



Program and Commercial Loudness: Measurements and Options for Effective Loudness Management

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Program Loudness

- Approx 70 prime-time programs were measured
- ABC, CBS, FOX, NBC
- Programs recorded Sept-Oct 2009, Feb 2010*

- * Last-minute re-capture of data for one network

Loudness Measurement

- Analysis tools
 - Dolby DP600 Program Optimizer (Primary)
 - Dolby Media Meter (Spot Check)
 - Dolby LM100 Broadcast Loudness Meter (Spot Check)
- Loudness measured with ITU-R BT.1770 algorithm
- Dialogue Intelligence[®] enabled
 - All programs contained dialogue

Loudness Measurement

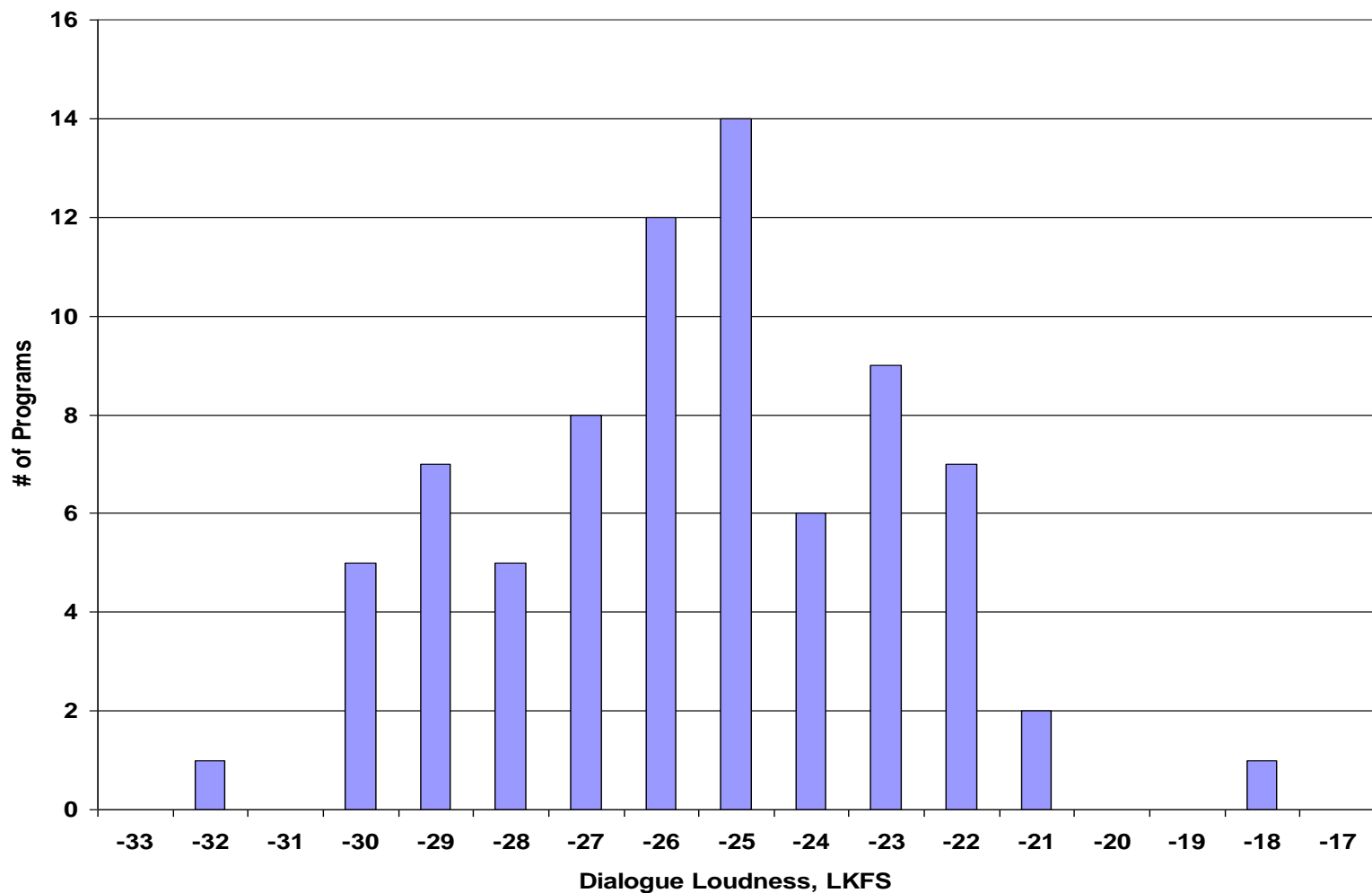
- Data taken:
 - Measured Loudness
 - Transmitted Dialnorm
 - Speech Percentage
 - Others

Loudness Measurement

- Loudness measurements tabulated and presented as histogram plots
 - Overall program loudness (all networks)
Network identity hidden (“W”, “X”, “Y”, and “Z”)
 - Program loudness by network, relative to dialnorm
 - Commercial loudness by network, relative to dialnorm
 - Programs **and** commercials, relative to dialnorm
 - Potential boundary issues

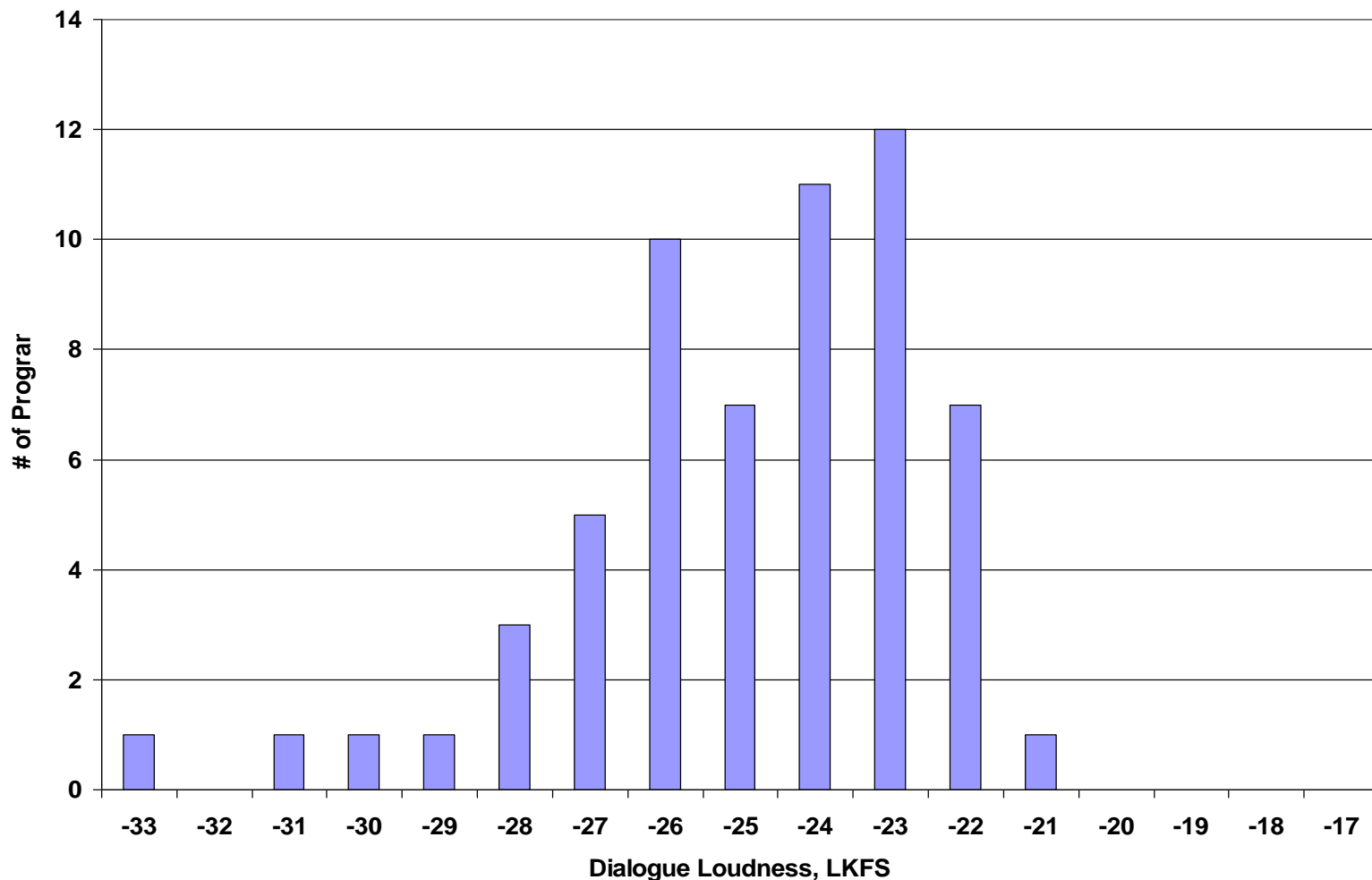
2008 Prime-time Program Loudness

Loudness Histogram, All Programs



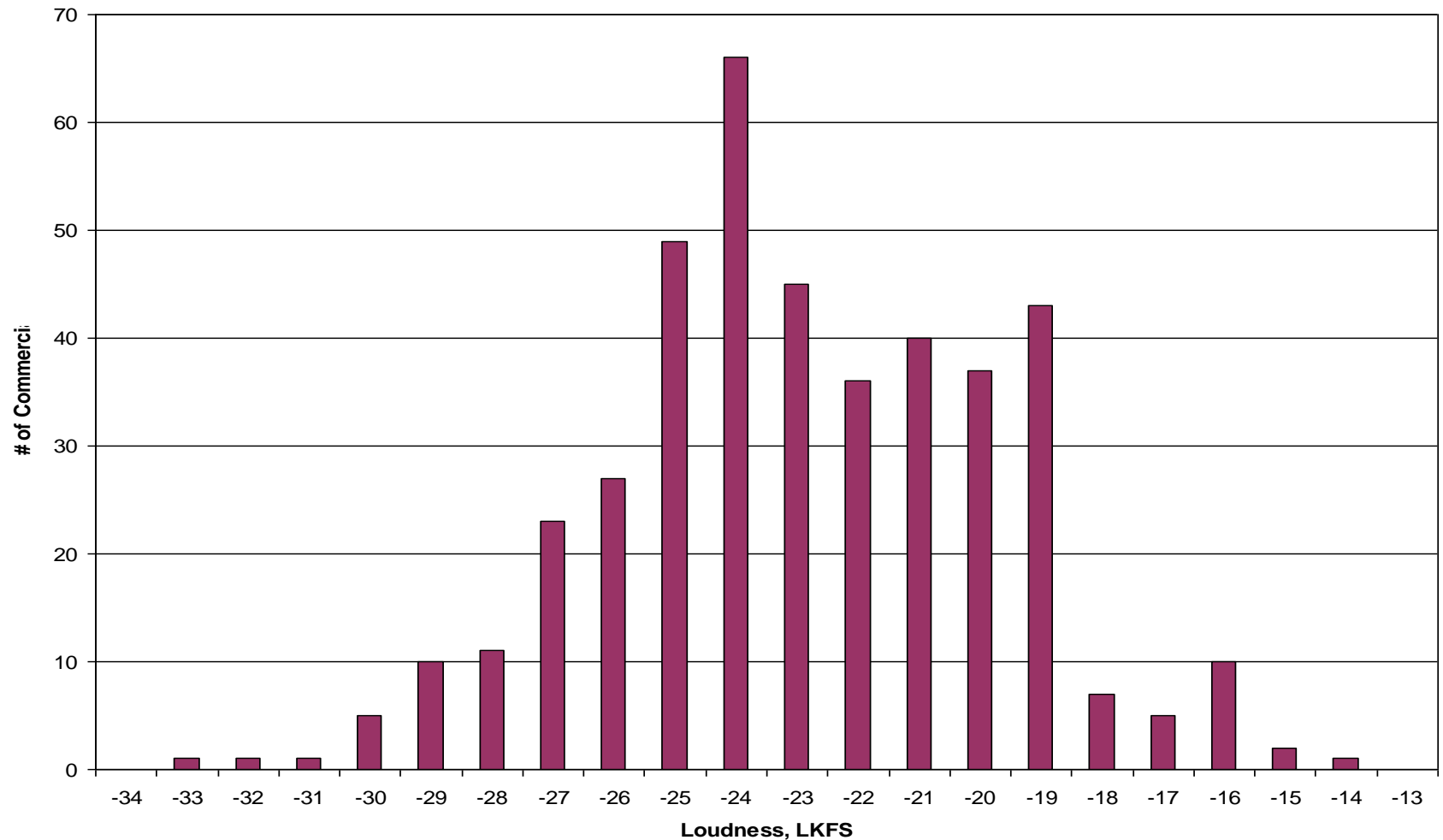
2009 Prime-time Program Loudness

2009 Loudness Histogram, All Programs



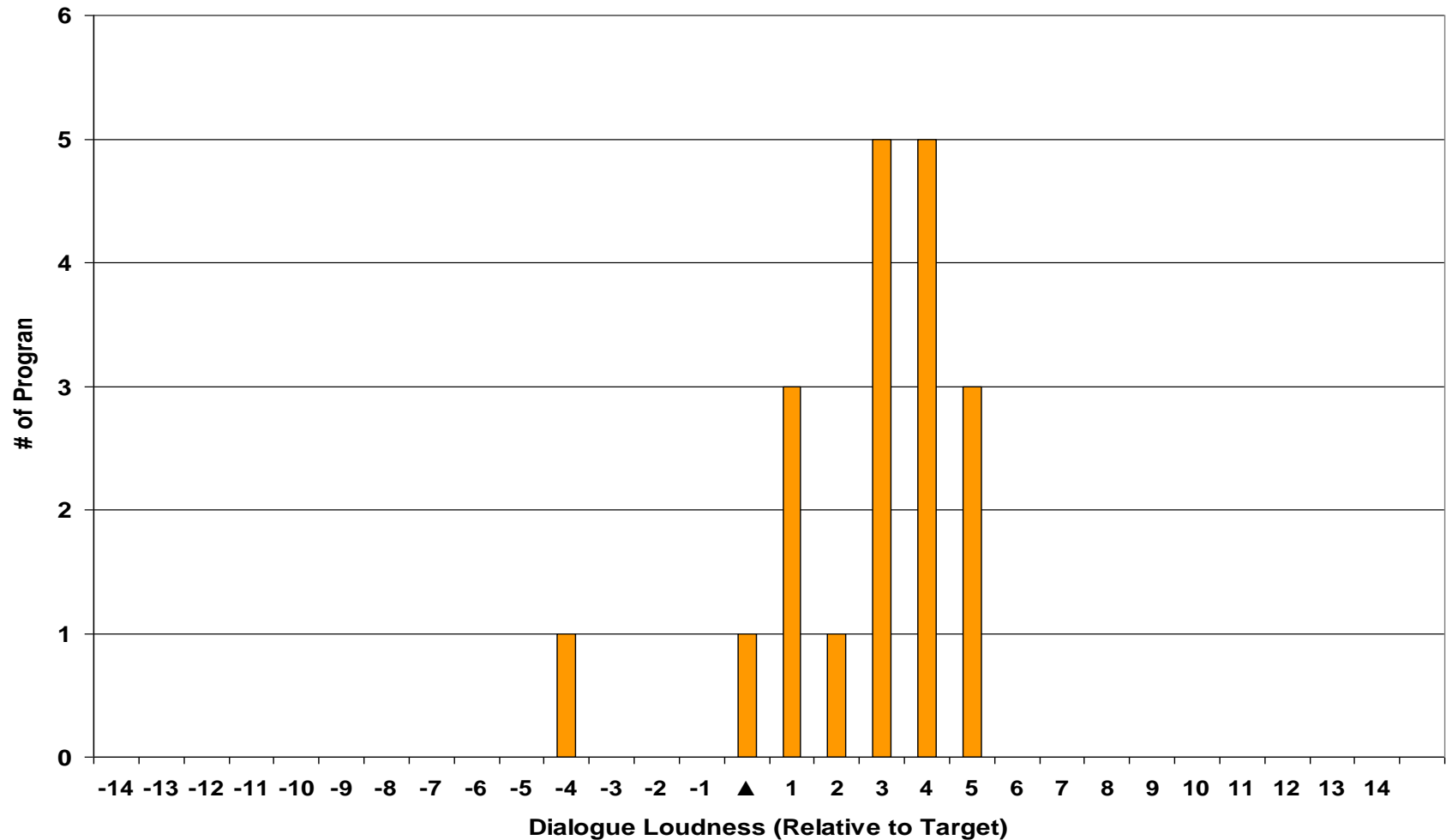
2009 Commercial Loudness

Loudness Histogram, All Commercials



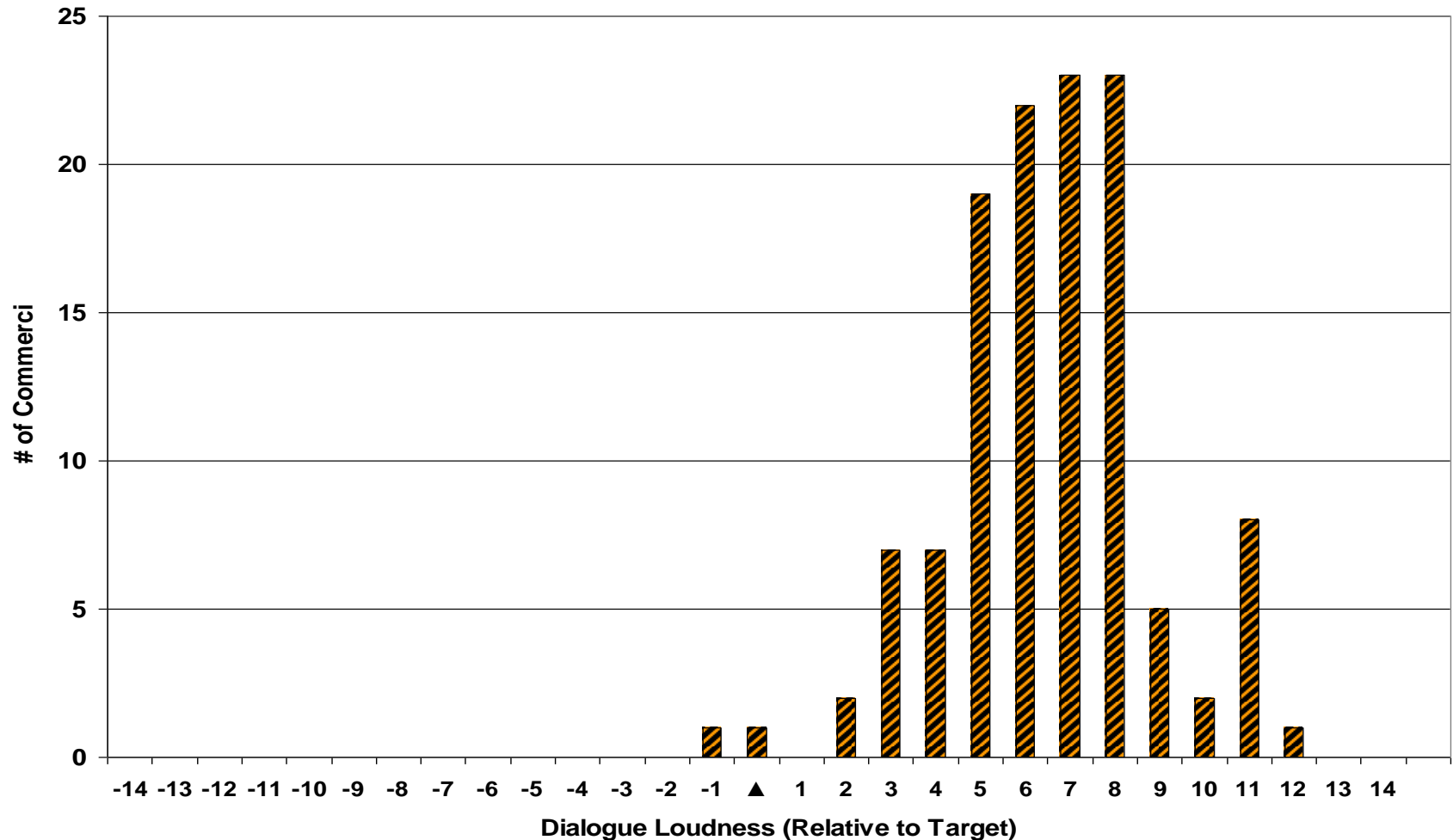
Network "W" Programs vs. Dialnorm

2009 Loudness Histogram, Network "W"



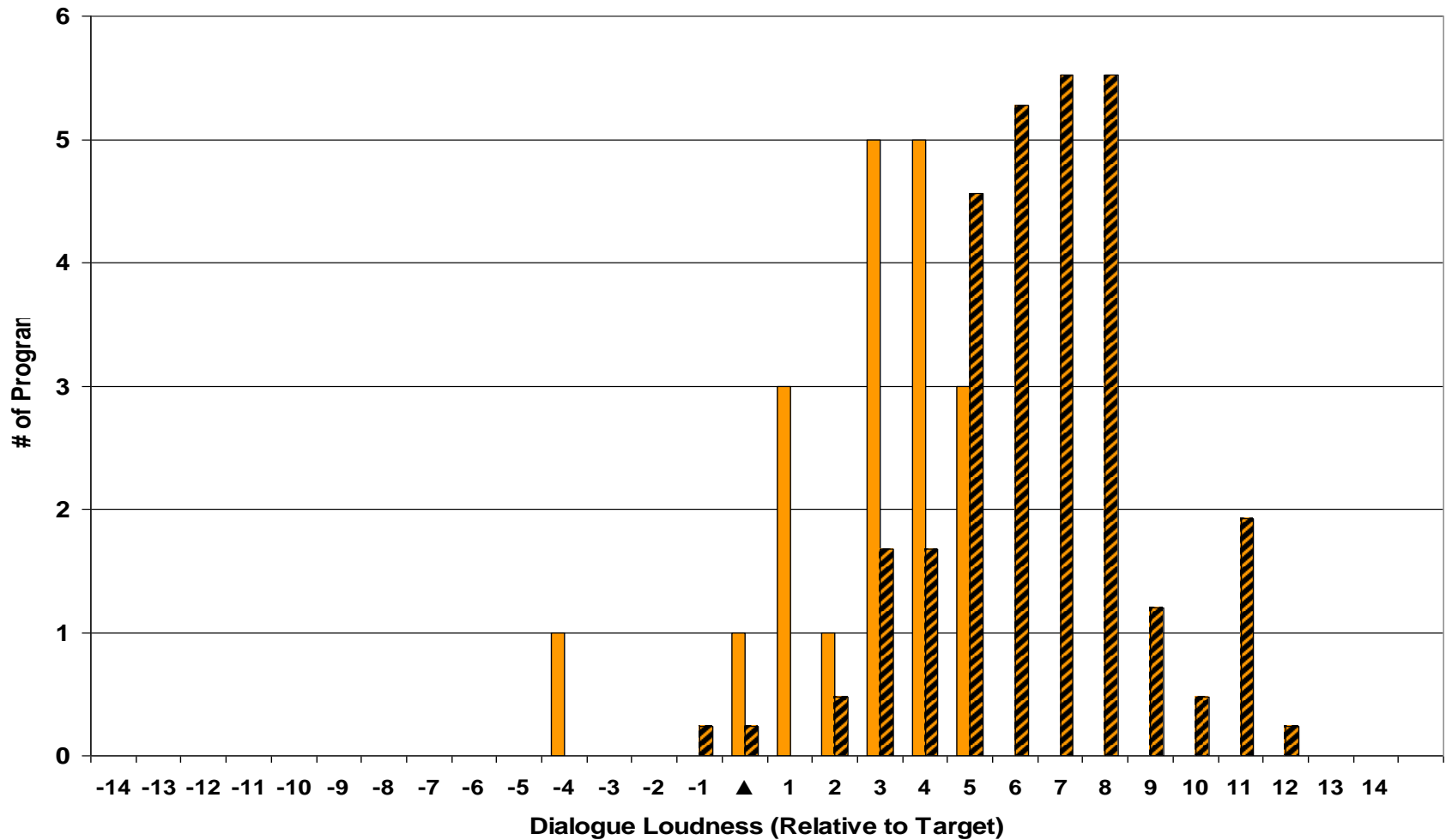
Network "W" Commercials vs. Dialnorm

2009 Loudness Histogram, Network "W"



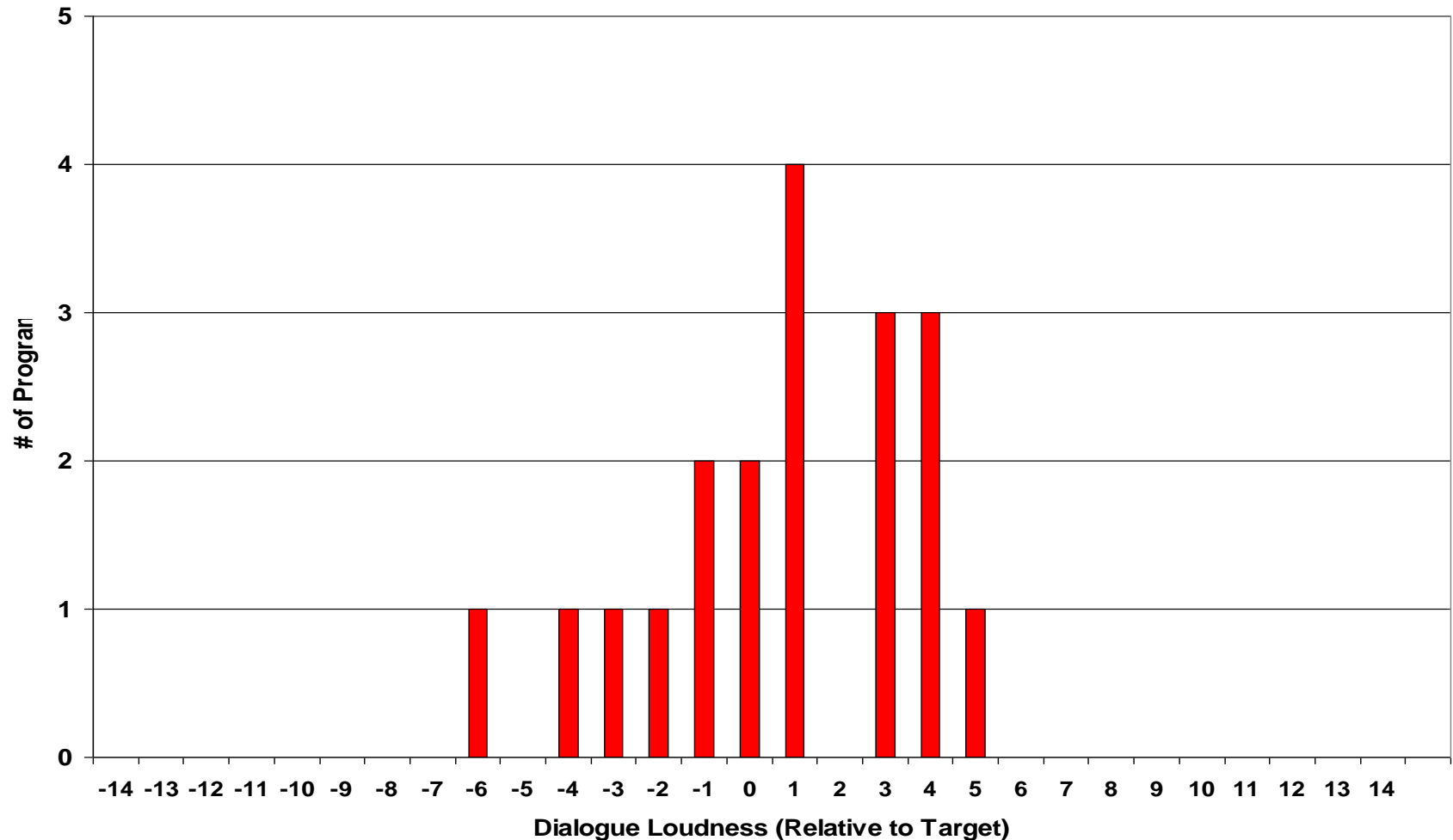
Commercials and Programs vs Dialnorm

Loudness Histogram, Network "W"



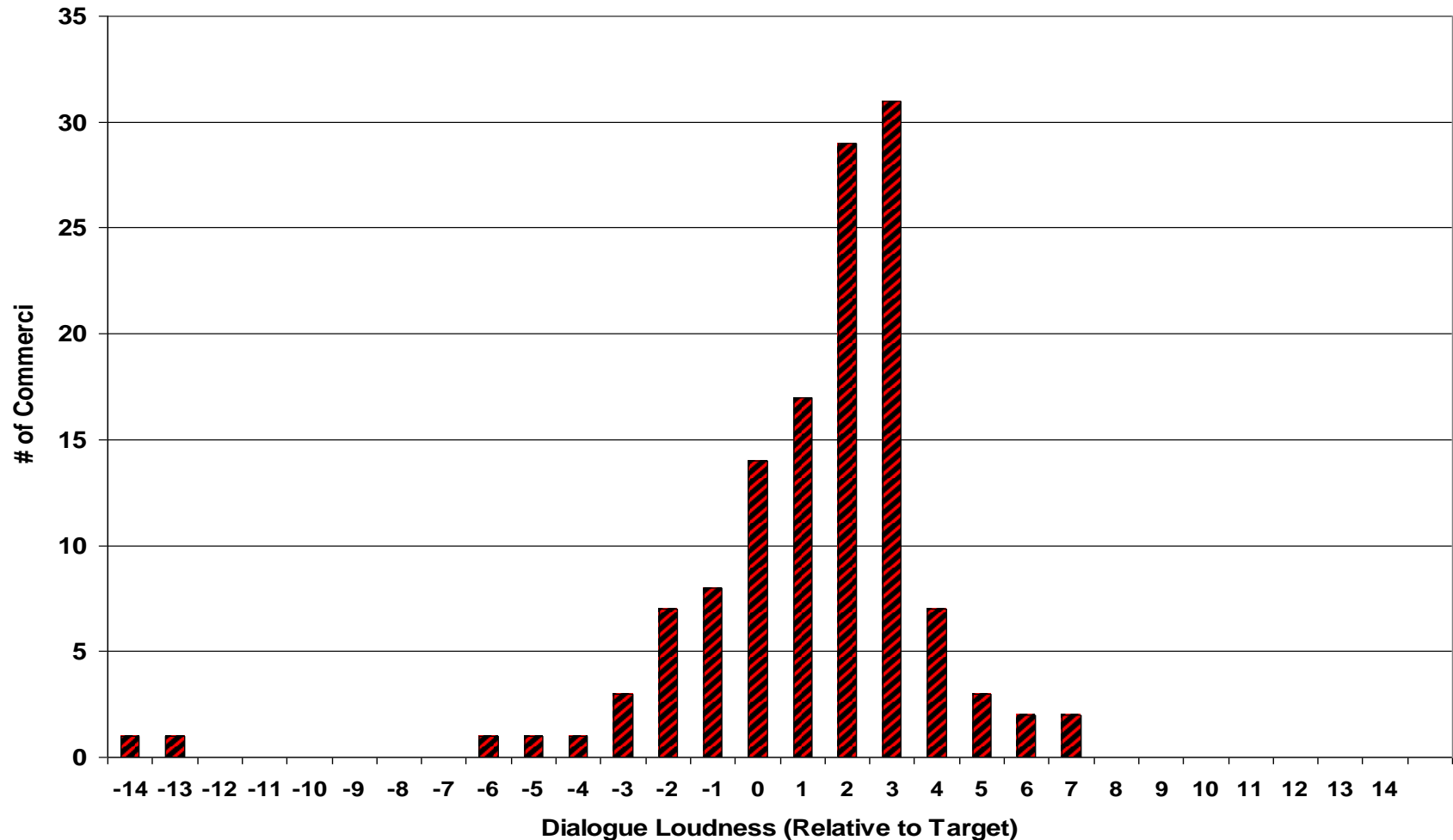
Network "X" Programs vs. Dialnorm

2009 Loudness Histogram, Network "X"



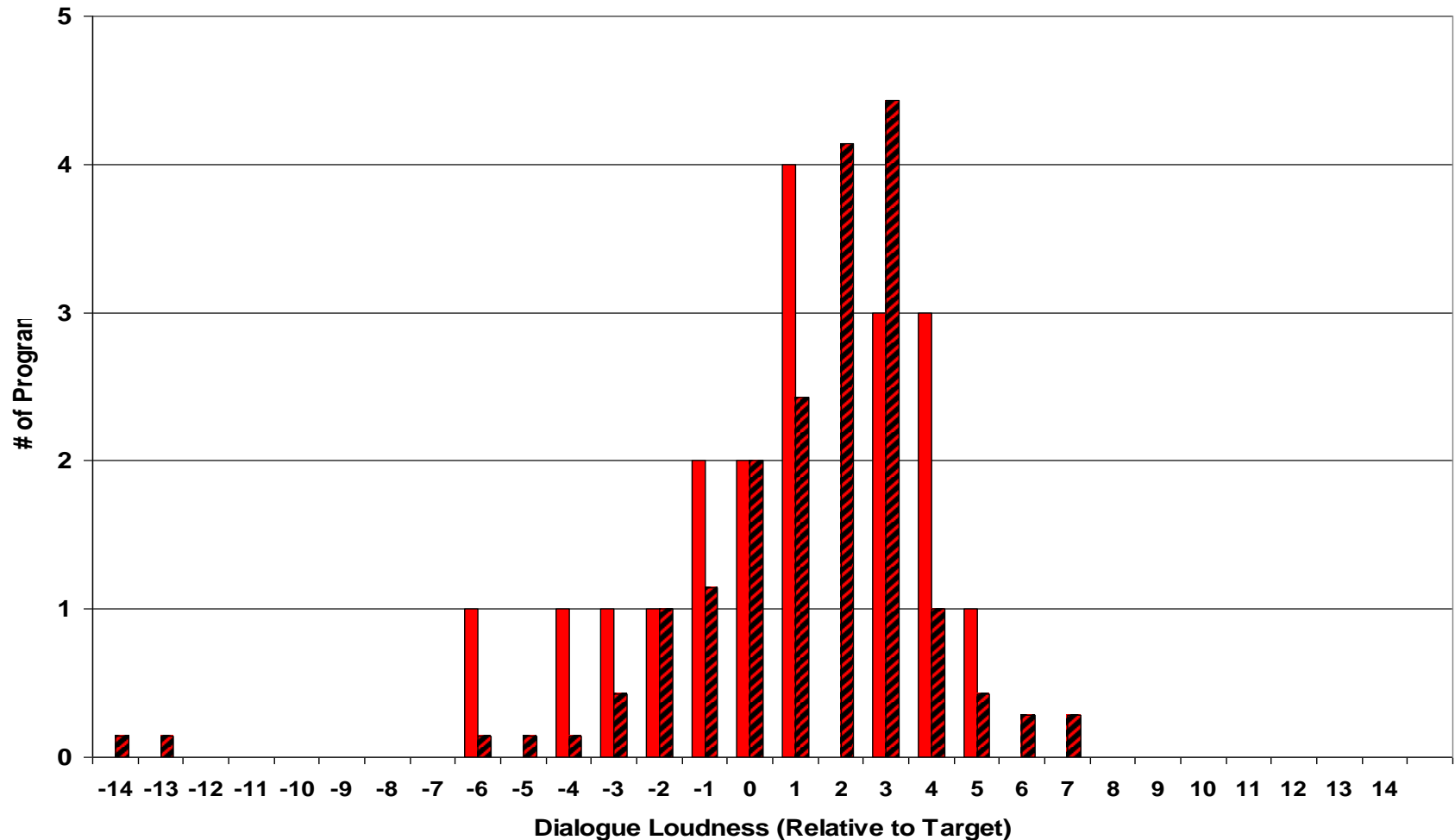
Network "X" Commercials vs. Dialnorm

2009 Loudness Histogram, Network "X"



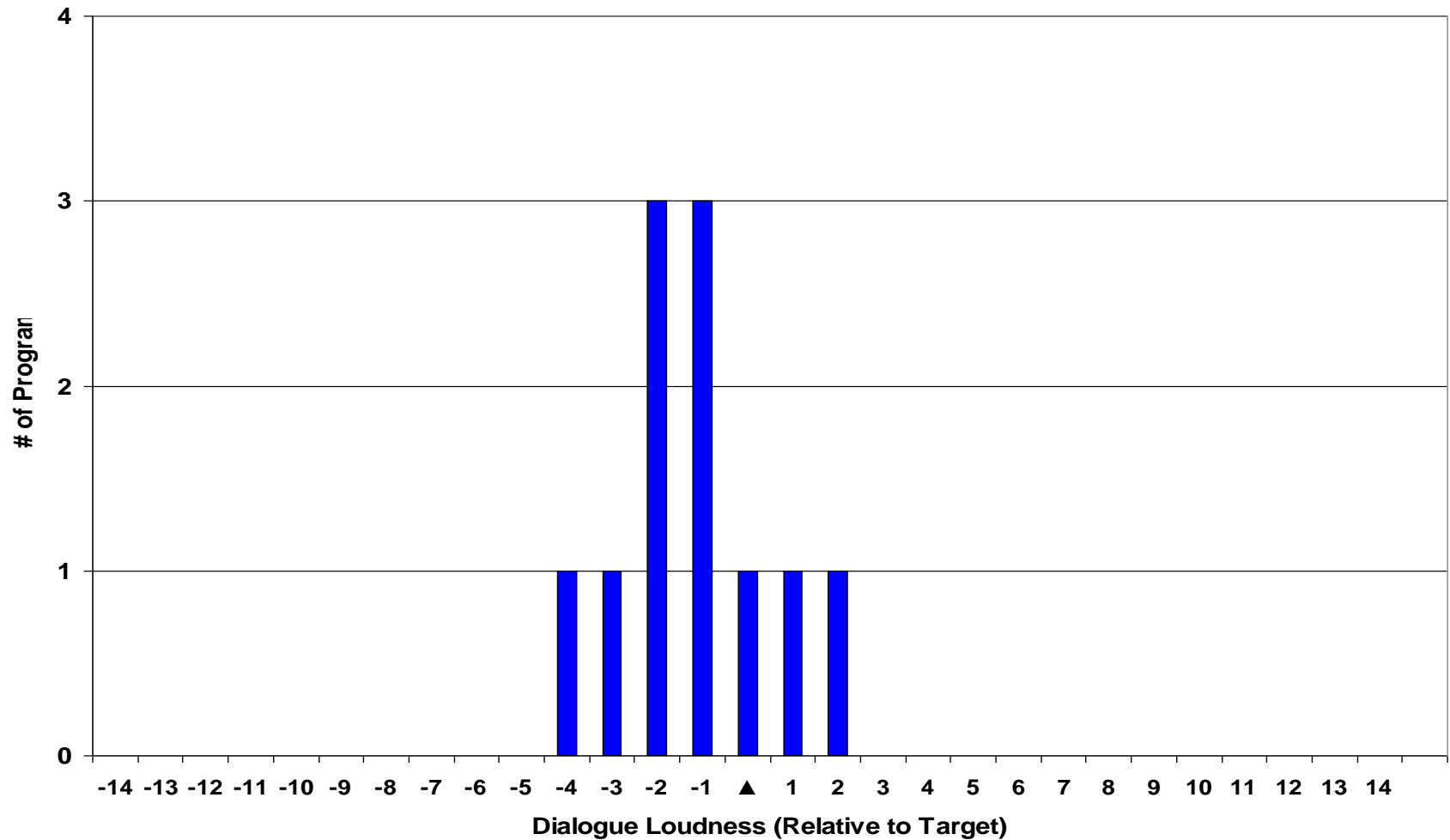
Commercials and Programs vs Dialnorm

Loudness Histogram, Network "X"



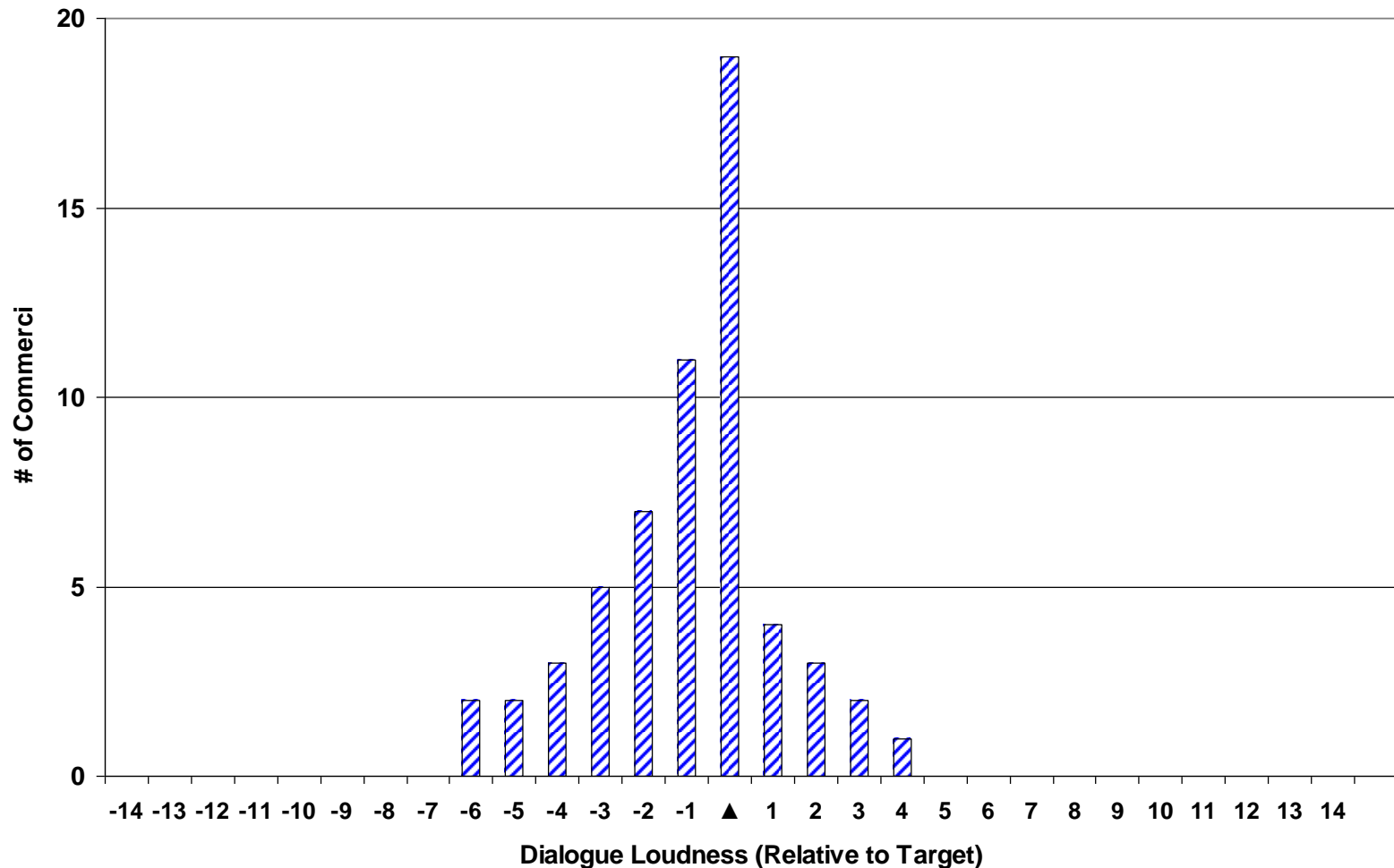
Network "Y" Programs vs. Dialnorm

2009 Loudness Histogram, Network "Y"



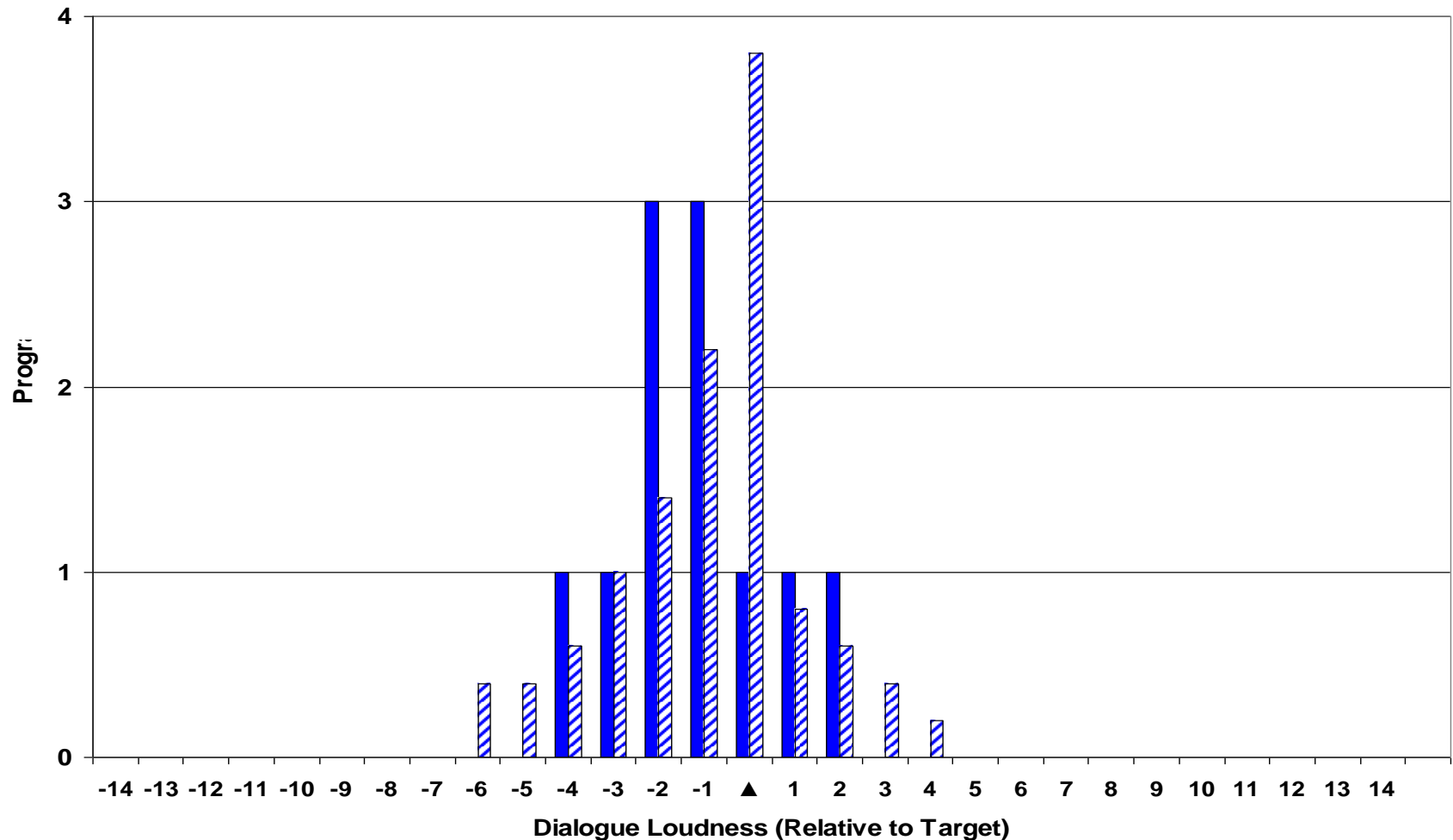
Network "Y" Commercials vs. Dialnorm

2009 Loudness Histogram, Network "Y"



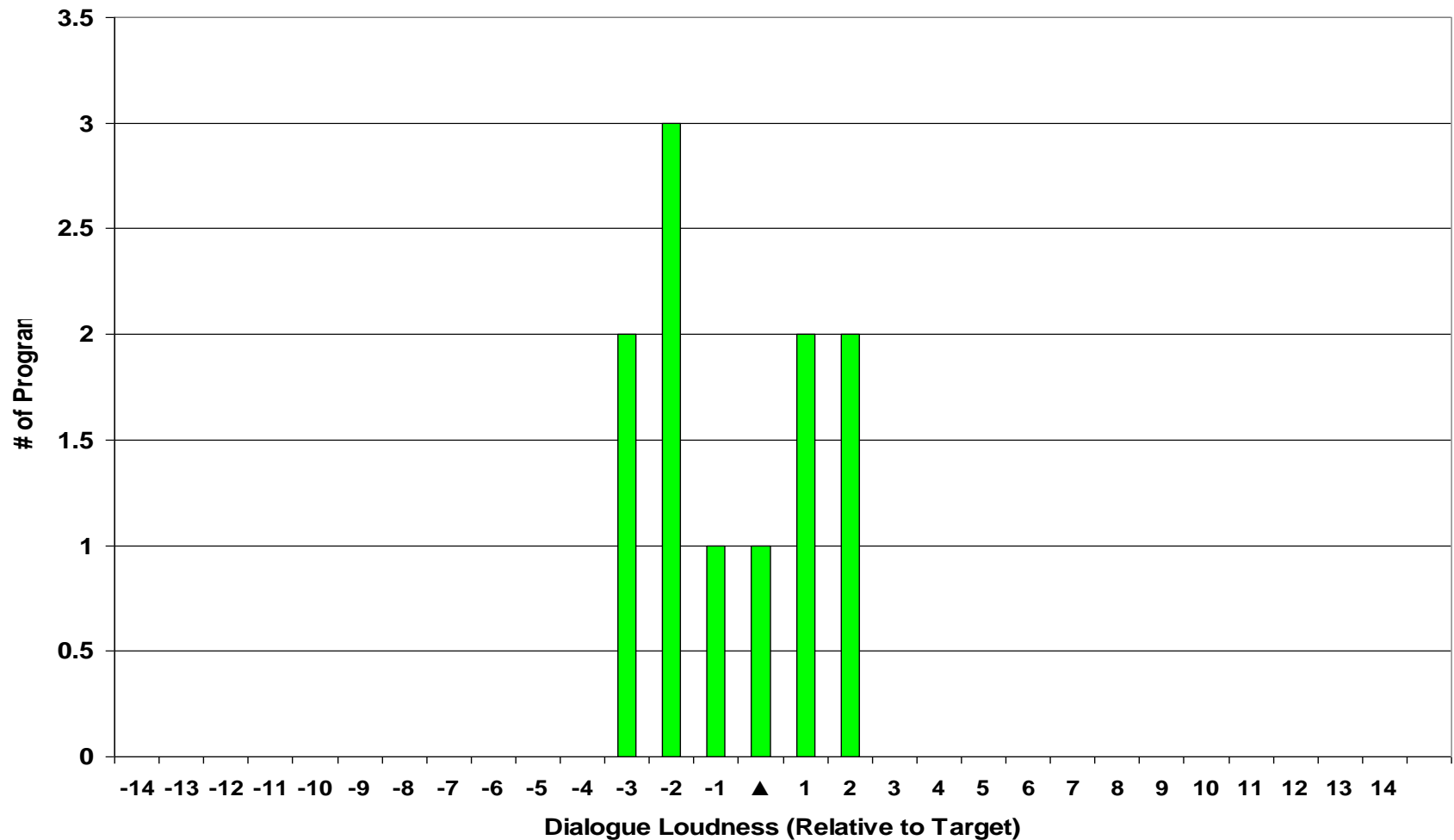
Commercials and Programs vs Dialnorm

Loudness Histogram, Network "Y"



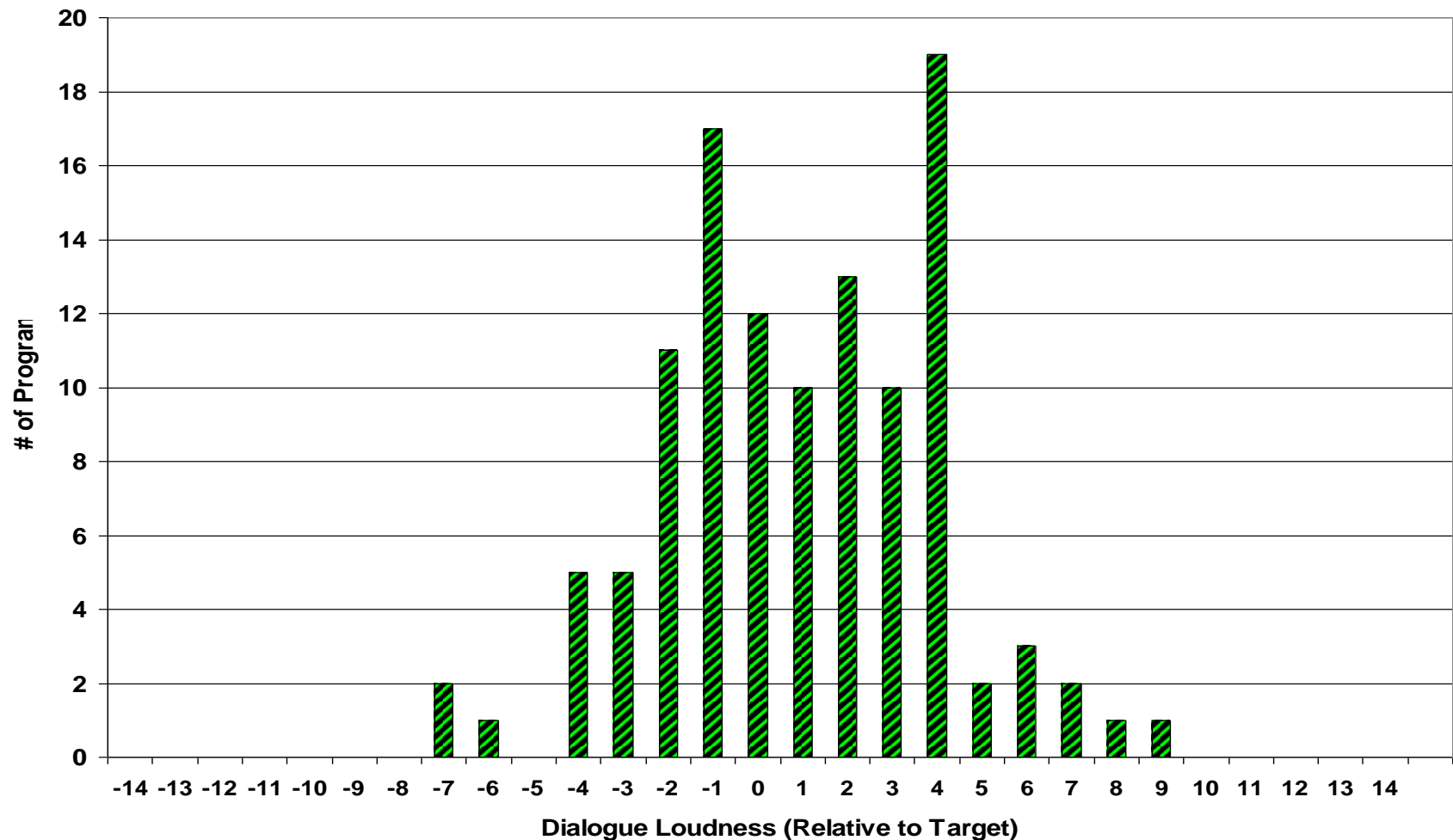
Network "Z" Programs vs. Dialnorm

2009 Loudness Histogram, Network "Z"



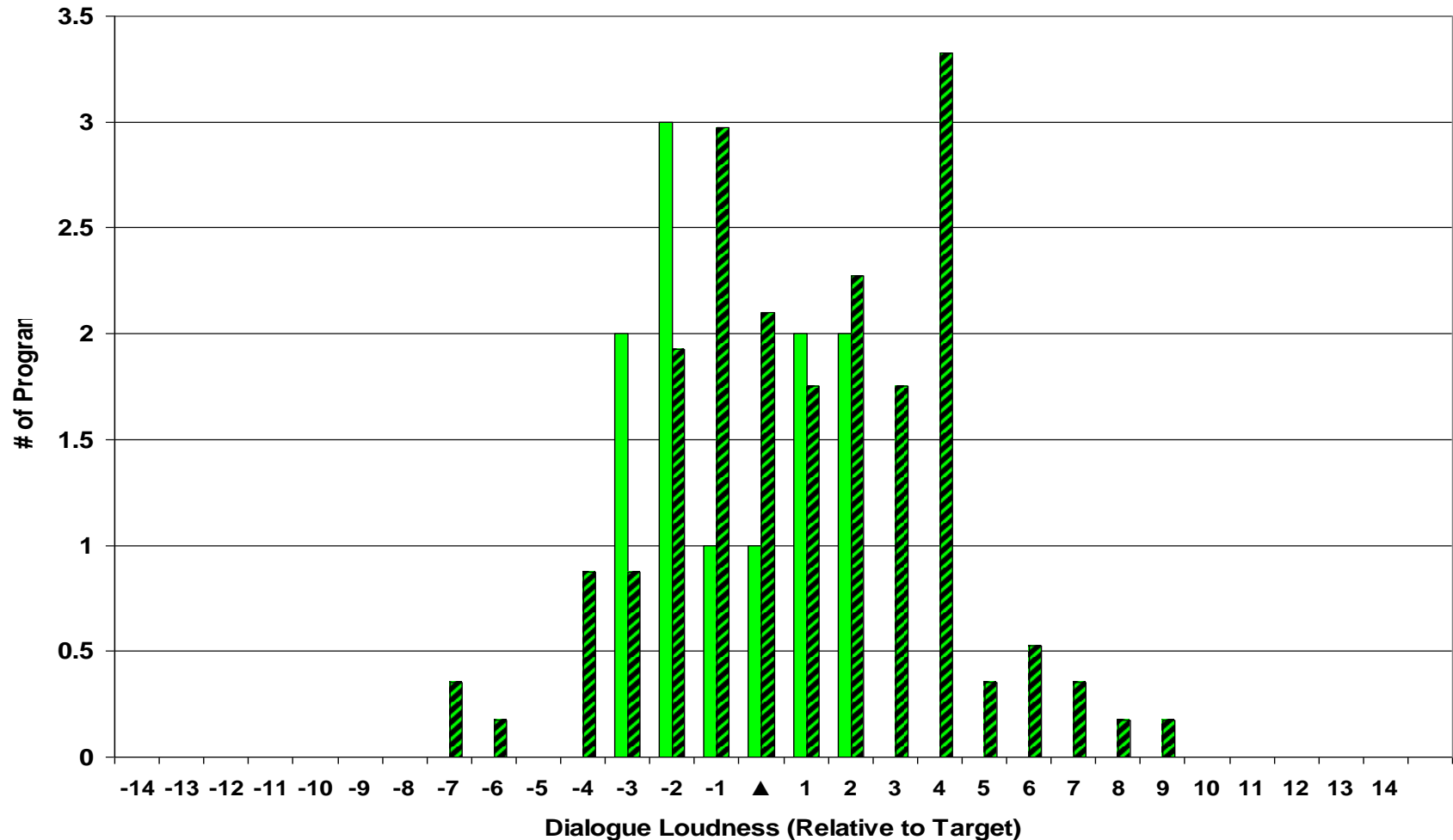
Network "Z" Commercials vs. Dialnorm

2009 Loudness Histogram, Network "Z"



Commercials and Programs vs Dialnorm

Loudness Histogram, Network "Z"



Loudness Management

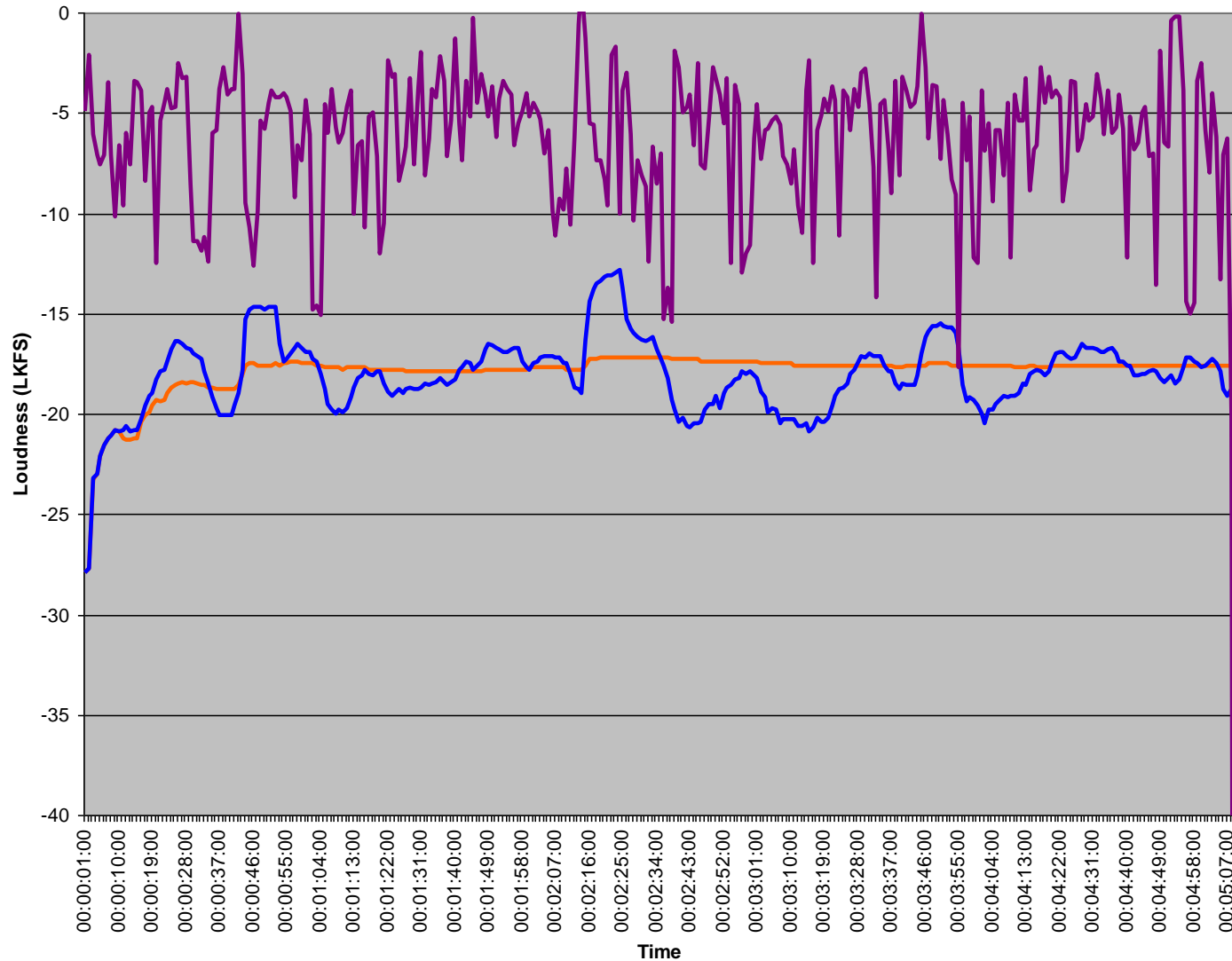
- Program loudness varies from -33 LKFS (very quiet) to -21 LKFS (very loud)
- Commercial loudness varied from -33 LKFS (very quiet) to -14 LKFS (**really** loud!)
- Loudness often did not match indicated loudness (the dialnorm parameter)
- Clearly, more work is needed to manage loudness

A Word About Loudness Processing

- One station used “automatic” level processing to manage loudness
- Processed programs were very consistent in loudness
- But...
- Program dynamics were also severely restricted

Original

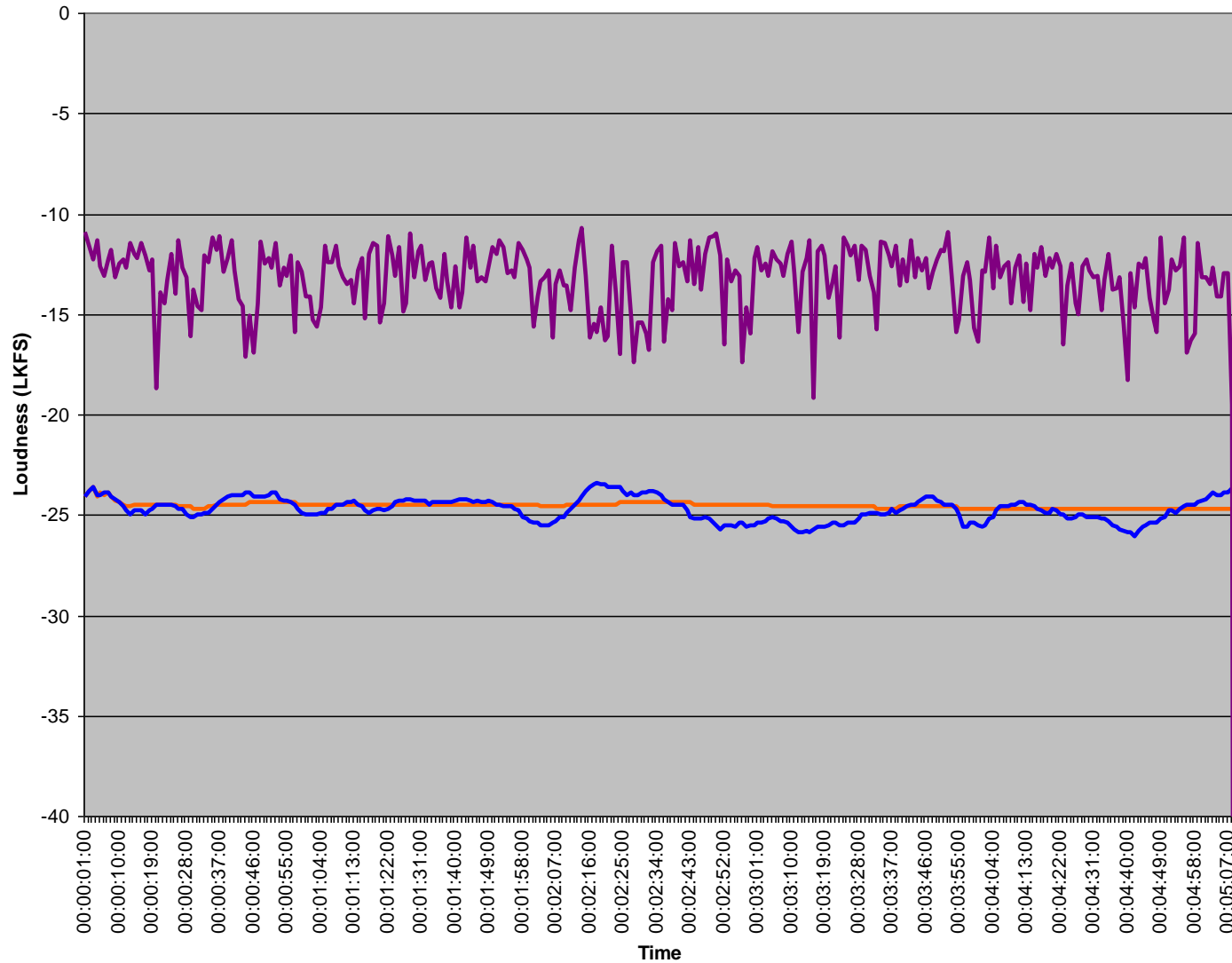
Sports Program - Basketball



— Infinite All — Short Term All — True Peak (dBFS)

Processed

Sports Program - Basketball



— Infinite All — Short Term All — True Peak (dBFS)

Loudness Management Strategies

- “Measure and Tag”
 - Measure content, tag content with accurate metadata
- “Measure and Scale”
 - Measure content, scale content to desired target
- “Target and Evaluate”
 - Select target loudness for submission
 - Evaluate content for compliance

“Measure and Tag”

- Incoming content is measured for loudness
- Loudness measurement inserted into content as loudness metadata
- File-based tools can speed-up and automate process
- Downstream systems must support audio metadata
 - Dolby E, V-ANC, RS-422/485, H-ANC, others

“Measure and Scale”

- A target loudness value is chosen
- Incoming content is measured and compared to target
- Content is scaled (one-time gain change) to meet target value
- Transmitted dialnorm is set to match target value

“Target and Evaluate”

- Target loudness value included in delivery specification
- Incoming content is evaluated for compliance
- Content that does not comply with the delivery specification may be rejected or corrected, at the discretion of the network

Conclusions

- Program loudness is very important
- Program loudness varies significantly
- Loudness management strategies exist, including
 - “Measure and Tag”
 - “Measure and Scale”
 - “Target and Evaluate”
- Commercial loudness is very important, too

Conclusions

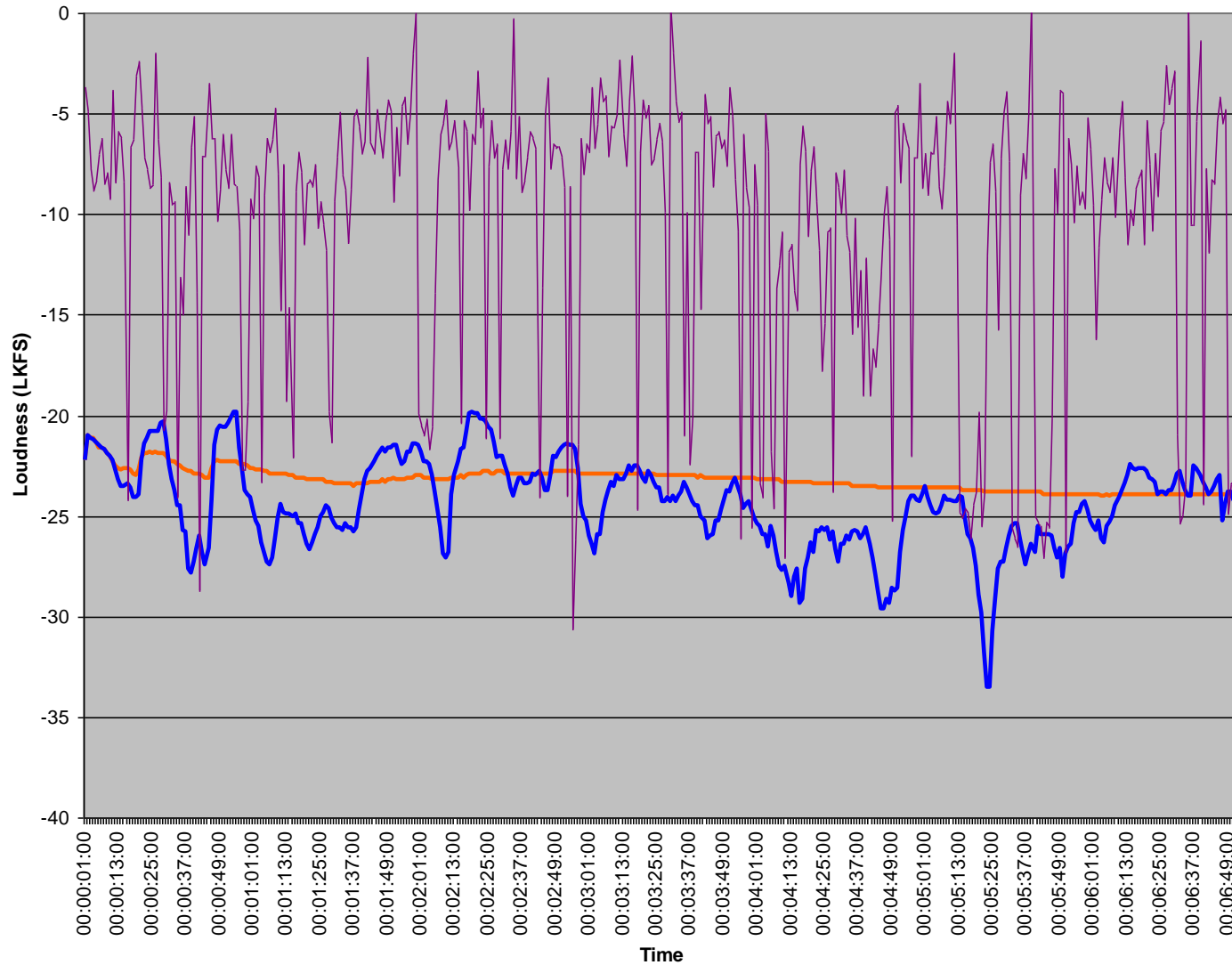
- Proposed legislation focuses solely on commercial loudness
- If the program loudness varies, “fixing” commercial loudness may still result in commercial transition issues.
- Using these loudness management tools on programs *and* commercials will result in:
 - Fewer annoyed viewers
 - **CALM** households...

Conclusions

- Proposed legislation focuses solely on commercial loudness
- If the program loudness varies, “fixing” commercial loudness may still result in commercial transition issues.
- Using these loudness management tools on programs *and* commercials will result in:
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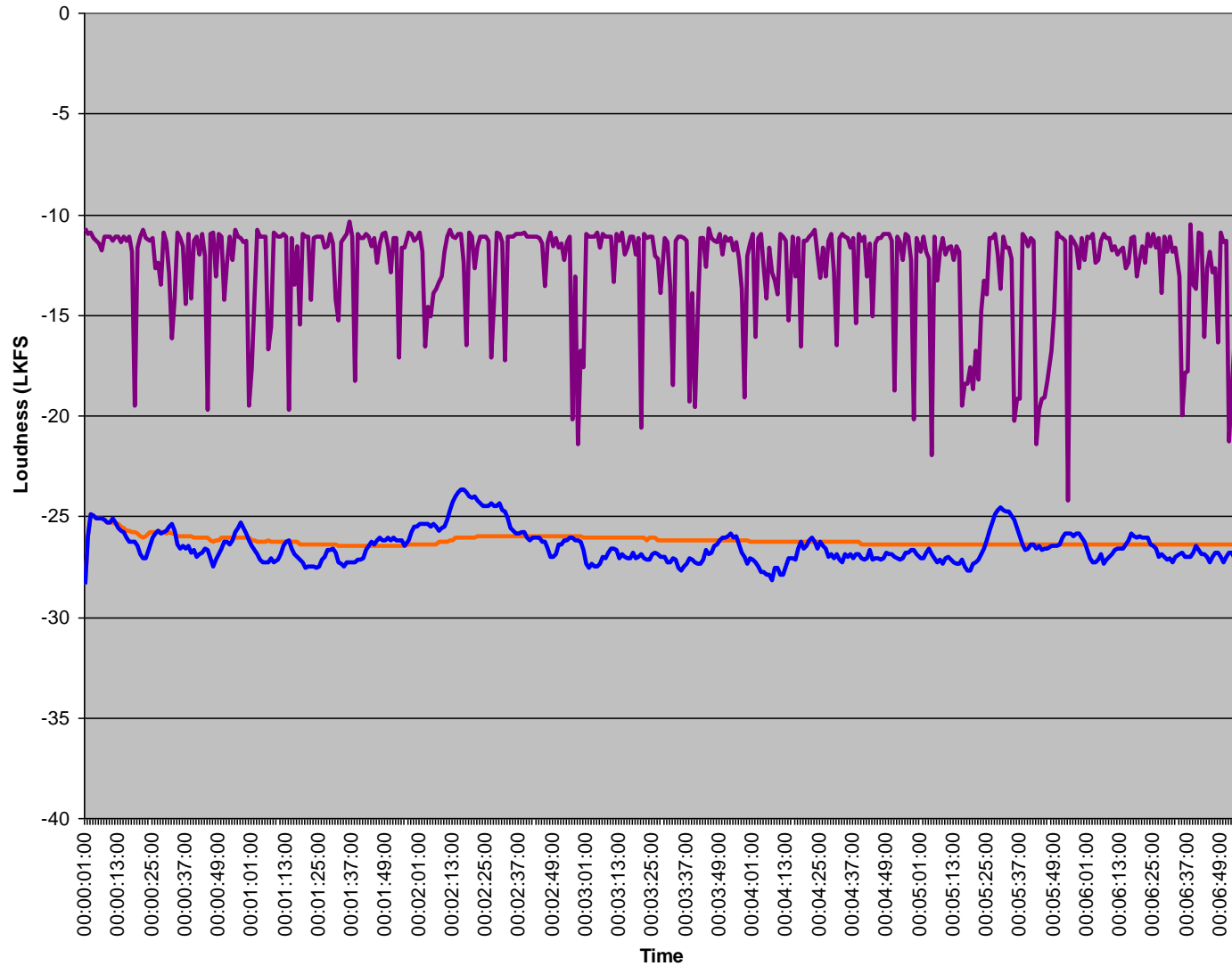
Sports Program - Golf



— Infinite All — Short Term All — True Peak (dBFS)

Processed

Sports Program - Golf



— Infinite All — Short Term All — True Peak (dBFS)