Battling DTV Audio Myths and Realities:

Some Useful Facts for the Transition

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Rules for US DTV Broadcasters

- FCC mandates the use of ATSC A/53D which states in section 5.5:

  "The value of the dialnorm parameter in the AC-3 elementary bitstream shall indicate the level of average spoken dialogue within the encoded audio program."

- North American Digital Cable standards ANSI/SCTE 43 and ANSI/SCTE 54 also reference A/53

General Points

- ATSC defined audio system in 1995:
  - Separate audio and audio control via metadata
  - Loudness and dynamic range also separated
  - One encode serves many different viewers

- Theoretically, there is no need for audio processing by local stations. In practice, this is not the case.

General Points

- Problems for the local station:
  - Loudness shifts within local programming
  - Local versus Network transitions
  - Dynamic range of network programs
- Loudness managed by metadata:
  - All local content could be measured, outliers could be corrected, better match to network
- Is this happening?

  - Share anecdote…My Dad!

Measurement Standard

- Loudness and Metadata
  - New *measurement* method: ITU BS.1770
    - May replace ATSC use of LeqA, but it is essentially similar
    - Both measurements take time, so…
    - Not appropriate for real-time loudness control

Metadata

- Metadata is data that describes the audio
- Problem Parameters include:
- AC MOD (Audio Coding Mode) - This can cause dialogue to vanish!
- Upmixing prevents this from ever happening
- RF Overmod -This can cause stereo set top boxes to badly misbehave in mono (Protection should be OFF)

Dolby Digital (AC-3)

- Downmixing is not simply a fixed process; it is controlled by parameters contained in a metadata stream carried within the AC-3 bitstream
- Provides smooth integration of legacy mono and stereo material with 5.1 channel programs
- Ensures dialogue will be reproduced from the center speaker regardless of how many channels are encoded thereby keeping a consistent sound field for all audio programs

What is the problem?

- Local stations simply do not have the resources - in the past, this has all been handled by an unseen processor.
- Broadcasters are struggling with overly dynamic programs, metadata is not helping
- IF the goal is to preserve the original content (AND satisfy viewers), it requires lots of time and/or advanced tools

Yeah, but most of my viewers are via cable.

- During NAB, leading cable engineers described how analog tier will be served:
  - Station provides downconverted video and downmixed and processed audio in *some* cases
  - Mostly, IRDs will be used to downconvert video and downmix audio to feed analog modulators: NO PROCESSING, NO LOUDNESS CONTROL!!!
- DTV signal should be appropriate for the HD/5.1 viewers, but MUST also work for the downconverted/downmixed stereo viewers (aka most of your audience)

Who is Responsible for Getting it Right?

- Ultimately, it is the holder of the FCC license or the owner of the cable franchise that must ensure compliance with Federal rules

- Analog stations would not think of running without a mod monitor and a processing safety net, DTV should not be any different

The Tools Exist

- Loudness meters are required and are the new audio “Mod Monitors” for DTV stations
- File-based content can be corrected in the file domain - gets it close, but does not fix dynamics
- Wideband/Multiband processing
- Live content like news should be processed locally for best sound and control
- Smart DTV audio processors are available today

The Tools Exist

- The Dolby System, using Metadata, is a good idea!
- The concept of using wideband processing is not!
- Wideband processing creates audible annoyances…
- Analogy: Going from an Omnia backwards to a AudiMax!

(Far) Less Processing is Required

- Get loudness right at each stage to minimize the amount that must be done
- Processors MUST support metadata and take advantage of the clues to alleviate aggressive processing
- “Smart” processors can satisfy both viewers and program producers
- Upmixing is useful and a successfully used tool (more than you might know)

Upmixing (NOT a dirty word)

- Turns 2-channels into 5.1
- Used to keep soundfield of output stream consistent - useful when metadata not available
- Used as a production tool to help make better 5.1 mixes faster (does not replace 5.1 mixing!)
- Used in transmission to help local content match network content
- Contrary to unfounded rumors, upmixing works and is used at times by ALL networks every day (Olympics: many hours, zero issues)

What Now?

- ATSC and CEA are investigating loudness
- Until (and if) something changes, dialnorm must be set appropriately, or audio must be adjusted to match fixed value
- The onus is on the creative community to use the system to its appropriate best…
  - Is that going to happen soon enough?

What if it is NOT solved?

- Consumer-based loudness control:
  - Terk VR-1 TV Loudness Regulator (external)
  - Philips/Sony/Others proprietary (internal)
  - Dolby Volume (internal)
- But, there are millions of legacy sets…
- …And February 17, 2009 is getting close!

- More legislation (Eshoo C.A.L.M. Act)?
- Fines? Lower ratings? (this is real)

What's a Station to Do?

- Work with a company that understands DTV audio from every angle: Hollywood to network to affiliate through cable and satellite to the consumer
- Trust the people who were part of developing the DTV audio system and continue to innovate solutions
- Install a modern DTV audio/loudness processor and loudness meter and get back to all the other things you have on your list!

How to Pick a Processor

- MUST Have:
  - Metadata support (RS485 and VANC)
  - Proven loudness control
  - Upmixing, Downmixing (LtRt and LoRo)
- Should Have:
  - Built-in Dolby encoding (DD and Pulse for M/H)
  - Extensive SAP/DVS support
  - Easy front panel control
- Nice:
  - Dual power supplies, SDI, GPI, TCP Remote

February 17, 2009 Is Real…Don't Get Caught!

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Q & A

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Thank You!

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