All work to make sound mixes comply with the clauses of this recommendation must be carried out under the authority of the entitled parties or by a service-provider appointed or empowered by them. The work done must be satisfactory for all concerned (producer, head of post-production, broadcasters).

The use of solutions consisting of the dynamic compression of the signal must not result in constant energy levels, with no « ventilation » of the sound signal over time.

2.3 UNITS

LKFS means Loudness K weighted, in relation to a Full Scale. An LKFS value expresses a weighted measurement K (Leq(R2LB)) on a Full Scale.

The LKFS scale is graduated in steps of 1 dB. Applying an increase of + 1 dB to the measured signal will result in a reading of a + 1 dB gain on the LKFS scale.

2.4 LISTENING AND MIXING CONDITIONS

The mixing of sound tracks must be effected in an auditorium where the technical equipment and dimensions are suitable for televisual listening (close range listening). For example, auditoria such as large cinemas are not suitable for this type of mixing and are therefore not advised.

The CST – RT 017 – TV RTB Broadcasters recommendation defines the listening level for the “validation” of RTB sound tracks in a verification room that satisfies the requirements of recommendation ITU – RBS 775.

The mixer may adjust the listening level (SPL acoustic pressure level), validated with a referenced pink noise, depending on the room and the listening level used, in the region of 79 dB (C) per channel (not including LFE).

2.5 REFERENCING THE DIALOGUE LEVEL

The CST – RT 017 – TV RTB Broadcasters Recommendation defines the methodology for evaluating the Dialogue Level. In this recommendation, we shall use the « Objective Gauging » method.

N.B. As a rule, the Dialogue Level value is representative of the programme dynamics. The lower it is (around -31 LKFS), the greater the dynamics may be. The higher it is (around -18 LKFS), the more the dynamics are reduced. A target value must be carefully selected.

2.6 REFERENCES

- ITU-R BS.1770-1 and 1771: Algorithm for audio measurements Leq RLB
- ITU-R BS.775 : Positioning of 5.1 speakers
- EBU Tech 3304 : 5.1 audio test signals
- IEC 60268-5 : Audio listening
- CST-RT 010- TV : Audio dynamics reserve
- CST-RT 016-TV : Methodology for measuring the dialogue level
- CST-RT 017-TV : RTB Broadcasters

3/ RECOMMENDATION

3.1 CREST VALUES

Mixes delivered through two channels (LtRt, LoRo or dual mono) : the peak level measured must not exceed 0 dB PPM virtual peakmeter 10 ms DIN 45406.

5.1 Mixes: the peak level of the audio signal, measured on a full scale digital peak-meter, must not exceed -3 dBFS.

3.2 MEAN VALUE OF DIALOGUE LEVELS (DIALOGUE LEVEL)

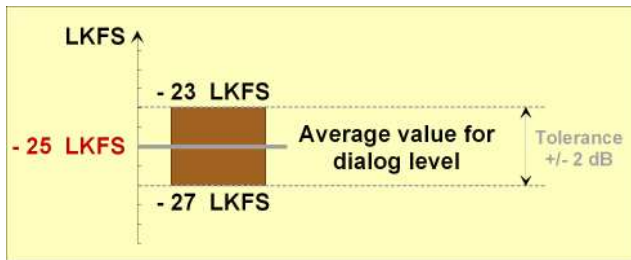


Fig. 1 : Target values for Dialog Level

Whatever the mixing type, the mean reference value chosen for the dialogue level is -25 LKFS with a tolerance of ± 2 dB. This value is equivalent to the programme's Dialogue Level.

3.3 PROFILE OF DYNAMICS

Since the use of DRC (Dynamic Range Control) is inherent to Dolby encoding, the "Film Light" in "Line Mode" is used since it is the best suited to televisual broadcasting with controlled dynamics.

Loudness excursions are permitted, measured as defined in § 3.4 below, as follows :

- ✘ **For dialogue** : ± 7 dB measured in *short term* in the region of the Dialogue Level value
- ✘ **For all the sound elements in the programme** : ± 12 dB measured in *short term* in the region of the Dialogue Level value

3.4 METHOD FOR MEASURING DYNAMICS («SHORT TERM» LOUDNESS)

Measurements concerning the programme's dynamics are carried out using a tool that allows the energy level to be displayed over a 10 second rolling window (in LKFS, weighting ITU-R BS.1770-1).

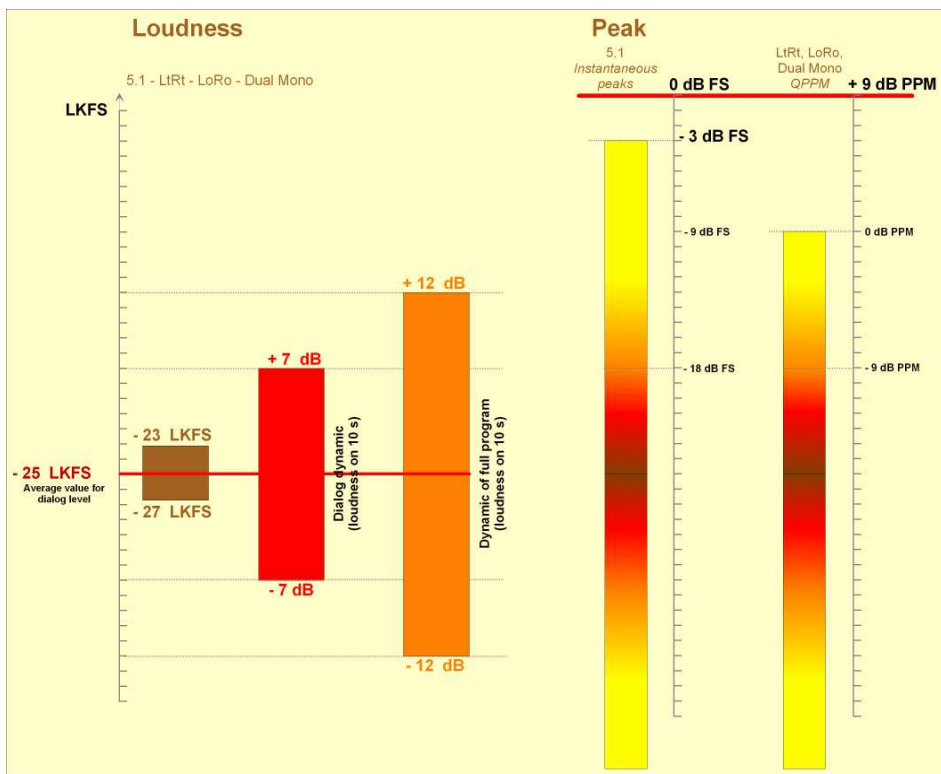


Fig. 2A : Dynamic profil

Fig. 2B : Peak

APPENDIX

COMPLEMENTARY INFORMATION

As specified in the subject, this recommendation is designed to specify the clauses of section A.2.2.3 of CST recommendation RT 017.

It appeared necessary to members of the group that certain thoughts that allowed us to define this recommendation should be specified.

Listening level

In § 2.4, we indicate that the value of the listening level in a mixing auditorium may be adjusted to « around » the value of 79 dB (C). We use the term “around” rather than “to the value of” so that mixers may adjust their listening level according to the dimensions and the acoustic features of the auditorium. It is customary, in small auditoria and in most verification rooms, to sometimes –or even necessarily- lower the listening level.

Crest measurements

One of the difficulties encountered in drafting this document involves the compatibility that must be maintained with regard to analogue broadcasting until 2012. This means that the members of the working group considered that eventually, once all broadcasting is digital, the treatment of crests must be identical for all the different types of mixing (5.1, LtRt, LoRo, Dual Mono), at -3 dB FS. Until everything “goes digital” however, it is necessary to maintain the possibility of measuring crests using the Din 45406 virtual crest method (used in the CST RT 003 recommendation) and combined in this instance with the loudness measurement.

Metadata

With regard to § 3.4, we are reminded that in any event, the reference document for the selection of metadata and DRC profiles is figure 2 on page 12 of recommendation « CST RT 017 – RTB Broadcaster ».

Hence, in version V2 of CST RT 017, it will be required that in « *line mode* » the « *Film Light* » profile is applied, but it is still necessary (see above) to temporarily maintain the « *Film Standard* » profile in « *RF mode* ».

Dialogue Level

Another difficulty arises in relation to the measurement methodology for the Dialogue Level. This is described in the CST RT 017 recommendation in § A.2.6.4.2 *Noting the DialNorm* ».

Complement regarding the measurements of level and loudness

Service providers may find it useful to refer to the EBU publication, « Levelling and Loudness – 2004 » by Gerhard Spikofski and Siegfried Klar *Institut für Rundfunktechnik GmbH (IRT)* (available on the www.ebu.ch website), which gives a precise description of all the methodologies for displaying level, loudness and crestst. The table below, taken from this publication, summarises this information.