

Audio Decoders: Two updates

Technical Bulletin 11
matching audio levels across programmes

Associated (e.g. AD) Audio Streams
alternative mixing methods & potential features



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Tony Spath, Dolby Laboratories

Dolby Technical Bulletin 11

matching audio levels across programmes

The Outline ...

What the problem was (is)

How Dolby aimed to solve it

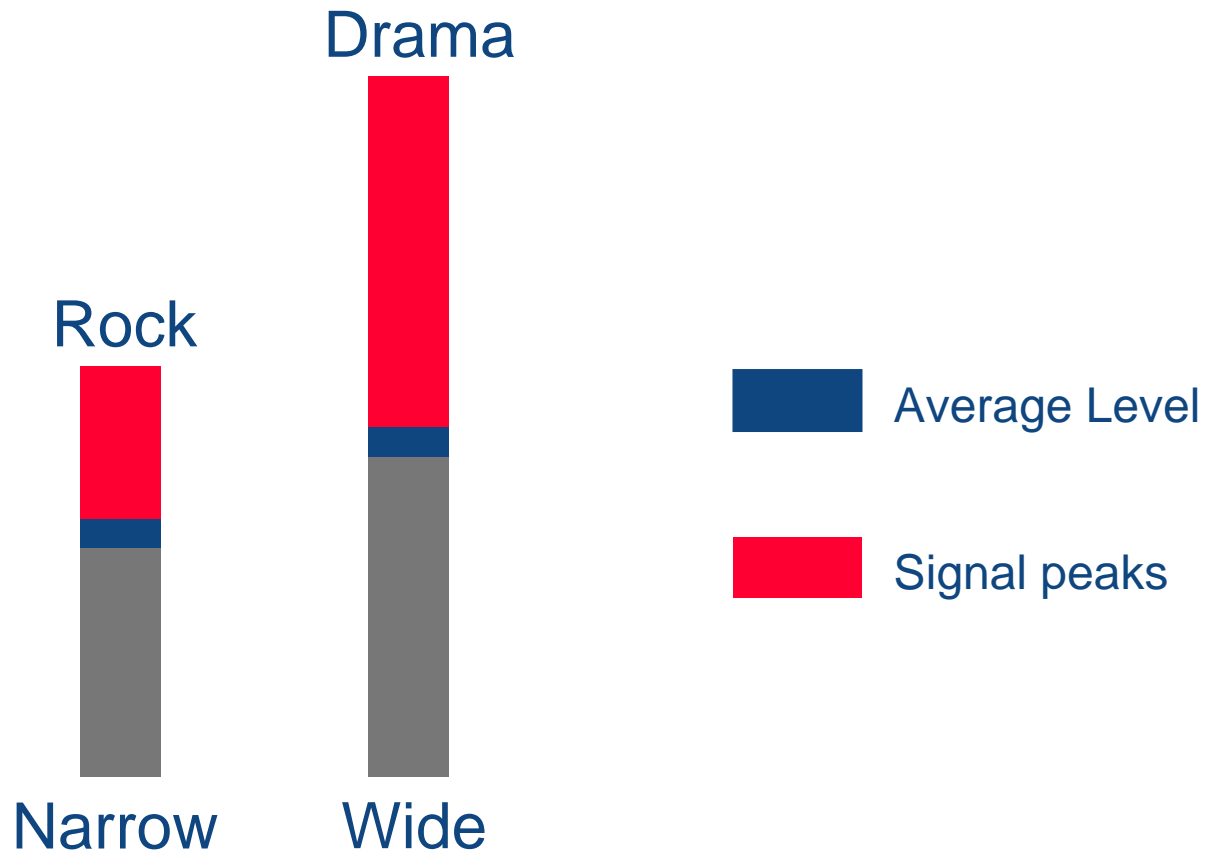
Why Dolby published Technical Bulletin 11 (TB11)

Where we are today

What Dolby will do (with TB11) in future

Some programmes sound different

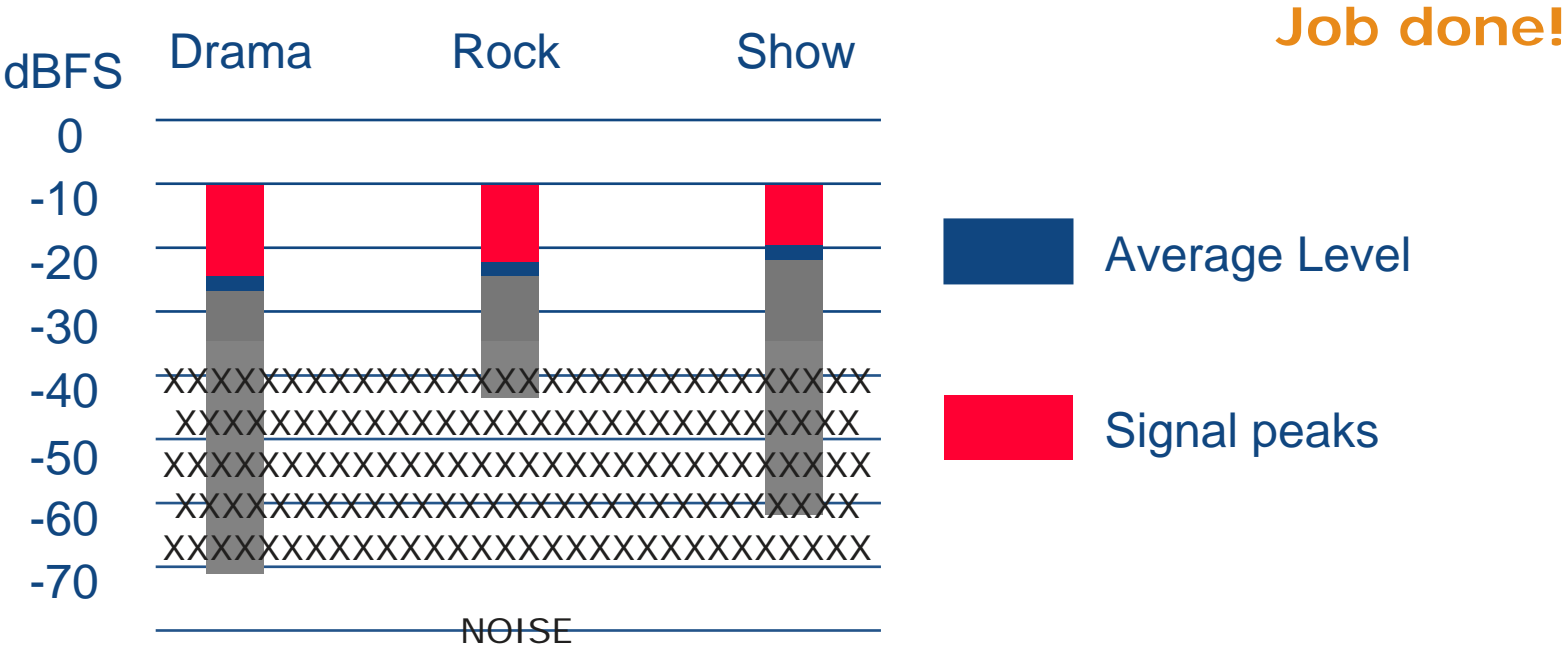
This is what programme makers make



Analogue Broadcast Methods

The broadcast channel was narrow
– so limiters were used to stop over-load.

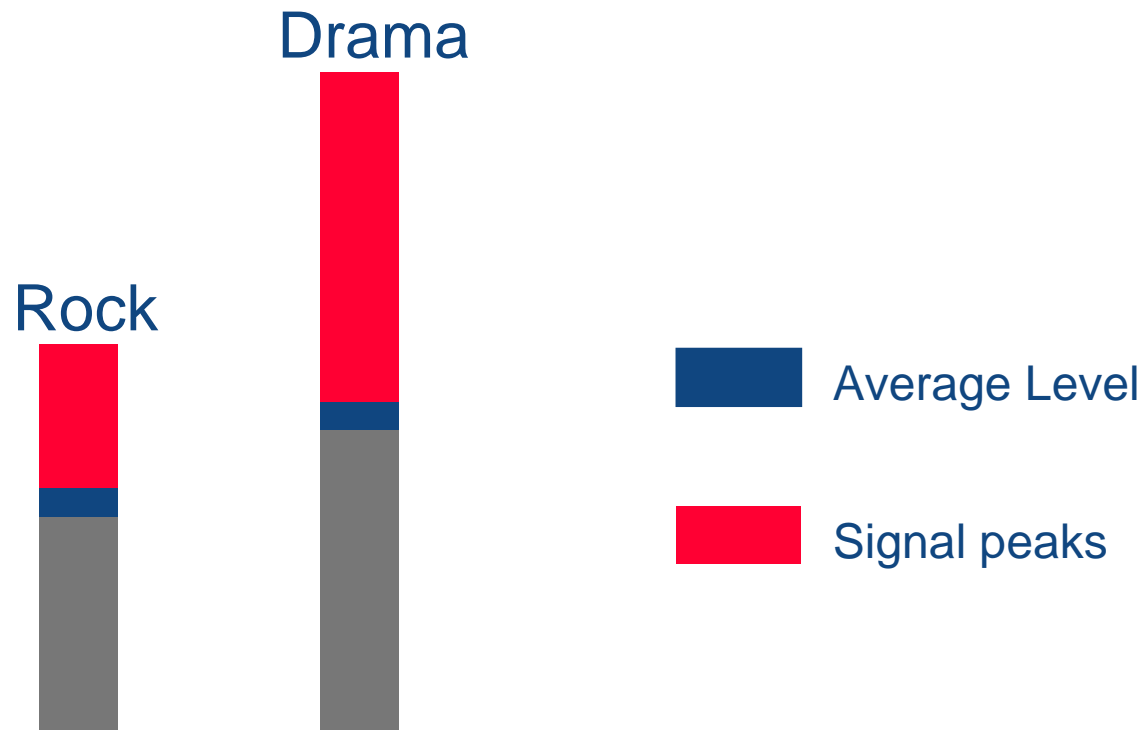
This also gives all programmes a reasonable correlation for programme loudness.



Digital Broadcast Methods

Digital has a wider dynamic range

Programmes can be broadcast with their original dynamic range



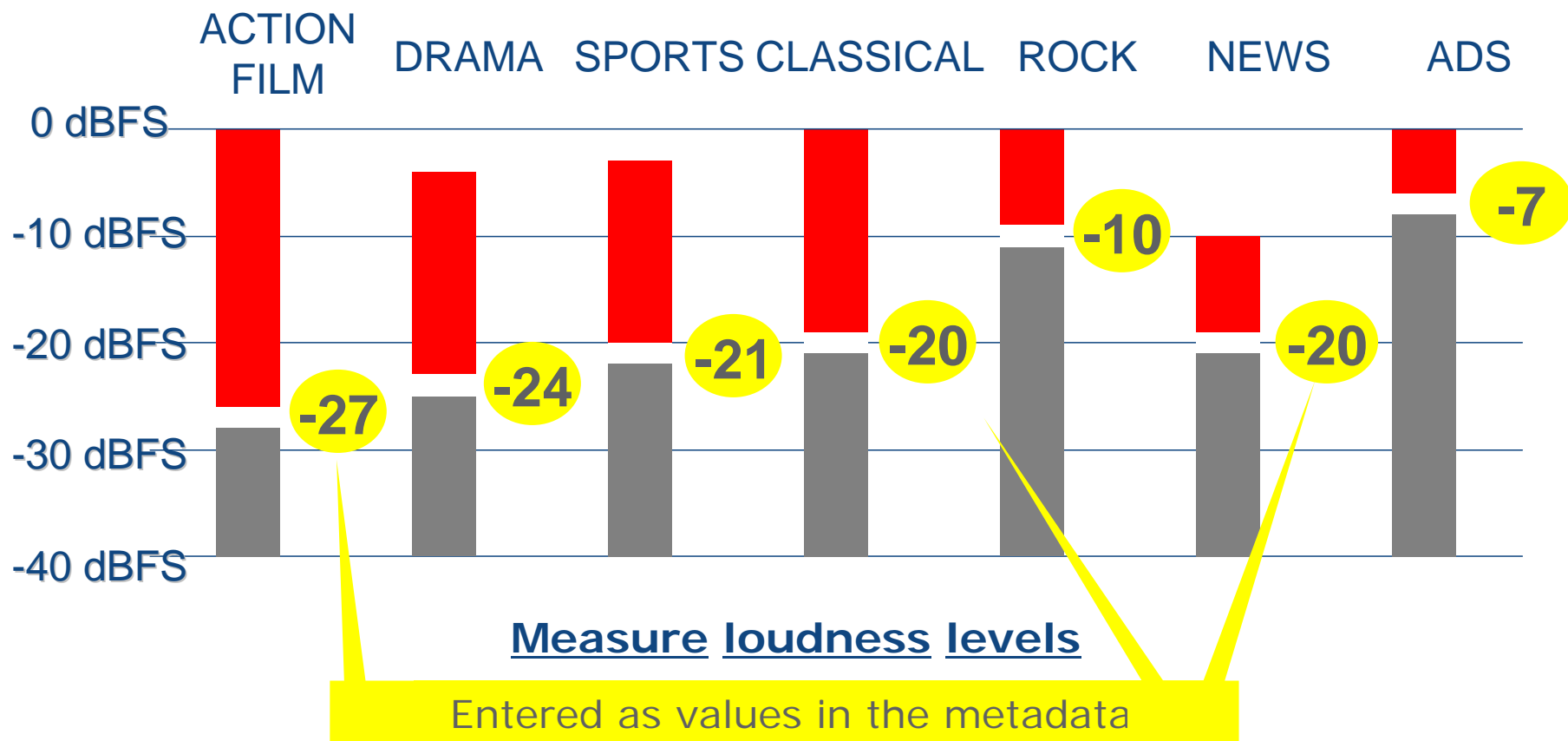
The problem...

- 1) Digital audio has a wider dynamic range than analogue
 - We no longer have a convenient correlation between loudness and dynamic range
- 2) There are many more channels, and many more programme sources.

Result: There is a wide variation in programme loudness

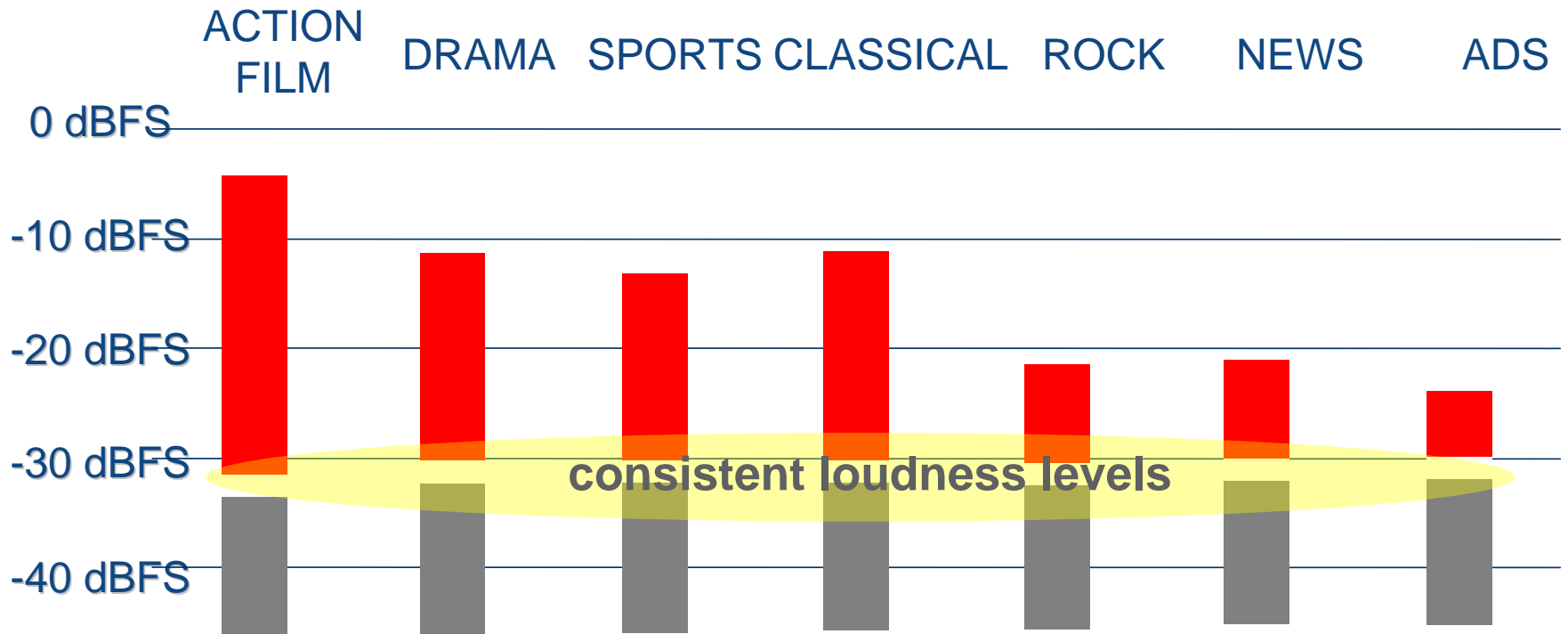
- Between different programme genres
- Between channels on different platforms
- Between channels on the same platform
- Between digital channels and analogue channels

Dolby Digital Broadcasts (circa 1995)



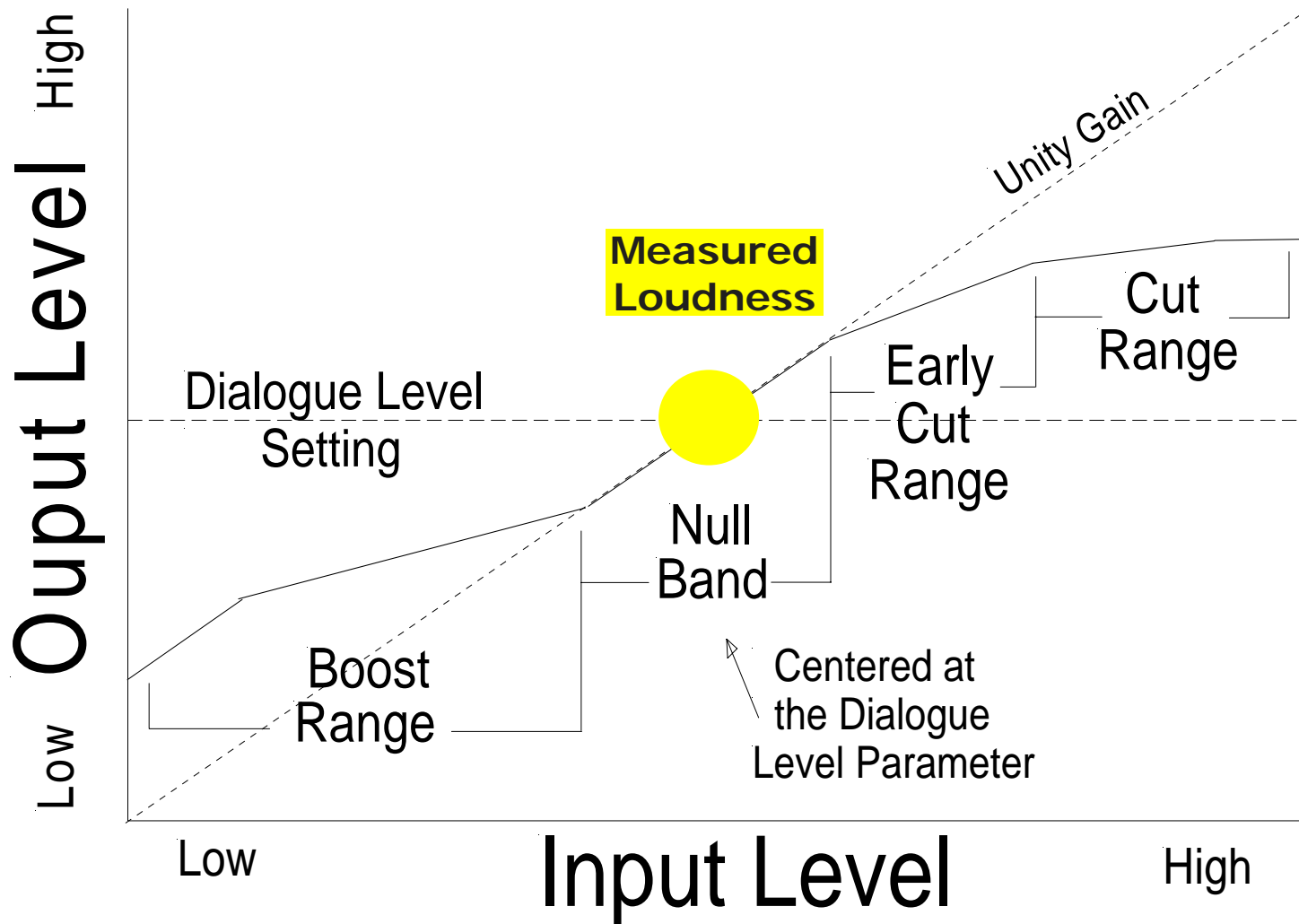
Dolby Digital Broadcasts (circa 1995)

– Normalising Audio Levels



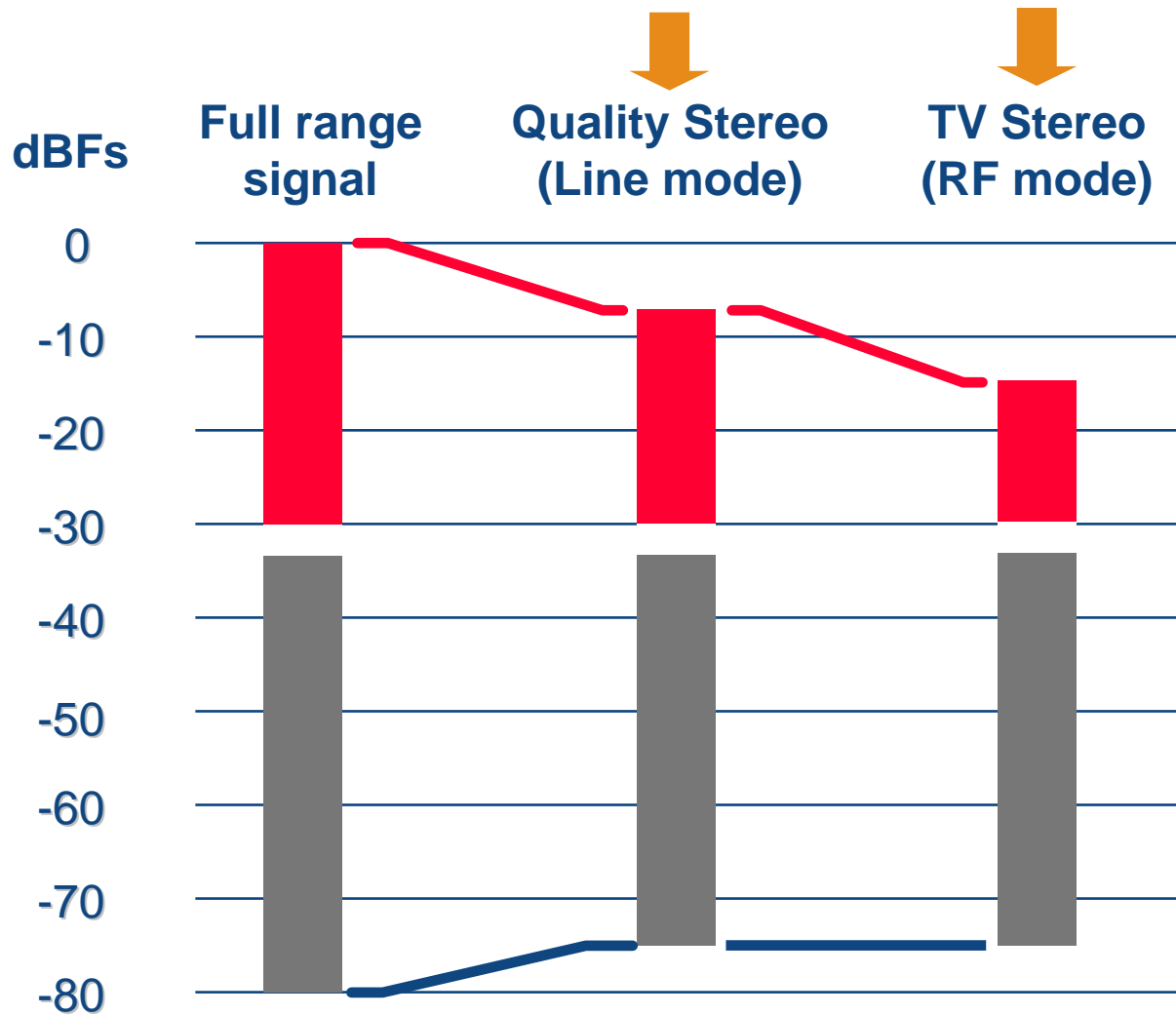
Dynamic Range Control

- available in every Dolby decoder

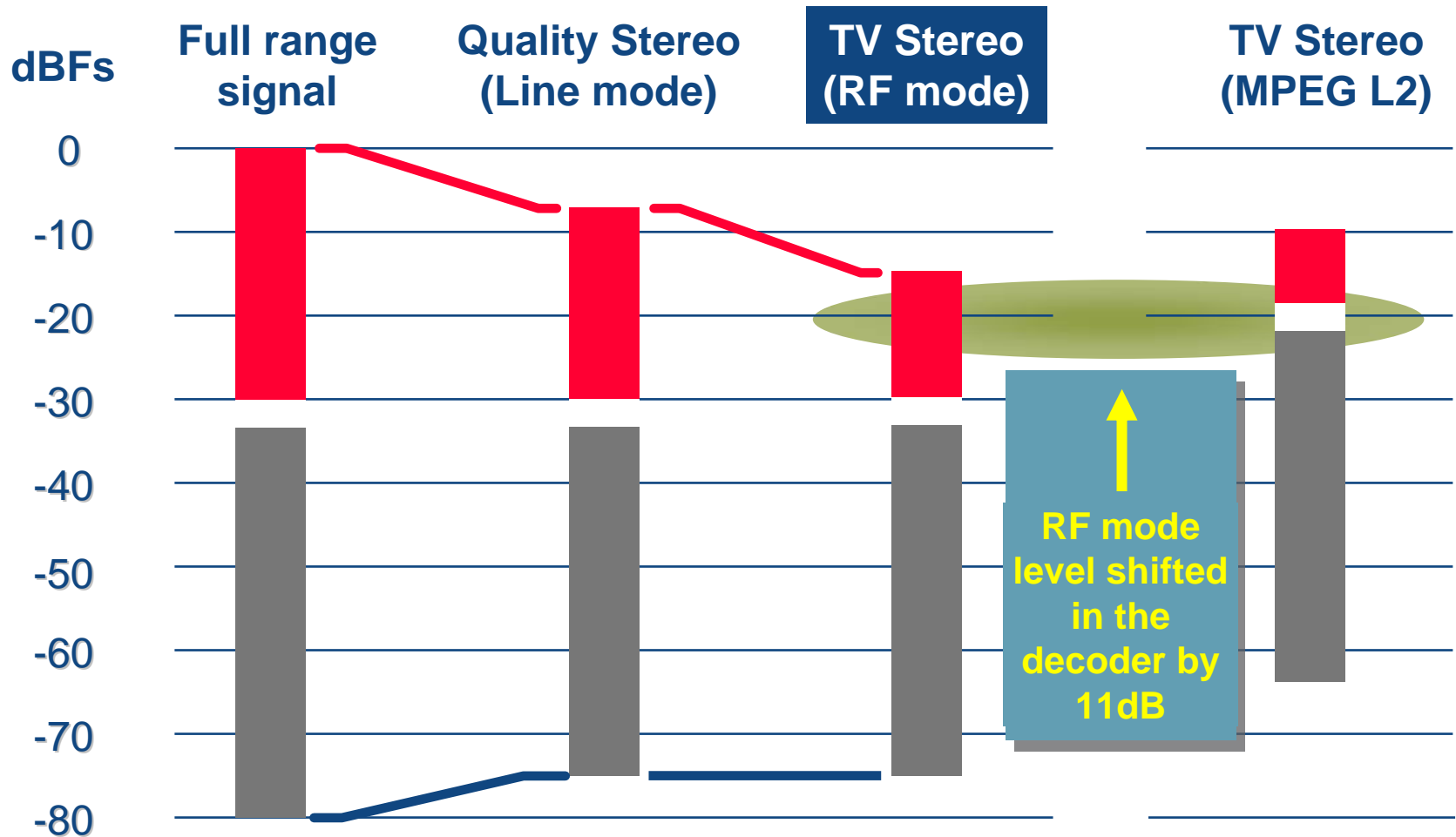


Dynamic Range Control

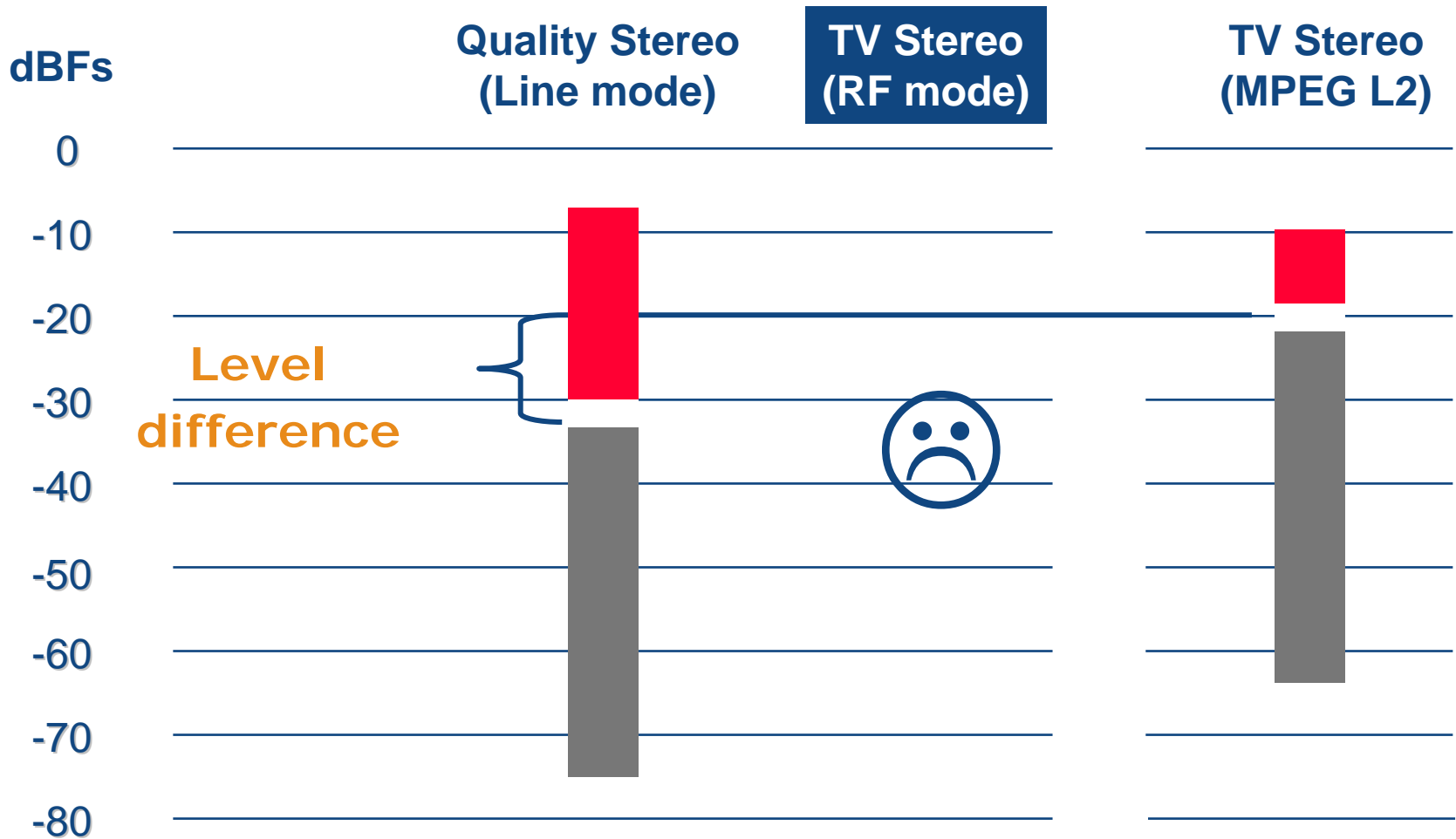
User selected decoder settings



RF mode: All chips sets include RF Mode Mode was optional in STBs and TVs



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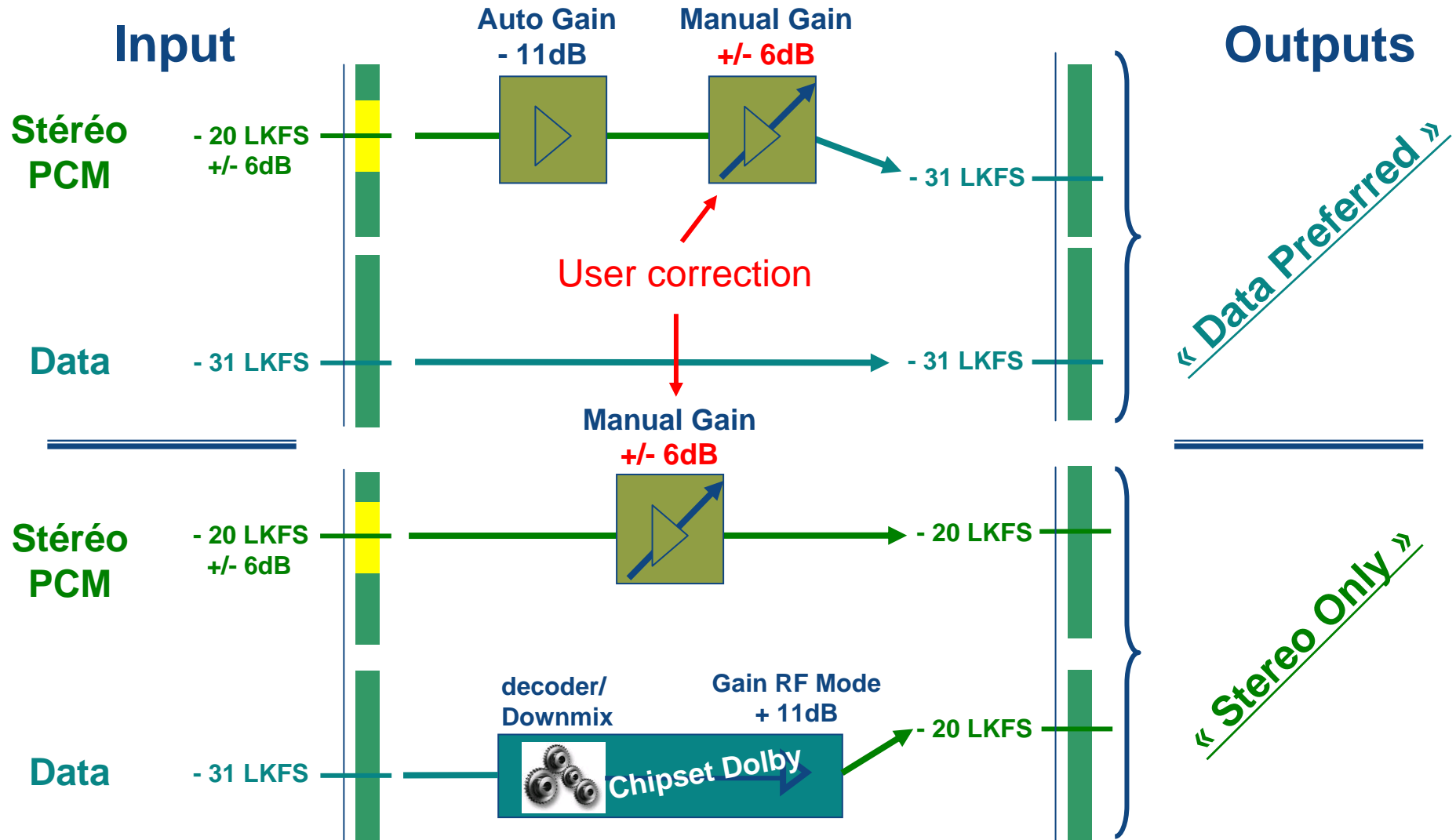
Make RF Mode mandatory for TVs and STBs

Make RF mode the default setting for TVs and STBs

Strongly recommend that the MPEG audio sent to the PCM output is reduced by 11 dB

GT SON #2

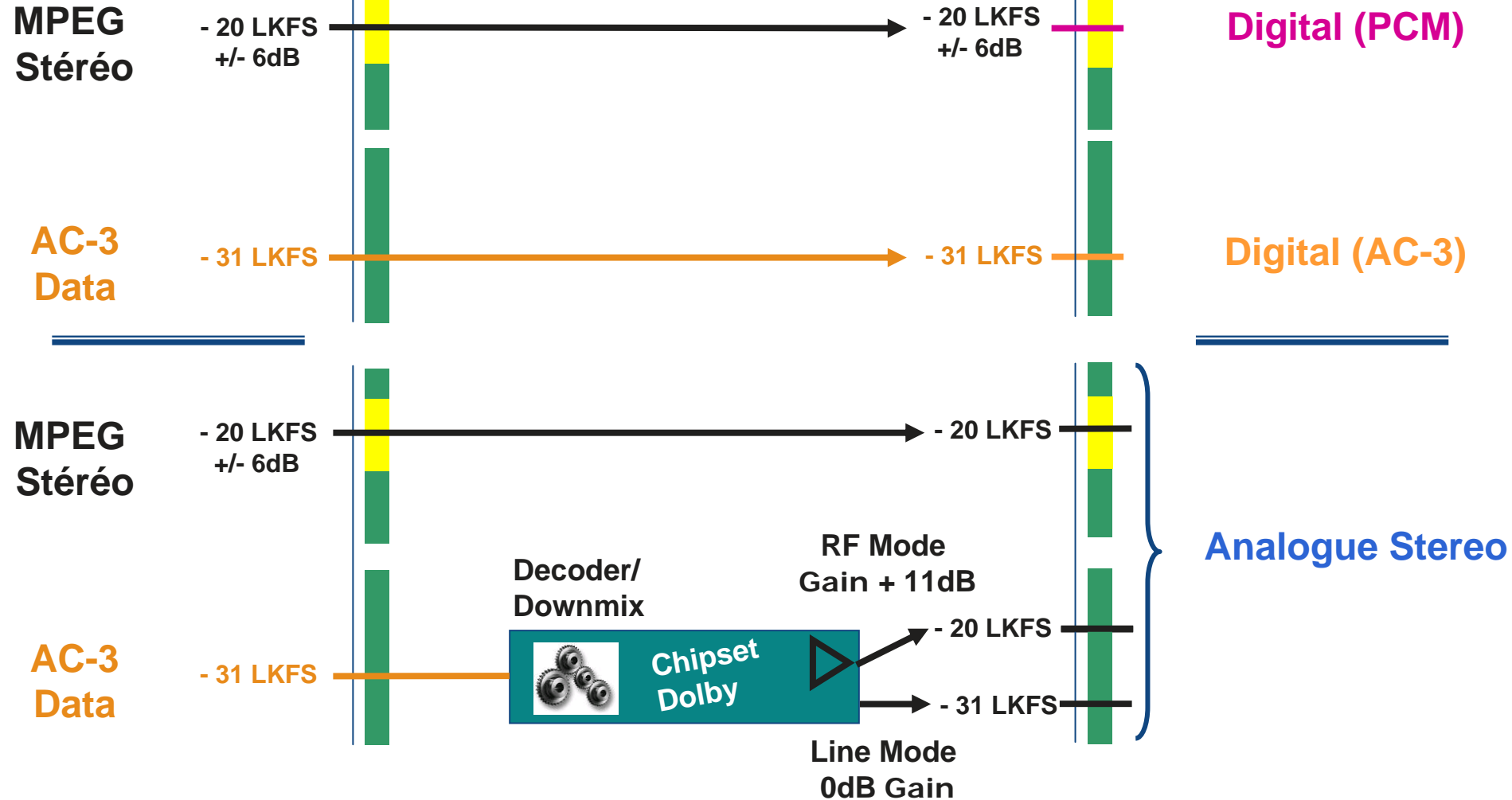
Reception (2/4)



Before TB 11: Audio Levels in Dolby Decoders

Input

Output



TB 11: Audio Levels in Dolby Decoders

Input

Output

MPEG
Stéréo

- 20 LKFS
+/- 6dB

Gain
- 11dB



- 31 LKFS

Digital (PCM)

AC-3
Data

- 31 LKFS

- 31 LKFS

Digital (AC-3)

MPEG
Stéréo

- 20 LKFS
+/- 6dB

- 20 LKFS

Analogue Stereo

AC-3
Data

- 31 LKFS

- 20 LKFS

- 31 LKFS

Decoder/
Downmix



Default:
RF Mode
Gain + 11dB

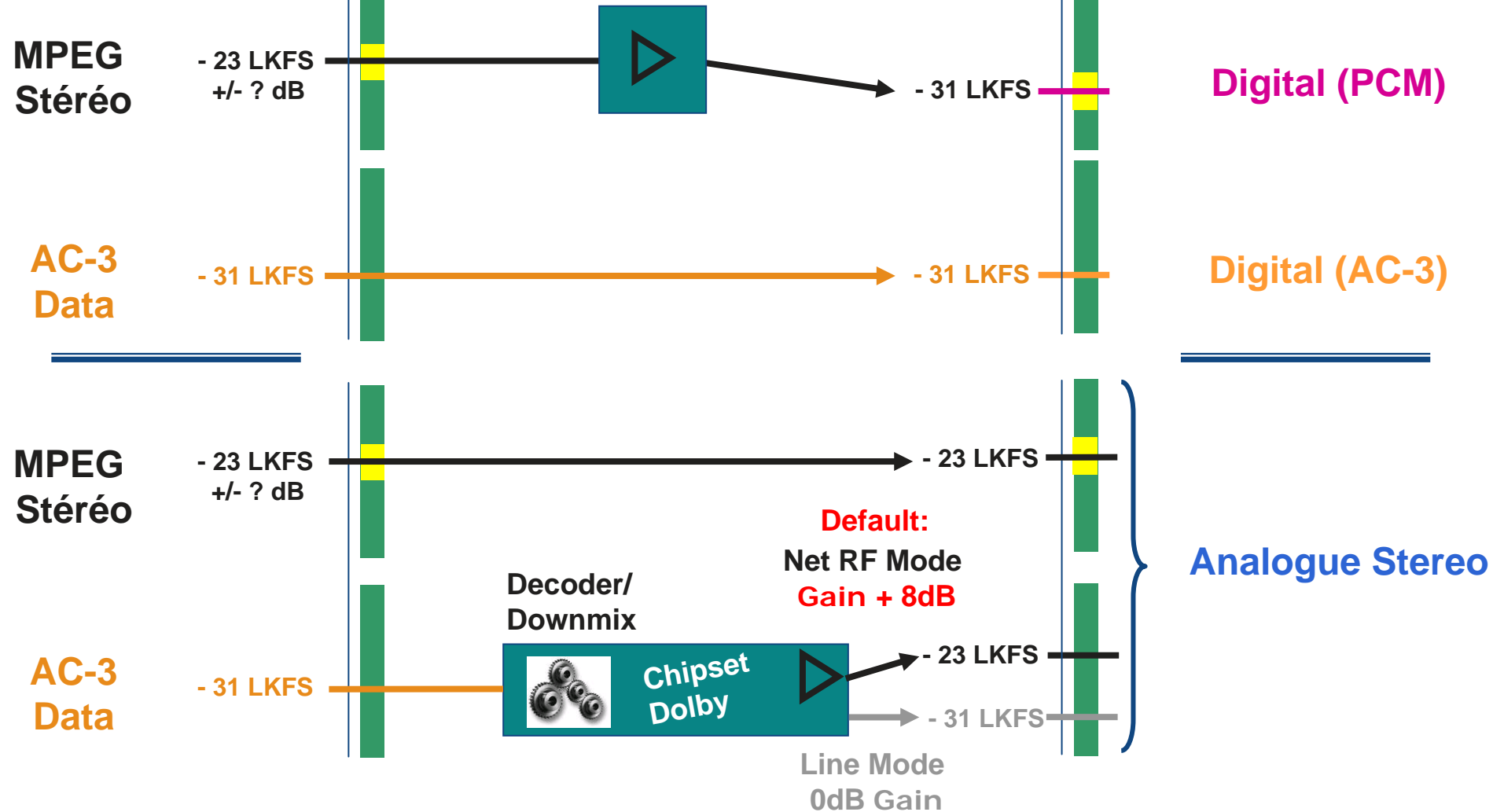
Line Mode
0dB Gain

Future: Audio Levels in Dolby Decoders *

* Awaiting EBU rec.

Input

Output



Future: Audio Levels in Dolby Decoders

Move Target level from -20 to -23 dBFS

This requires...

- EBU recommendation
 - Loudness measured and set at -23db LKFS
- Public adoption by broadcasters
- Programme makers make programmes to it
 - They measure and set Loudness!!
- Implementation in TVs and STBs
 - The Schedule

- Questions?

Associated (AD) Audio Streams alternative mixing methods & potential features

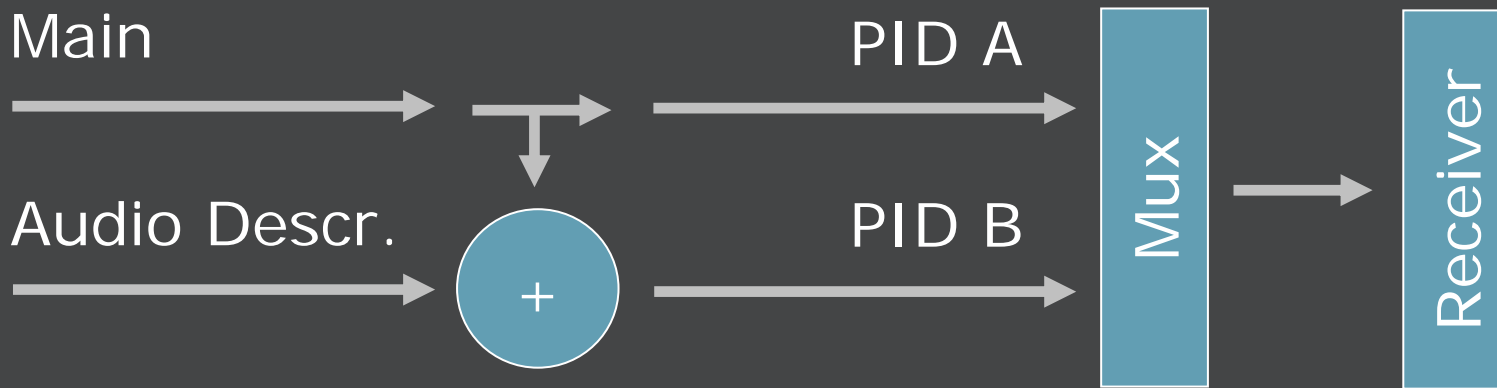
The Outline ...

The alternatives

Mixing metadata and encoding

Decoder status

Associated (e.g. AD) Audio Mixing Broadcaster Mixed - today's solution

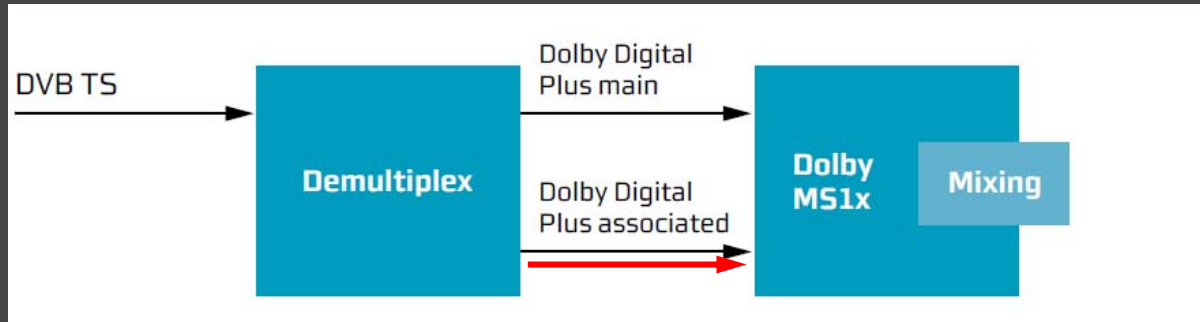


- This is possible now
- Any audio format can be used
- Not bandwidth efficient, and requires mixing / QC at broadcast station

Main + Associated Audio Delivery Alternatives

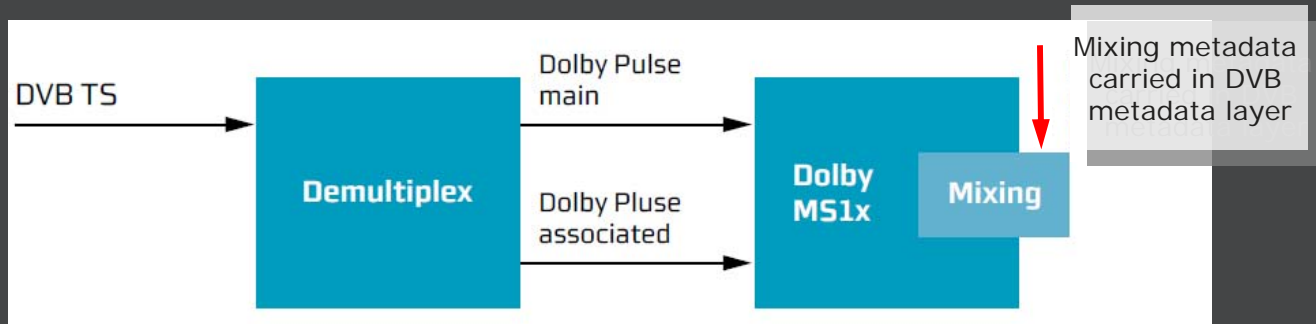
Dolby Digital Plus Dual PID

Stream mixing metadata



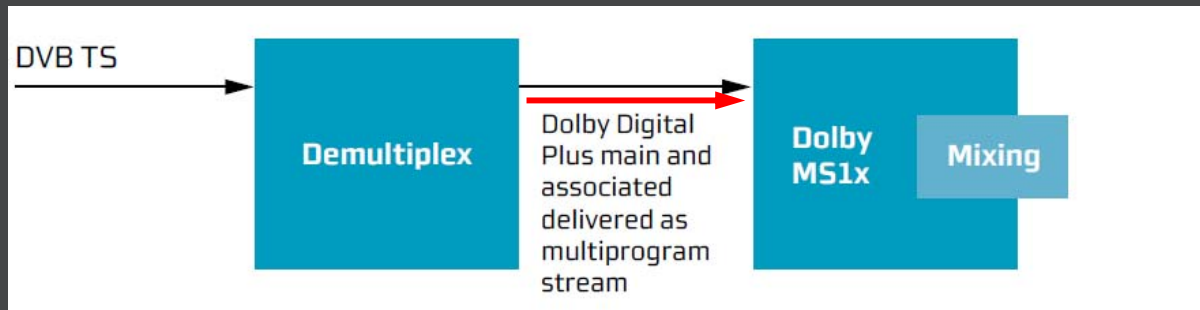
Dolby Pulse / HeAAC Dual PID

Stream mixing metadata



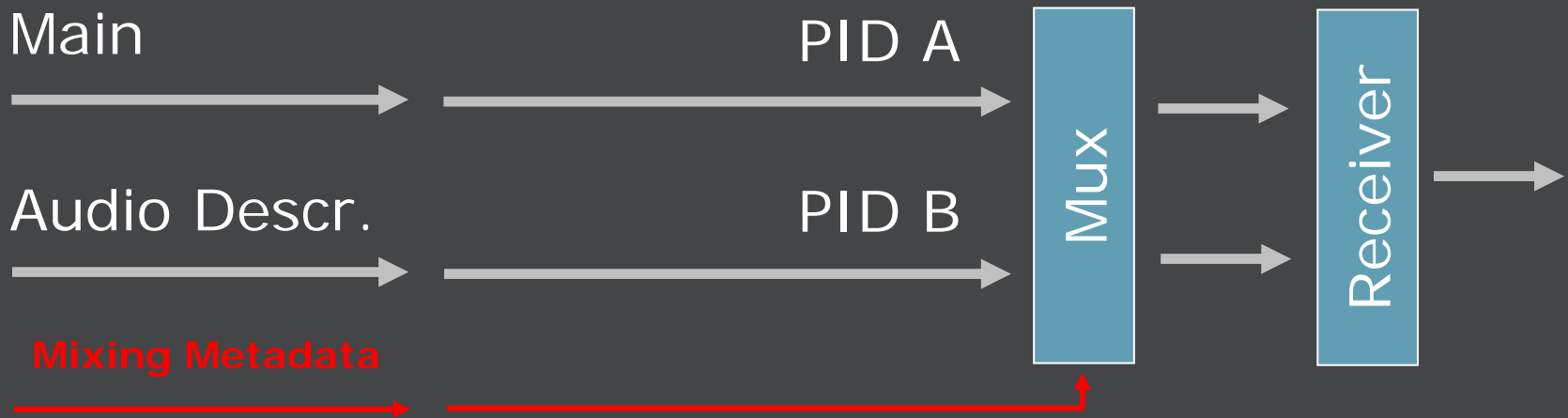
Dolby Digital Plus Single PID

Stream mixing metadata



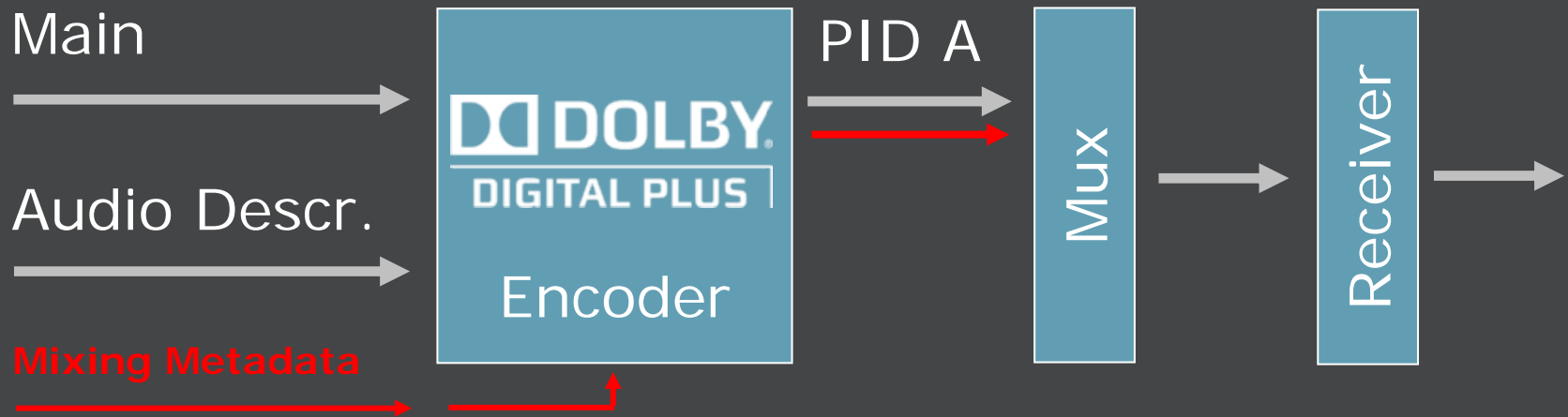
Associated (e.g. AD) Audio Mixing

Dual PID, Receiver Mixed (DVB MD)



- Early DVB specification only allowed mono MPEG1-LII audio as AD audio
- Encoders available
 - MS10 decoders will enable AD mixing with new audio formats

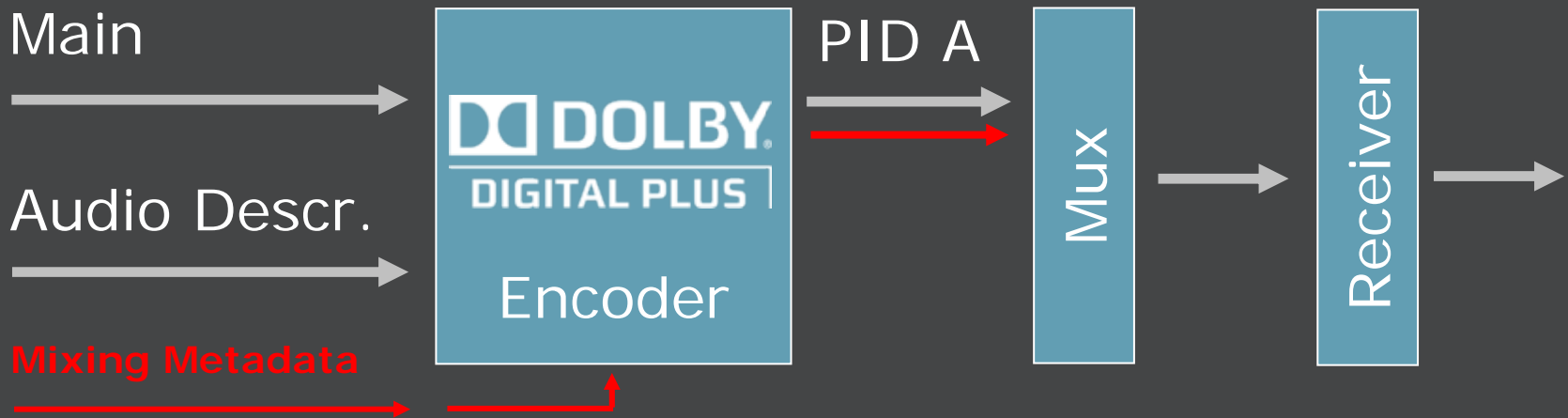
Associated (e.g. AD) Audio Mixing Single PID, Receiver Mixed (EAC-3 only)



- Dolby will certify encoders and decoders
 - MS10 decoders will be the first to do this
 - AD mixing initially limited to stereo output only
 - 5.1 channel output in future decoders (Dolby MS11)
- Initial work on track with encoder makers

Dolby Digital Plus

Associated Audio metadata features



- Audio elements locked and synchronous (Single PID)
- Smooth gain changes in Associated audio level
 - 32 ms between data values, ~ 80 ms look-ahead

Dolby Digital Plus

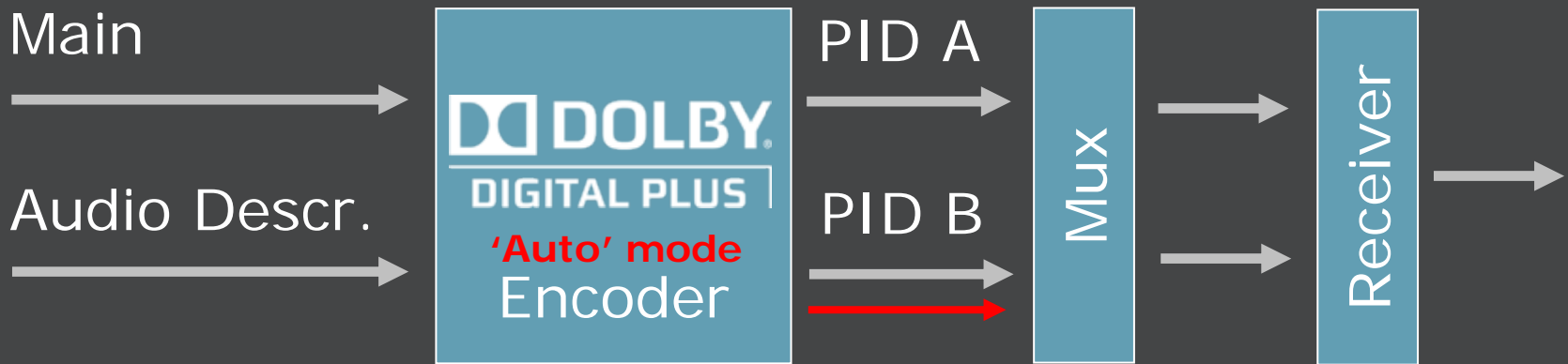
Associated Audio metadata features



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- Optional "Automatic" generation of mixing metadata

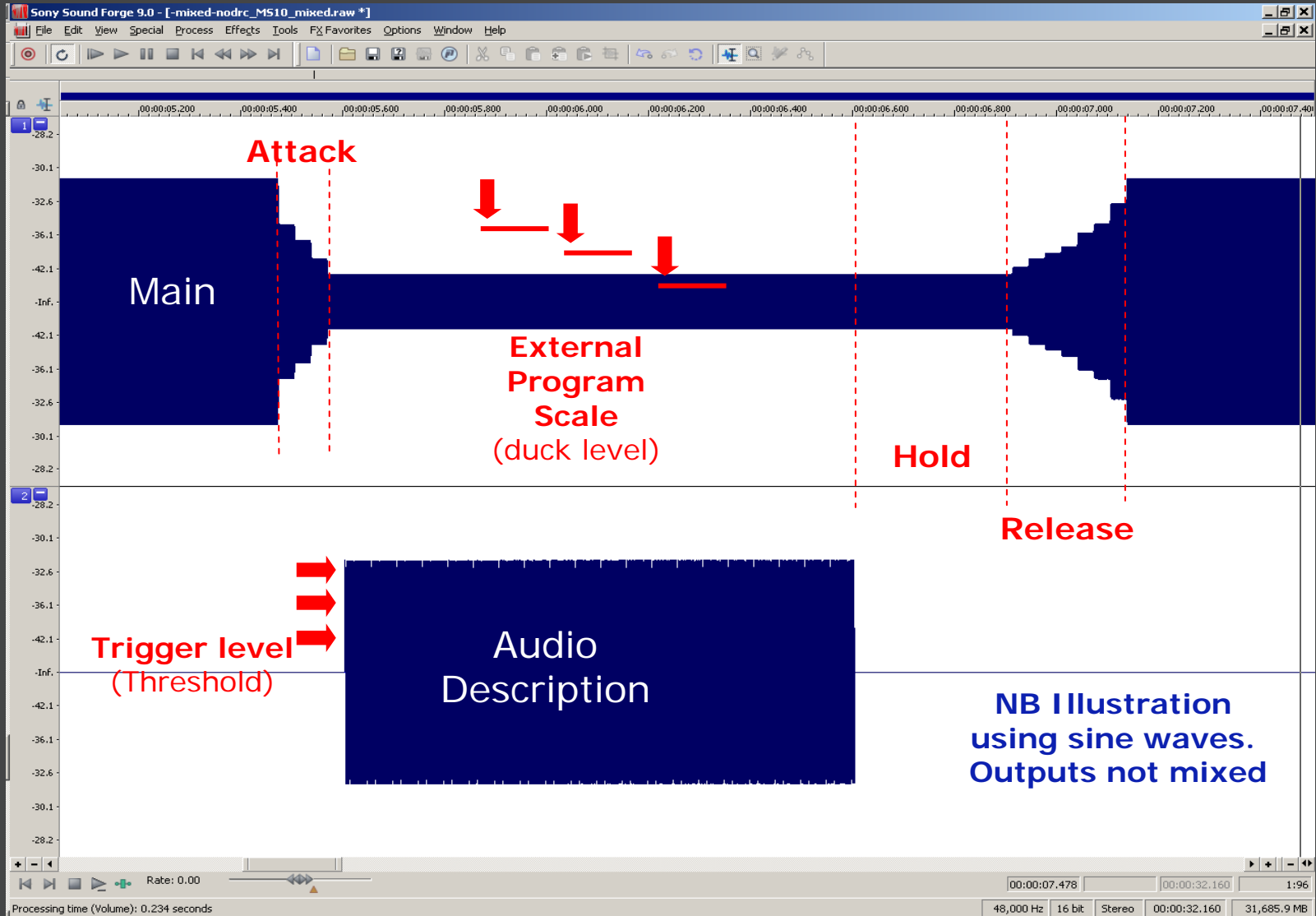
Dolby Digital Plus (Dual PID)

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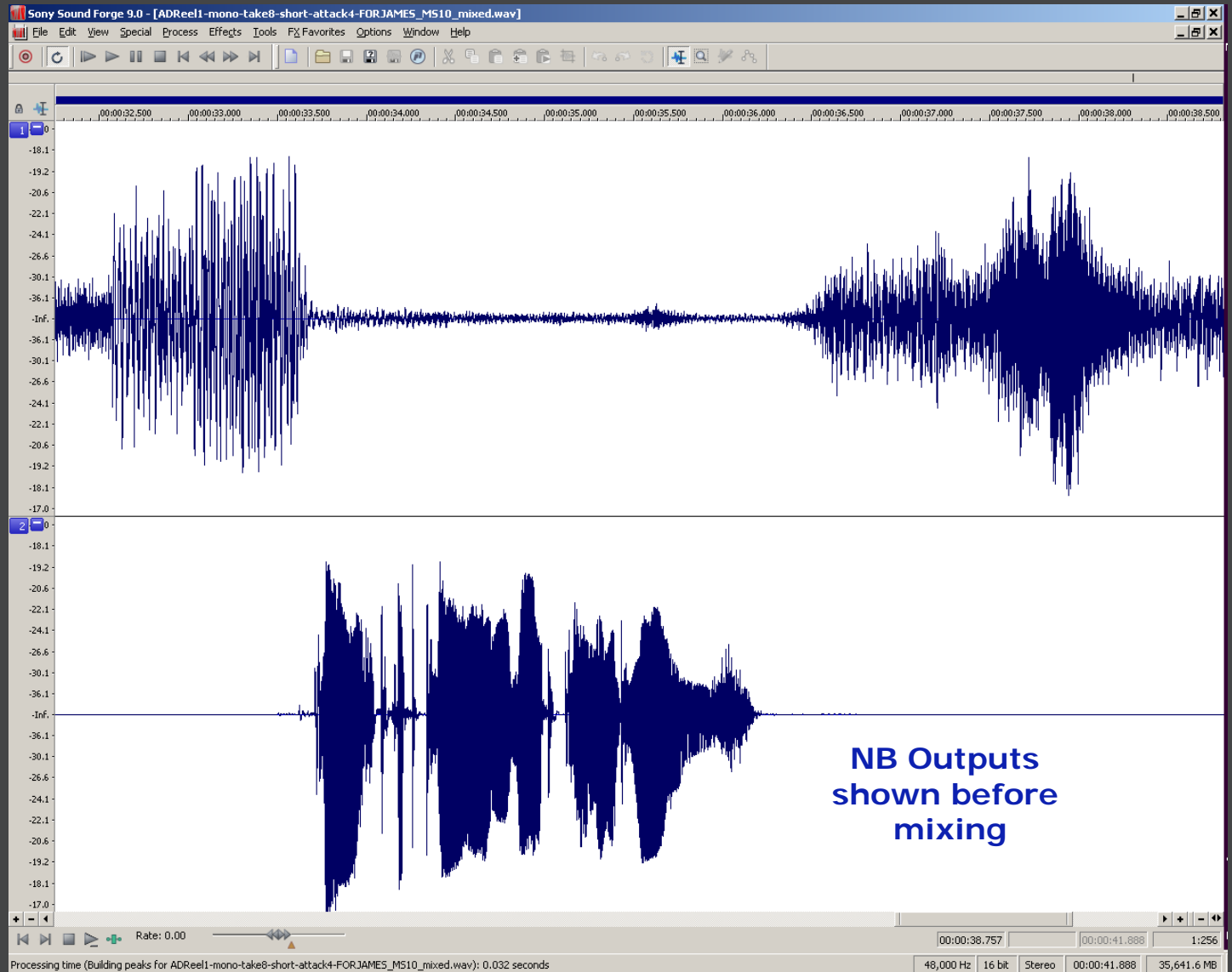
AD Mixing: Illustration of 'Auto' Metadata features



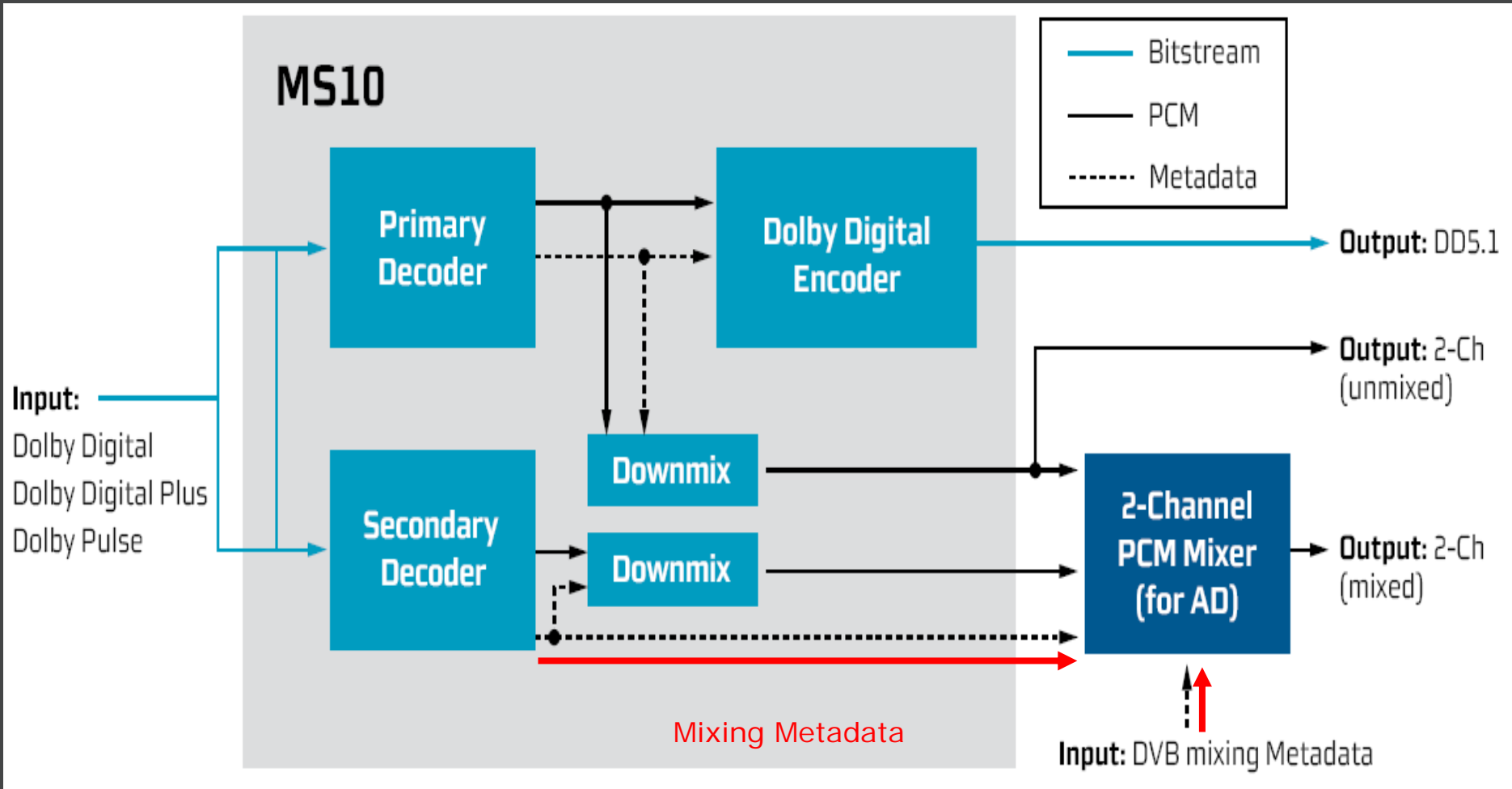
Example

Main

Audio
Description



Dolby MS10 Multistream Decoder



Associated (e.g. AD) Audio Mixing Decoder status

- Dolby Digital Plus decoders in the market today but not yet with secondary audio mixing
- Dolby MS10: the first integrated opportunity for either Single or Dual PID stream mixing with audio formats other than mono MPEG2
 - Single package (testing and IP); lower IP cost
- All Dolby Digital Plus decoders are tested with Single PID secondary audio streams – to ensure they ignore the secondary stream

Questions?

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Thank you

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