

# Loudness Foundations

You know loudness is important, you know the world is putting limits on LUFs; but are you well enough prepared and equipped to ensure your deliverables don't get returned to sender? It's time to exchange your sausages for Toblerones. TC Electronic's Thomas Lund breaks down the basics...

## EXPERT Witness

### 1. Welcome Loudness Normalisation

The days of the Loudness Wars – where the mantra was: the louder the better – are coming to an end. Thanks to ITU, a non-commercial organisation under United Nations, audio professionals from any genre can work against a transparent Loudness Target. If you're systematically below that Target, the programme or track will get turned up. If you're always above, it will be turned down. The concept is called "loudness normalisation". It works great, it's based on open standards, and it's finding the way into TV, mobile TV, radio, iTunes, gaming, even cinemas and IMAX theatres. Loudness normalisation also allows entirely different types of programmes to sit back to back: news, talk shows, old pop, new pop, film, commercials, drama, concerts – because it defines a best fit gain offset. This is the first step towards a world where the volume knobs of TV remotes or iPods will no longer be the first to wear out.

### 2. Goodbye Sausage Processing

Having the same loudness programme for programme, track for track doesn't mean that each of them has to be the same shade of grey from start to finish. On the contrary. Because level is no longer constantly banging against the ceiling, a wonderful quality is being rediscovered: variation. Once again, loudness variation can become part of the storytelling in music, drama, and broadcast. The EBU standard even includes an objective measure of how much loudness varies inside a programme or a track, allowing you to objectively balance contrasts and suit a certain audience or a particular listening situation. Old sausage compressors and sausage limiters can still be used for creative reasons, but chances are that your music track or commercial will appear dull and not very appealing if you overdose it. Using more words from the food vocabulary: Like liver paste among other programmes with Gruyère, Jamon Iberico, and Truffles. After loudness correction in broadcast or in iTunes, a sausage audio file will actually appear to be softer than most other programme material, drawing less attention.

### 3. Delivery Specs: Programme Loudness

If the end destination for your production is HD broadcast, be sure to know the delivery specifications you're up against. Nearly all broadcasters in the world are now rooted in the same ITU standard named BS.1770. It's tightly

followed by Brazil, China, Europe, Japan, and others, but there are still a few things to check: the default Target Loudness in Europe is -23 LUFs, everywhere else it's -24 LUFs. Using an EBU R128 compliant meter, your programme should measure one of those as "Programme Loudness".

Uncertainty only really creeps in if you're delivering to a US broadcaster, where requirements could be according to the local ATSC A/85 standard specifying speech level to be measured instead of Programme Loudness, unless it's a commercial. For these stations, hit -24 LUFs when soloing normal speech in regular programmes. For a US-bound commercial, measure all audio like with BS.1770. Until the next revision of A/85, US stations may also ask for measurements to be carried out using an obsolete version of BS.1770. On a loudness meter, the outdated version might appear as "Leq(K)" or "BS.1770-1". Note: The unit for loudness, "LUFs" is exactly the same as the "LKFS". Some have taken the "U" vs. "K" as an indication of differences in measurement, but that is a misunderstanding.

### 4. Delivery Specs: True-Peak Level

Loudness measurement is by far the most important part of the new broadcast standards. A user is even encouraged to disregard peak level unless there's a risk of overload. Still, the ITU standard includes a more precise way of measuring peak level in the digital domain than the old sample by sample measure called "true-peak". To maximise headroom, which is a defining factor in music clarity and in speech intelligibility, as high true-peaks as possible should be allowed. The EBU R128 standard sets the bar high at -1 dBTP, which is ideal for linear audio, while most other regions require true-peak to stay below -2 dBTP.

### 5. Universal HD Broadcast Delivery

Combining all of the above, unless specific local rules apply, this guideline can be followed to deliver a programme to any broadcaster anywhere:

1. Use a BS.1770-3 meter to hit -23 LUFs.

Most countries accept between -26 and 22 LUFs, except for Europe where you should be between -24 and -22 LUFs.

2. Make sure you don't have true-peak level higher than -2 dBTP.

3. Make sure that solo of regular speech doesn't fall below -25 LUFs.

### 6. Mixing for Mobile TV, iTunes, and Web

If your production is not targeted at broadcast, but for instance iTunes, mobile TV, or online streams, it is still recommended to use the new and efficient loudness tools when mixing. iTunes has a fine function called "Sound Check" which is able to normalise music tracks and podcasts. Research has shown that its Target Loudness is close to -16 LUFs on a BS.1770 scale; so tracks softer than -16 LUFs are boosted, those louder are brought down. Another recent study proved how -16 LUFs in general is a good Target

to aim for, where the user of mobile TVs from any vendor, iPods, iPads, etc, is able to turn up the level high enough, while it still allows for essential transients to survive. Fortunately, it's not a problem to convert an HD broadcast programme normalised at -23 LUFs to a fine sounding, mobile TV version normalised at -16 LUFs. It can easily be done without destroying the discrimination between foreground and background sounds or without custom metadata and codecs.

For consumers with flat panel TVs and matchbox sized loudspeakers, personal platforms and headphones is the closest they get to a decent audio experience these days. Let's make sure that possibility is preserved by putting an end to sausage processing and to lossy data reduction where we can. Bottom line: there's no reason to make mobile TV, iPod, and Web mixes louder than -16 LUFs.

Thomas Lund is HD Development Manager at TC Electronic, one of the leading manufacturers of loudness meters and audio processors. With perceptual studies as the background, Thomas has played a significant role in the development of several broadcast standards such as ITU-R BS.1770, BS.1771, BS.1864, EBU R128, ATSC A/85, and others.

