

## 1. SCOPE

This Operational Practice is recommended by Free TV Australia and refers to the audio reference level for streamed media sound tracks. It addresses sound quality metrics, including loudness, for soundtracks originated by broadcasters and distributed to the end user via platforms employing the Internet.

While this Operational Practice has a focus on television broadcast soundtracks delivered using the Internet, it is equally applicable to soundtracks produced for sound broadcasting delivered using the Internet.

## 2. BACKGROUND

Many regulatory agencies and broadcasting organizations have developed operational practices for audio loudness and true peak audio levels from the point of origination of a soundtrack intended for carriage to and emission from a broadcasting station in the following:

- Recommendation ITU-R BS.1770 - *Algorithms to measure audio programme loudness and true-peak audio level*
- Recommendation ITU-R BS.1771 - *Requirements for loudness and true-peak indicating meters*
- Recommendation ITU-R BS.1864 - *Operational practices for loudness in the international exchange of digital television programmes*

These have resulted in techniques which, as far as it is practicable, provide broadcasters with metrics which should not require any level adjustment.

Increasingly soundtracks intended for carriage to and emission from a broadcasting station are now being also delivered across telecommunication systems for delivery to the end user as sound including platforms employing the Internet.

Many broadcasters now consider it desirable that their audiences may have the option to watch broadcast television programs on the screens of their laptops, tablets or smartphones when they do not have access to a television receiver and there is now a real interest on the part of consumers to use the screen of these devices as an alternate screen, on which they can watch broadcast television programs.

Television broadcasters deliver their programs to an increasing number of receiving platforms, including traditional TV receivers, hybrid TV receivers, personal computers, tablet computers and smartphones, as what is referred to as the “third screen”. The screen size, aspect ratio and picture resolution of these devices cover a wide range, from screens less than 100 mm to over 1 m, and resolution from QVGA (320 x 240) to UHD.

The end user viewing environments also cover a wide range, from quiet, private spaces to noisy, public spaces. In quiet, private spaces, it is possible to hear a wide dynamic range in a TV program soundtrack. In noisy spaces, the audible dynamic range is reduced.

As well as the noise limitation at the bottom end of the dynamic range, most portable viewing devices are only capable of a modest maximum sound level, as they have very small loudspeakers, often less than 25 mm diameter.

The audible dynamic range on a portable device is therefore usually much less than the audible dynamic range on a large stationary receiver, both because of ambient noise and because of limited output capability. Hence, as well as tailoring the picture to the capabilities of these devices, the sound must also be adjusted to suit their capabilities and constraints.

### **3. HARMONIZATION OF CONSISTENCY IN SOUND QUALITY, INCLUDING LOUDNESS CHARACTERISTICS, ON THE INTERNET**

Most of the end user viewing / receiving platforms also receive content from non-broadcast sources. Much of the content from these alternate service providers has a low dynamic range and/or is user-generated, and the average loudness level is often much higher than broadcast loudness level.

In a viewing environment with reduced dynamic range, a higher average loudness level has the advantage that it can greatly improve speech intelligibility. This is desirable for broadcast content as well as for non-broadcast content.

The disparity between broadcast loudness levels and non-broadcast loudness levels can also be an annoying for the viewer, and makes programme switching a frustrating experience.

To make the viewing and listening experience more consistent in audible quality, it is therefore desirable for the loudness level of broadcast content delivered to these devices to be adjusted to be closer to the levels used by non-broadcast content providers.

It is noted that two reference loudness levels are widely used among non-broadcast content providers: -16.5 LKFS and -13 LKFS. Of these, -16.5 LKFS is closer to broadcast loudness level, and is therefore less problematic for loudness level adjustment of broadcast content. It is therefore suggested that broadcasters should consider raising the loudness level of their programmes to -16.5 LKFS if it is possible to do so without seriously impairing the audio quality of the soundtrack.

Figure 1 shows how this could be done in a typical emission system. The servers are normally able to detect the type of device they are serving, and can choose the appropriate version of the soundtrack for that device, just as they choose the appropriate video resolution for the screen and the appropriate codec bit rate for the programme carrier.

In the case of the hybrid TV, called “connected TV” in the figure, it is anticipated that the viewing environment will support a wider audio dynamic range, and therefore the broadcast loudness level of -24 LKFS is preserved. This also maintains consistency with the loudness level of the conventionally received program.

FIGURE 2

**Example of emission system for multiple viewing platforms, showing dual audio level implementation**

