IRT – Loudness Range Compressor
A new cutting-edge technology for audio broadcasting

WDR – Radio Loudness Workshop
November 23rd 2012, Cologne

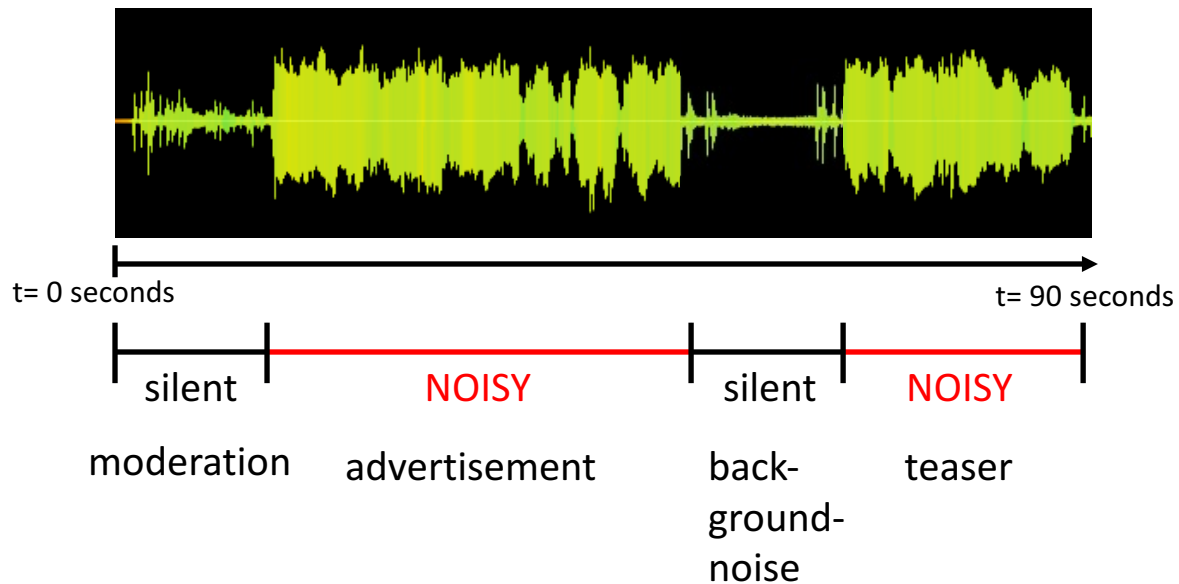Jens Groh, Christian Hartmann
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Topic Overview

① Introduction – Loudness in audio broadcasting

② IRT - Loudness Range Compressor at a glance

③ General operating principle

④ Key technologies

⑤ User Interface

Why can loudness be a problem?

waveform: beginning of a soccer match

t= 0 seconds

t= 90 seconds

silent   NOISY   silent   NOISY

moderation   advertisement   back-ground-noise   teaser

Broadcast is switching from „maximum loudness" to „normalised loudness"

- International European standard EBU R 128

- Higher acceptance by listeners

- Encourages producers to cease over-compression

- **New objectives for loudness control in broadcast production**

New objectives

- Eliminate loudness jumps between programmes

- Eliminate loudness jumps within a programme

- Keep the dynamic

- Reduce dynamic unobtrusively: only if it exceeds a threshold
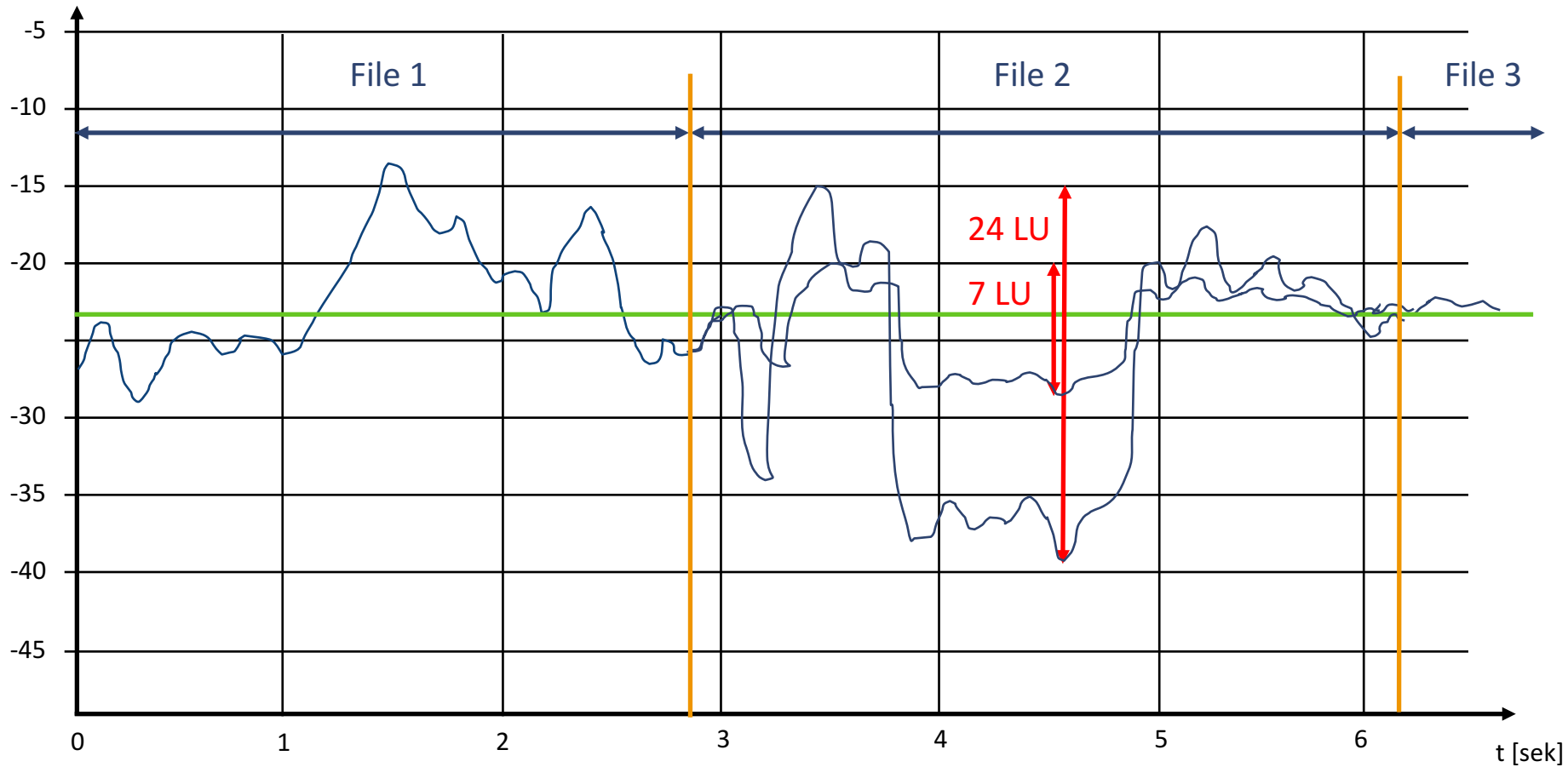
- Use standardised definition for measurement: EBU R 128

Real-time vs. file-based normalisation
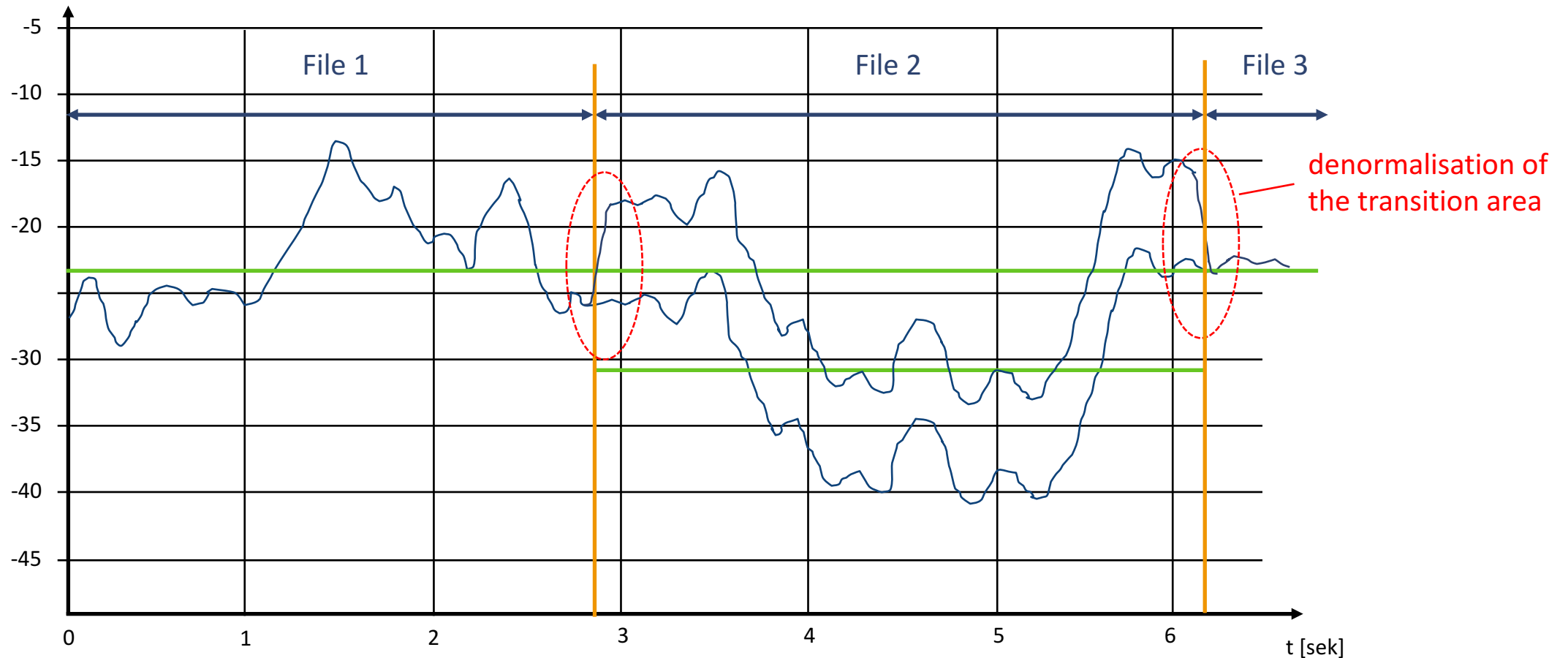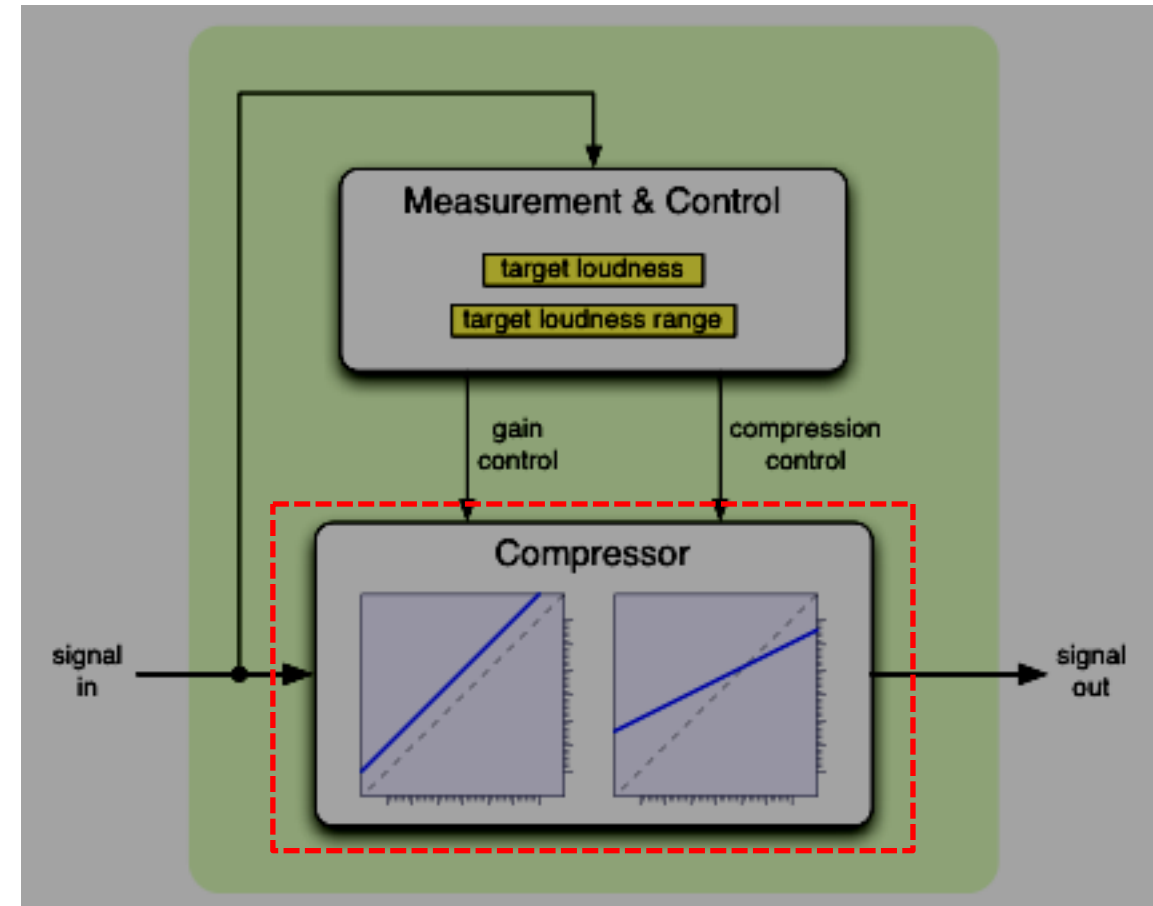
Real-time vs. file-based normalisation 2

Part 1: High-precision dynamic compressor

- loudness-based, not level-based

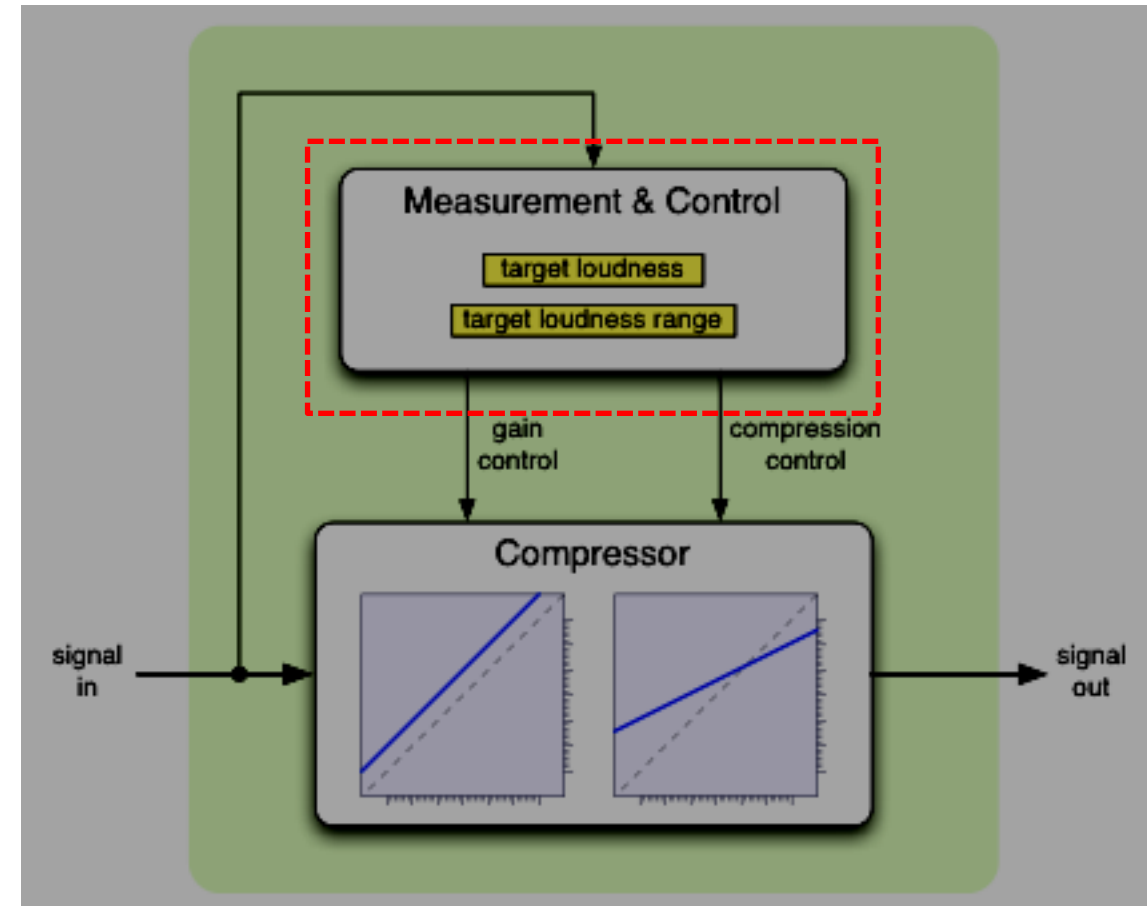- novel hybrid techniques minimises
  distortion & "pumping"
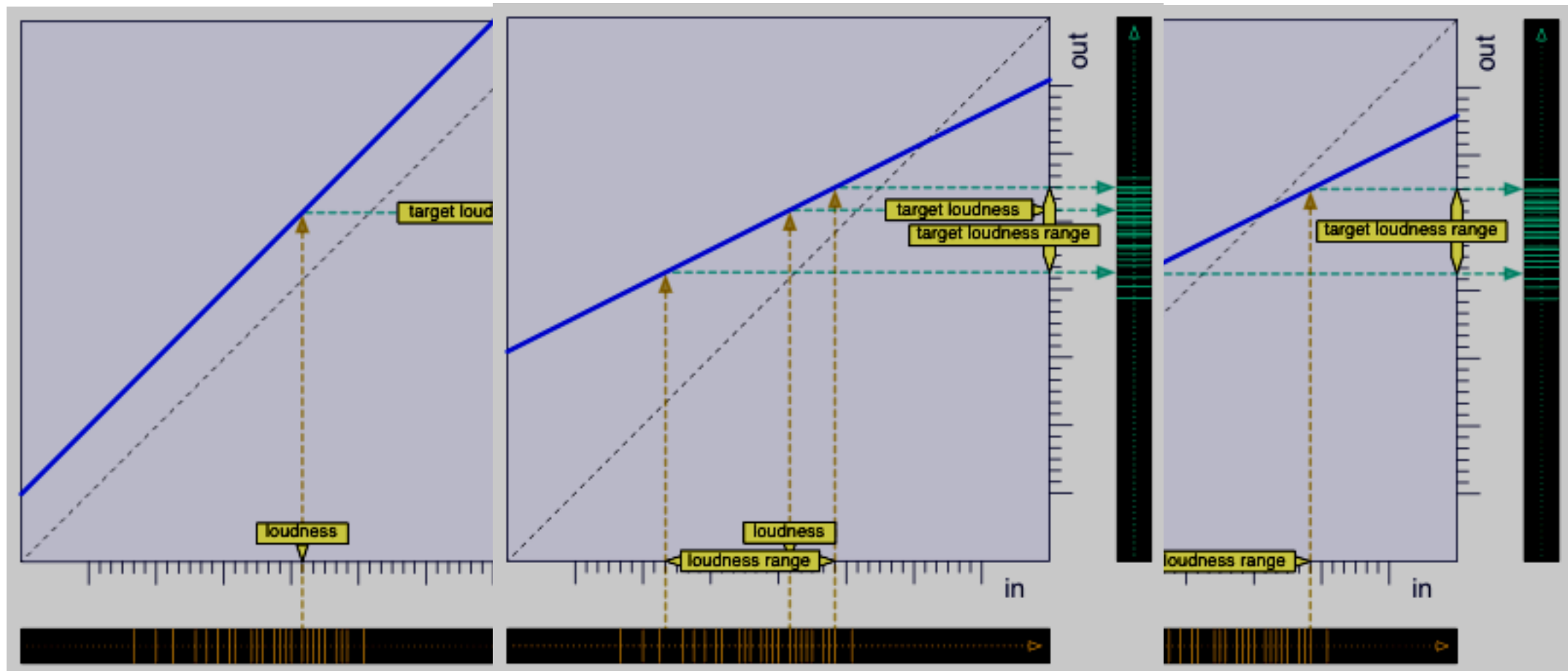
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- **Unobtrusively, "natural" loudness changes**
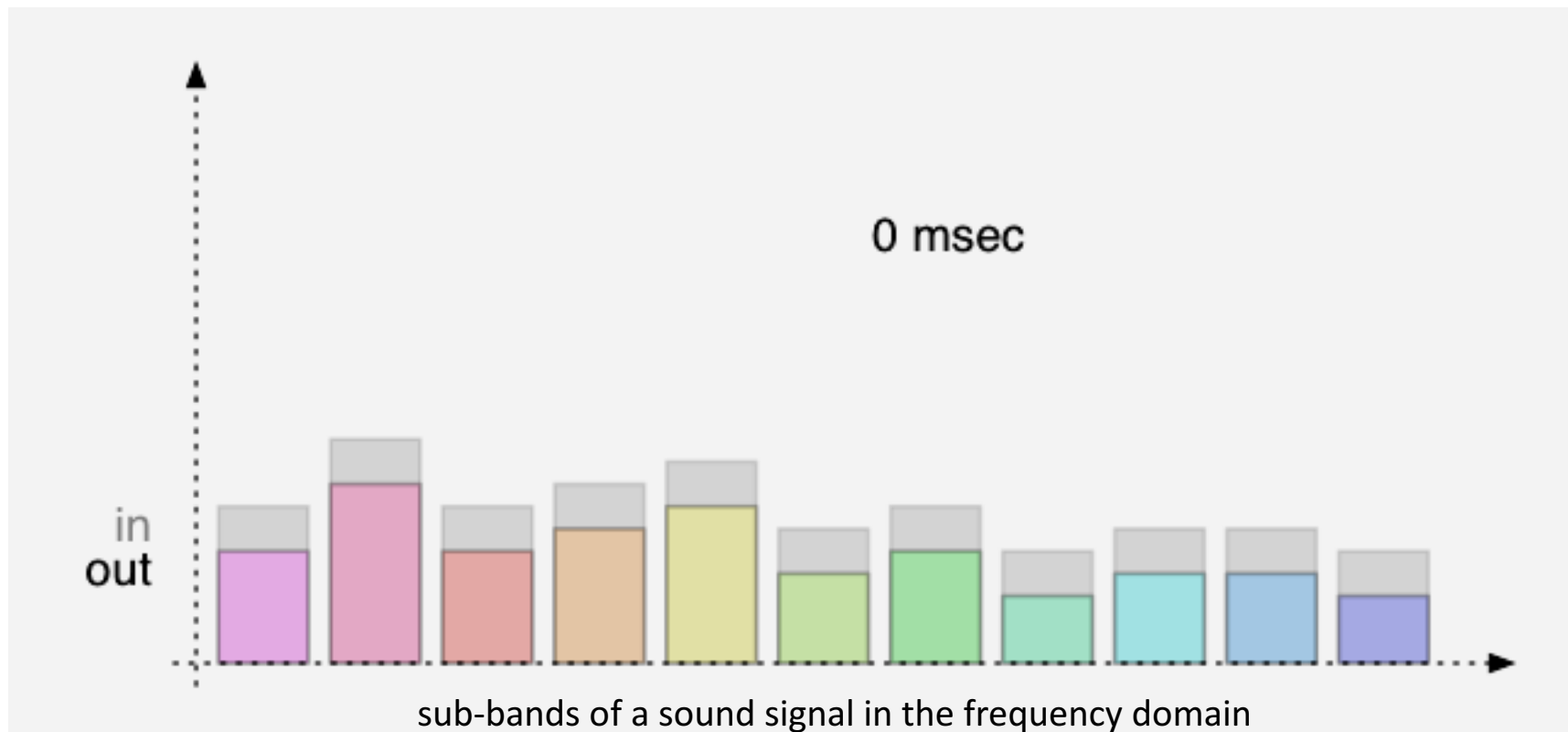
Part 2: High-precision controller unit

- auto-adapts programme loudness and loudness range in real-time

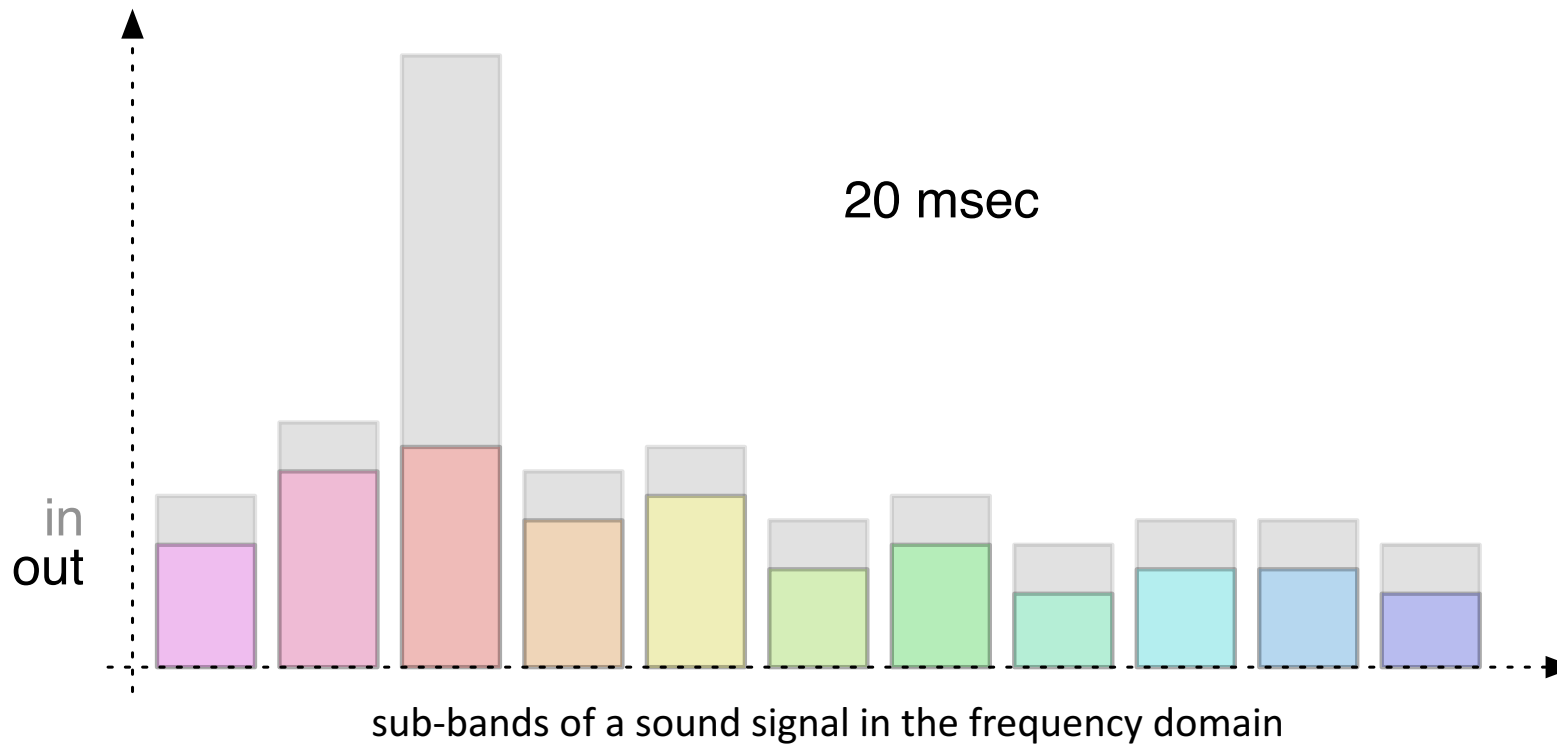- closely matches standardised file-based measurement and correction
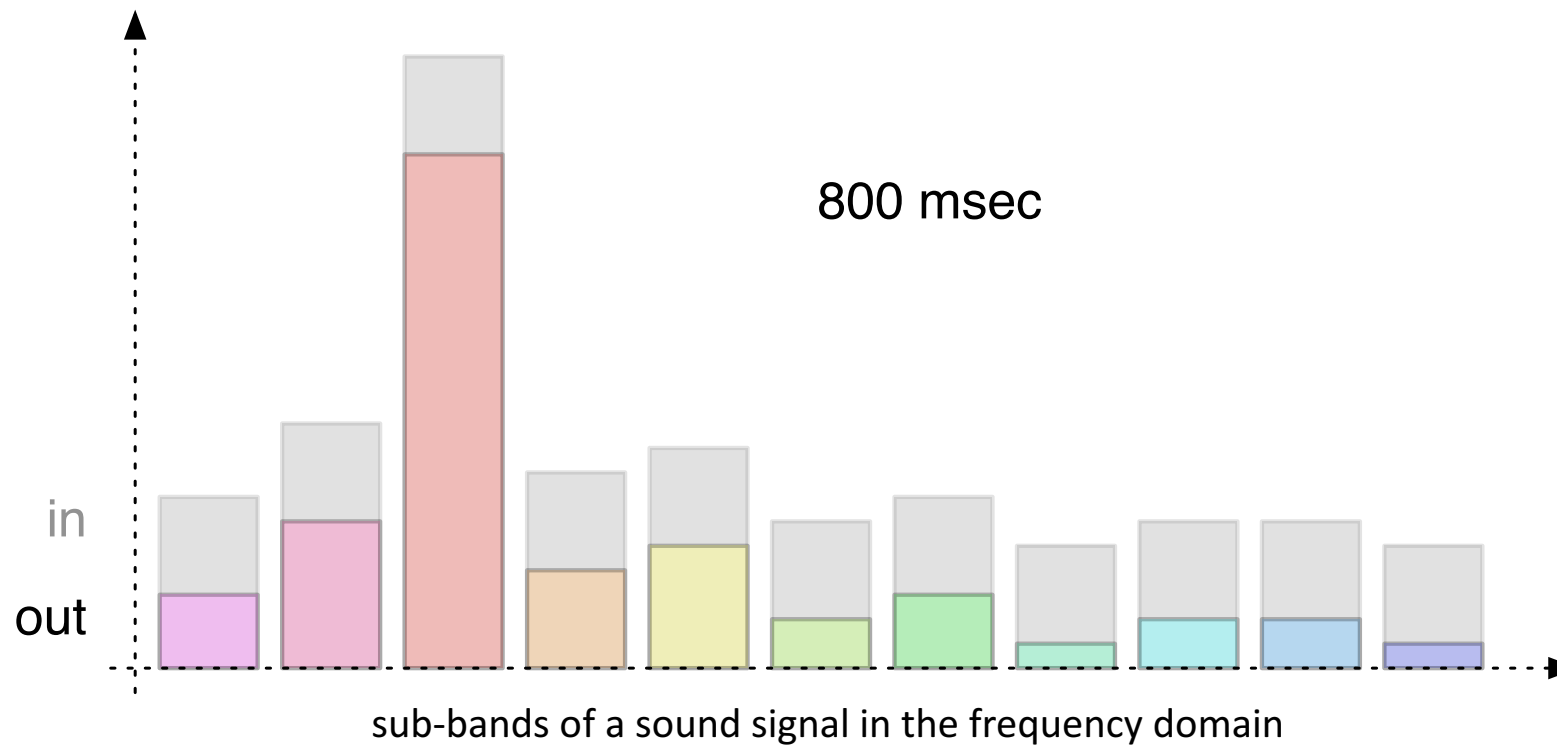
Compressor: Gain control and compression control

# Compressor: A hybrid of multi-band and wide-band compression control

sub-bands of a sound signal in the frequency domain

Compressor: A hybrid of multi-band and wide-band compression control

20 msec

in
out

sub-bands of a sound signal in the frequency domain

Compressor: A hybrid of multi-band and wide-band compression control

800 msec

in

out

sub-bands of a sound signal in the frequency domain

Compressor: High precision envelope curve
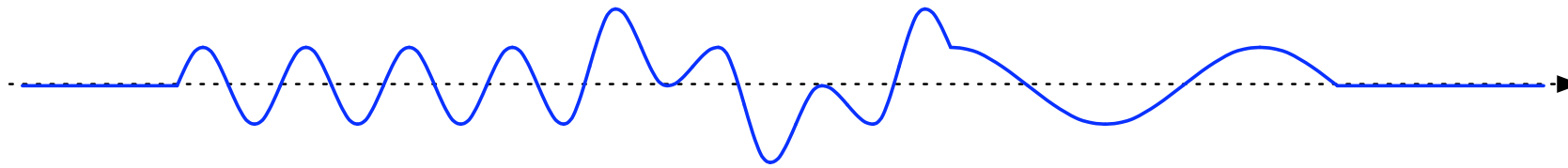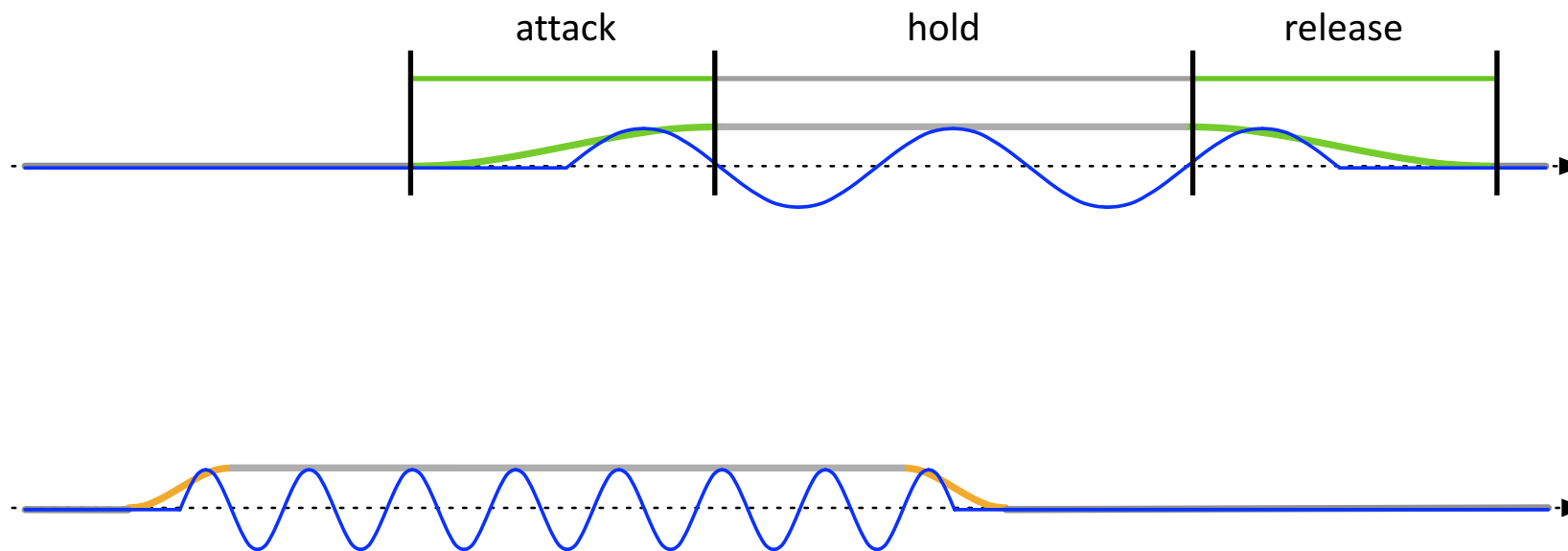

"natural" sound signal in the time domain

sub-band component

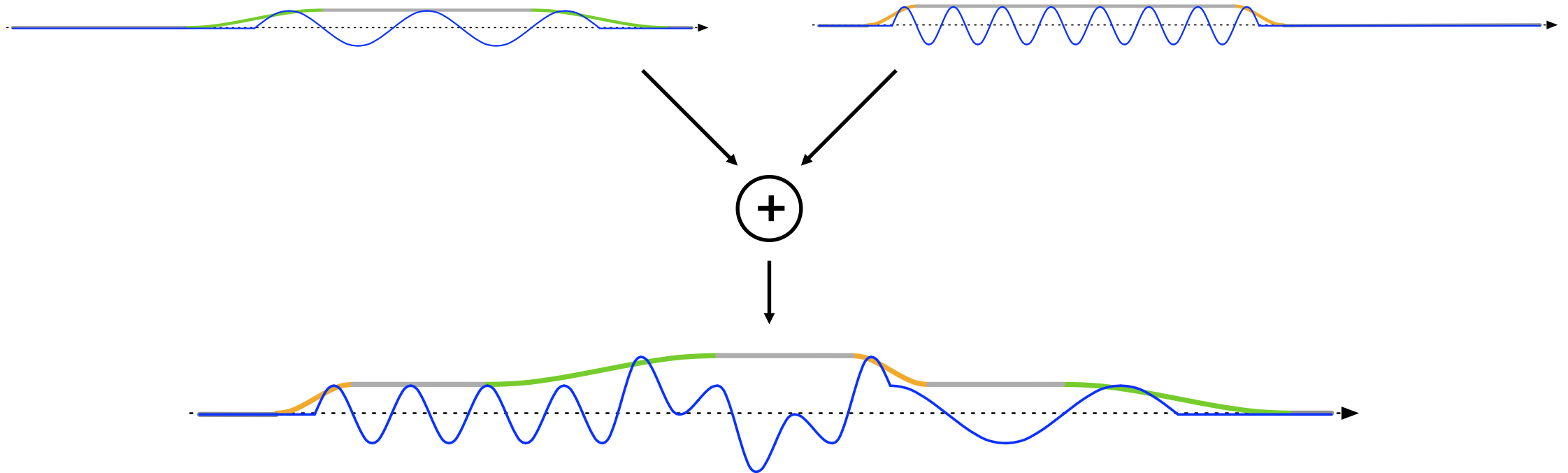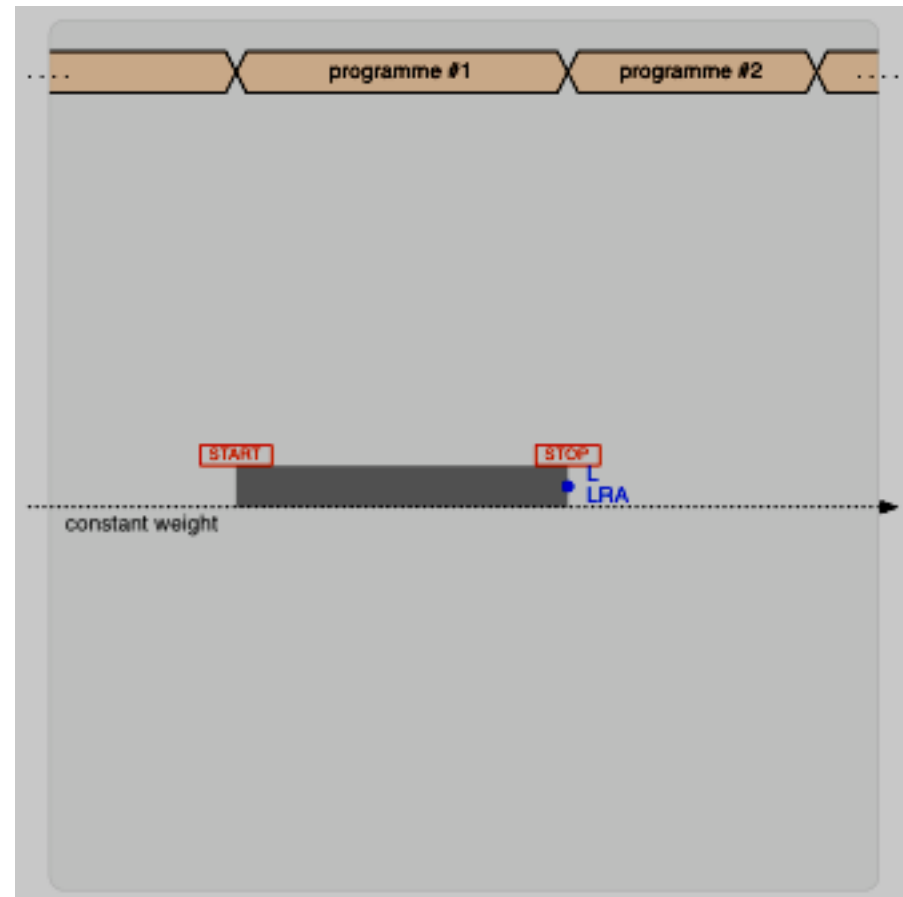sub-band component

Compressor: High precision envelope curve

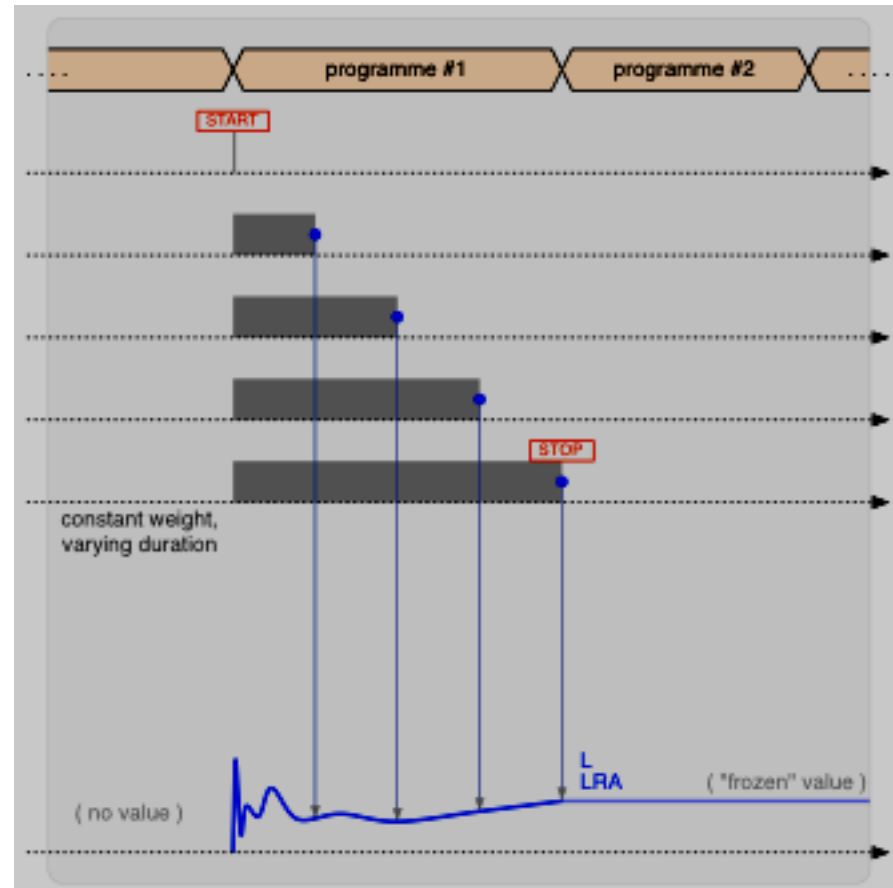# Compressor: High precision envelope curve

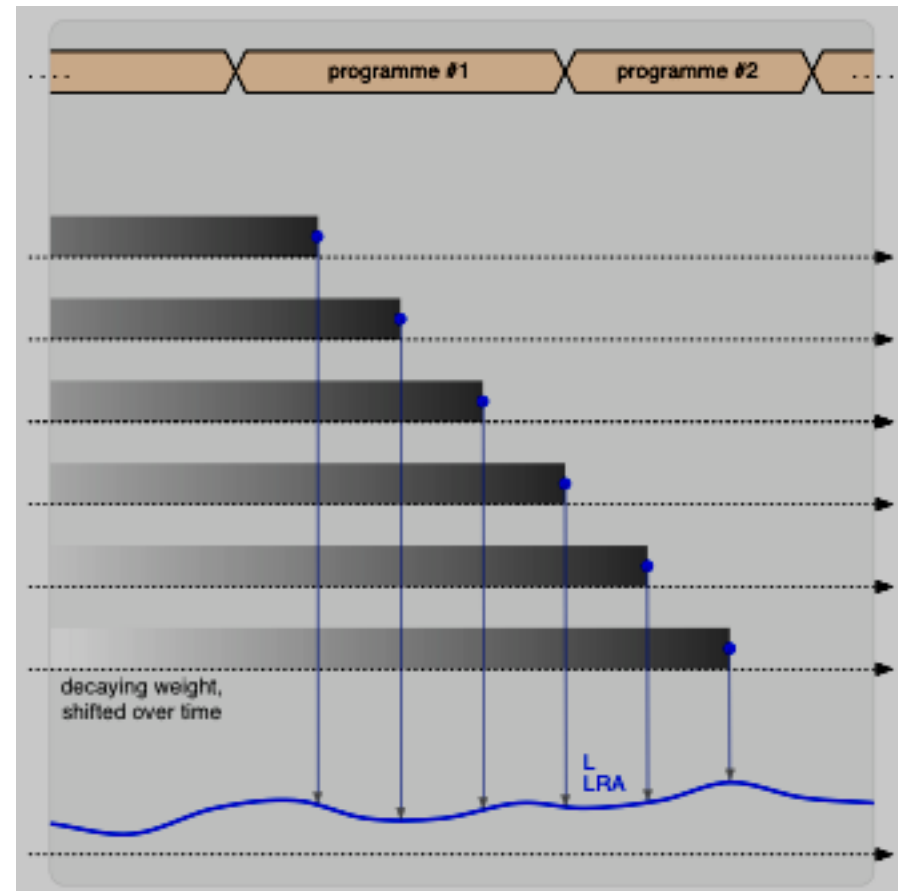# Controller unit: A way to measure the "Loudness Range" continuously

EBU R 128 definition:

Controller unit: A way to measure the "Loudness Range" continuously

Intermediate measurements:

Controller unit: A way to measure the "Loudness Range" continuously

Continuous measurement:

Thank you for your attention!

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