Audio Compression:
Are we squeezing the life out of radio?

Mary Ann Seidler

Tieline Technology

Welcome!

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- 1990’s – MPEG standards introduced
- Mid 1990’s - Cascading tests performed….

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ISO-MPEG Compression Guidelines

Bit Rate	Number of Transcodings
384 kb/s	10
256 kb/s	5
192 kb/s	2
128 kb/s	1

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Why is cascading such a problem for these algorithms?

MPEG codecs are perceptual

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Source material is often pre-compressed

- Music
- Commercials
- Voice overs
- Sound effects

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Where *do* we have some control?

- Audio codecs
- Smart phones
- Smart phone apps
- Remotes
- Automation systems
- Satellite feeds
- Remote studios
- STL links

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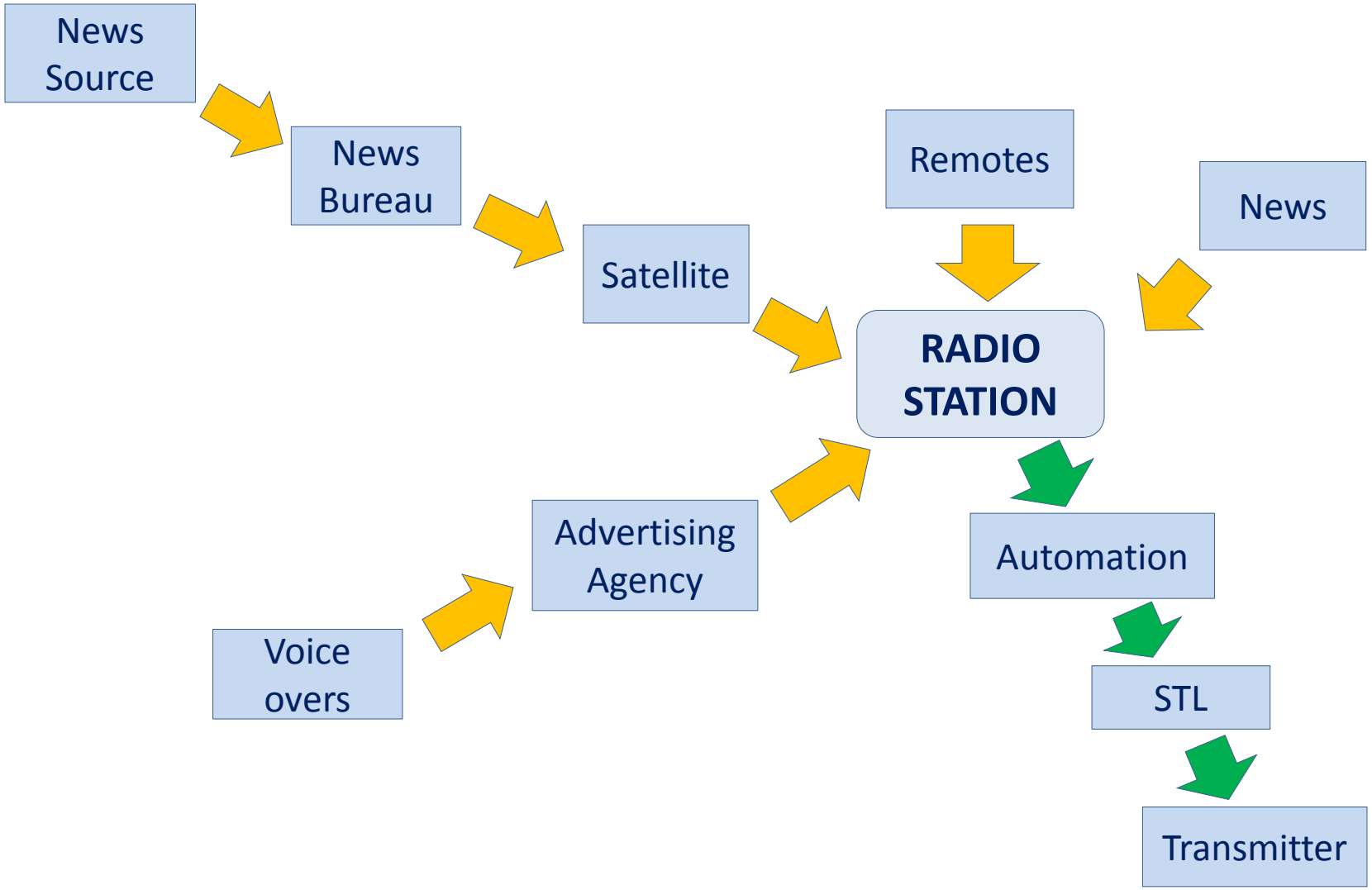

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Example of a compression chain

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“The Curse of the Cascading Codecs”

Will we soon need warning labels?

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Yes, *we* care…

But does anyone else?

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HTC recently purchased Dr. Dre's company for $30 million dollars…

Someone is putting their money on $$ for audio quality

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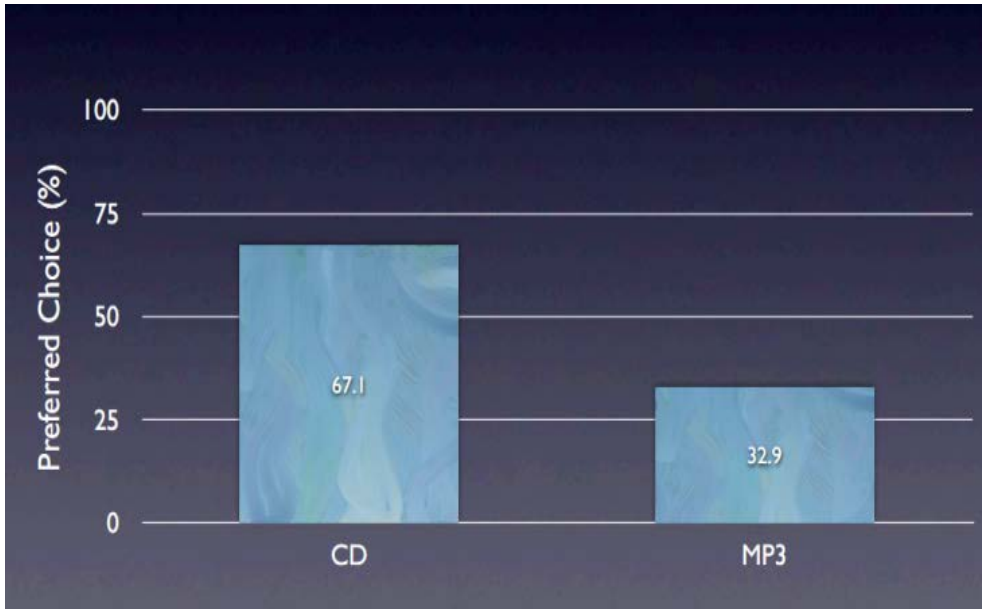
Young people prefer quality audio

Survey results from Sean Olive,
Director of Acoustic Research –
Harman International, 2011



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Why should audio quality matter to us in radio?

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Why should audio quality matter to us in radio?

We've come from this…

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Why should audio quality matter to us in radio?

We've come from this…

…to this

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It’s just too easy to turn us off

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So what can we do?

Here are four suggestions:

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1. Draw up a plan

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2. Test your audio chain

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3. Insist on higher bit rates

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4. Minimize compression in STL’s

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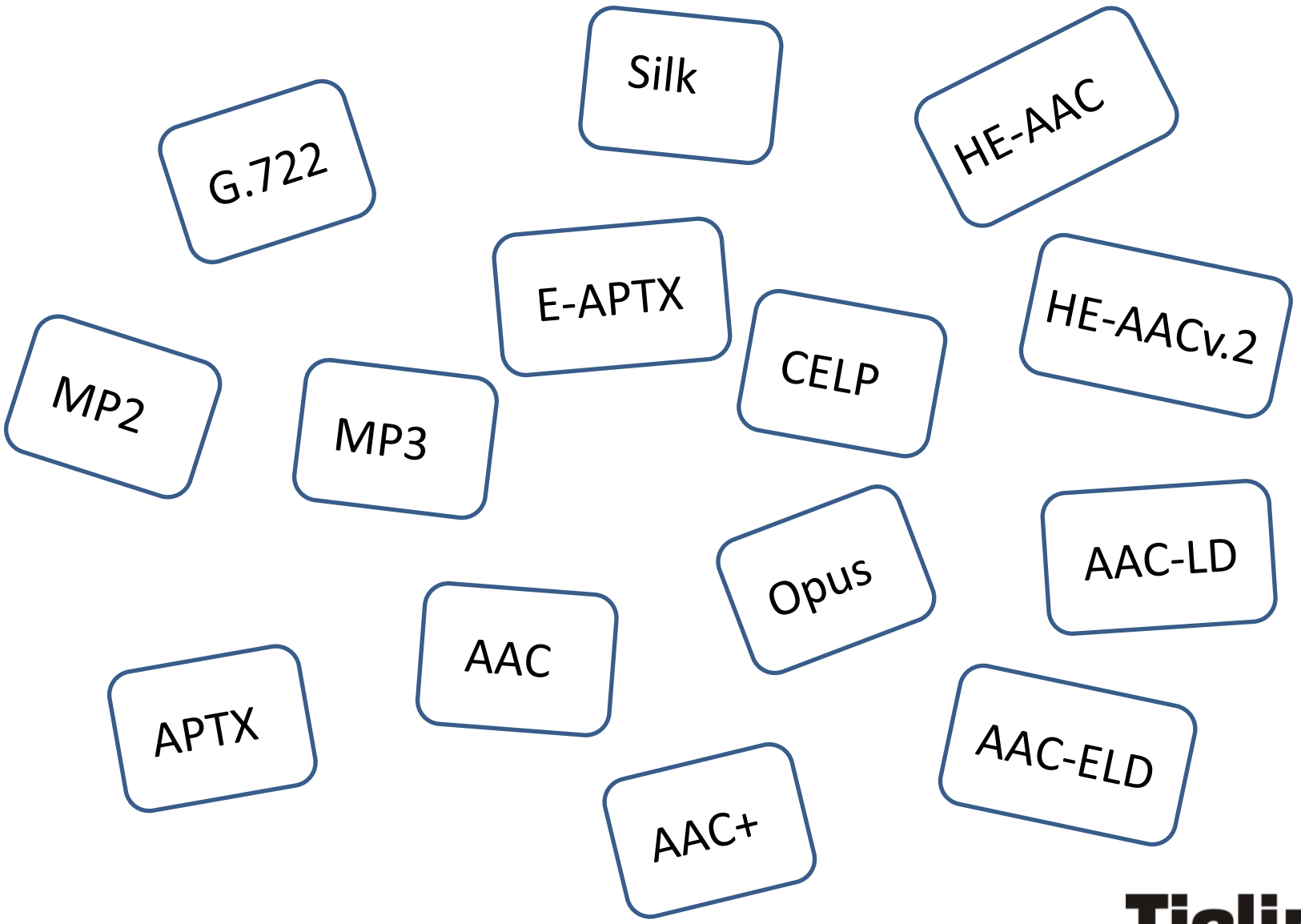

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Audio Codec Jambalaya

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Survey Says…

20 %	G.722
25 %	MP3
40 %	other
15 %	AAC

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In the Beginning…

G.722

--7.5kHz

-- Most codecs talked to each other….

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How did we get so far off the road?

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- ISDN
  - MP2
    B channel bonding
    algorithm compatibility
  - MP3
    B channel bonding

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POTS

- different set of algorithms
- different set of compatibility issues

IP Codecs

A whole new set of issues

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It's enough to make you want to pull your hair out!

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Issue One

- Interoperability between codecs

Maybe we should talk…

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…to each other

A modest proposal

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Yes, we can
talk to each other,
and here's how

- N/ACIP
- The Standard! EBU 3326
  Audio Contribution over IP

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N/ACIP

1. The Real-time Transport Protocol (or RTP) defines a standardized packet format for delivering audio.

2. Algorithms: mandatory, recommended and optional.

3. SIP or Session Initiation Protocol
   - The ability to register a name or number to a codec to simply dialing via a SIP Server.
   - A mechanism to allow the best algorithm that is common to both codecs.

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Issue Two

- Algorithms

Choices… You want choices?

- AAC
- AAC HE
- AAC HE v2
- AAC LD
- AAC –ELD

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AAC

64-256kbits.

- 20kHz
- 300 ms

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AAC HE

- 48-96kbits.
- 20kHz
- 300 ms delay

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AAC HE v2

- 18-28kbits
- 20kHz
- 300 ms

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AAC LD

- 96-384kbits
- 15kHz
- 80 ms delay

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AAC –ELD

- 24-96kbits
- 20kHz
- 50 ms delay

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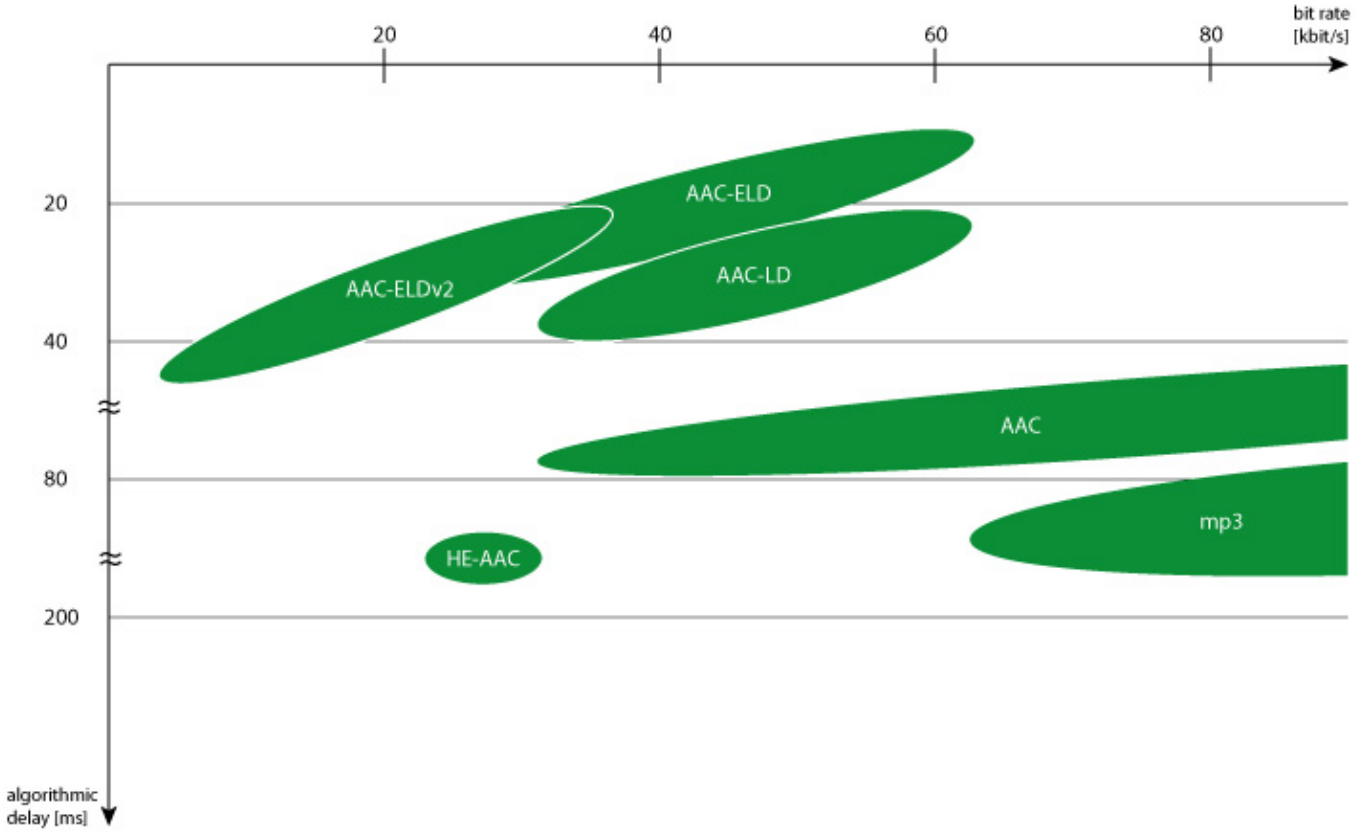

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Issue Three

- Delay
  - IP causes delays
  - Coding algorithms cause delay

Ya hear that?

- Most audio between 1-100ms most users won’t notice the difference.

- Over 100 ms – it causes hesitation.

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How much delay is OK?

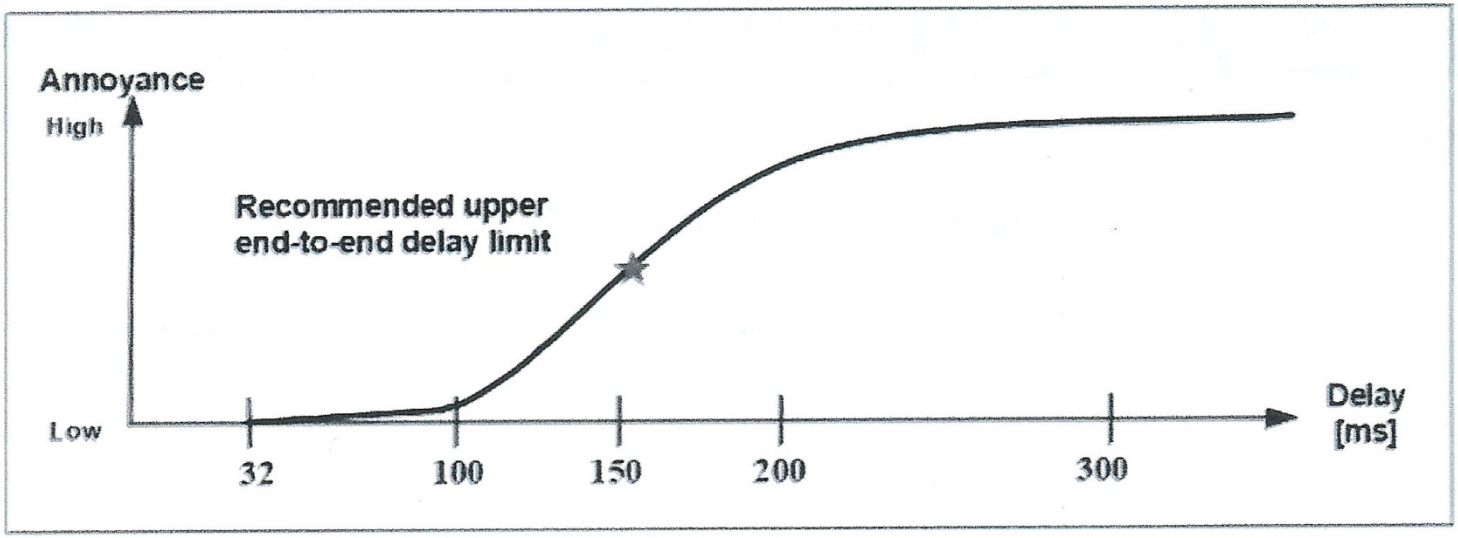

Figure 3: Delay's Affect on User Experience.

Chart from Agilent Technologies, Pracht-Hardman Voice Quality White Paper

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Do you have the following symptoms?

- Are the moods of your conversations cold?
- Frequent interruptions?
- Conversation out of beat?

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You may be suffering from Delayuptus!

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If so, ask your audio professional about

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Opus is an open standard, hopefully habit forming

Low delay, high quality codec

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Opus users report having more natural conversations

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Side effects include:

Less stressed out talent
One less problem for the engineer

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OPUS:

--Designed for both speech and music

--low bit rate, low delay, high quality

AND

--High bit rate

--Extremely low delay

--High quality audio

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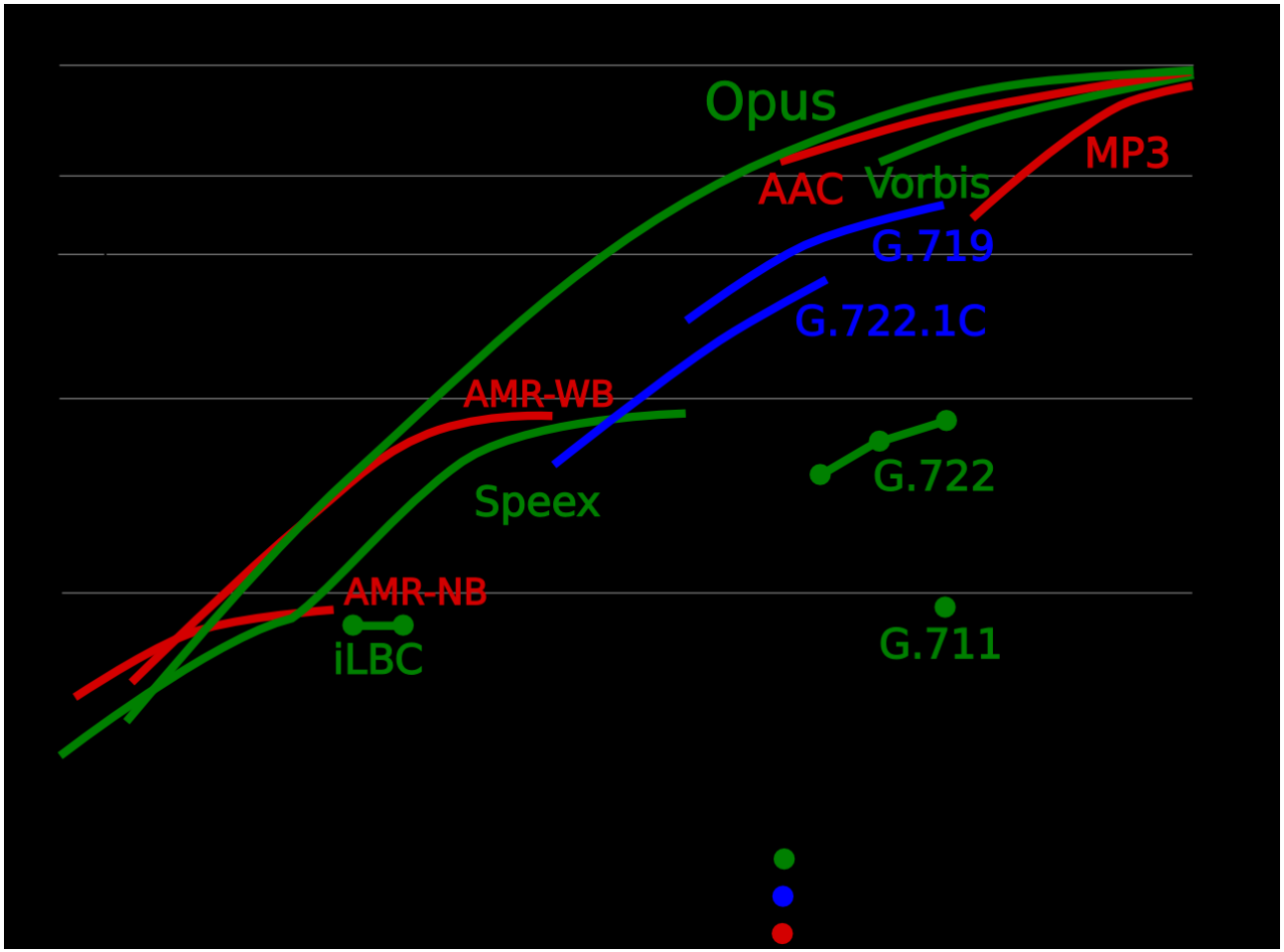

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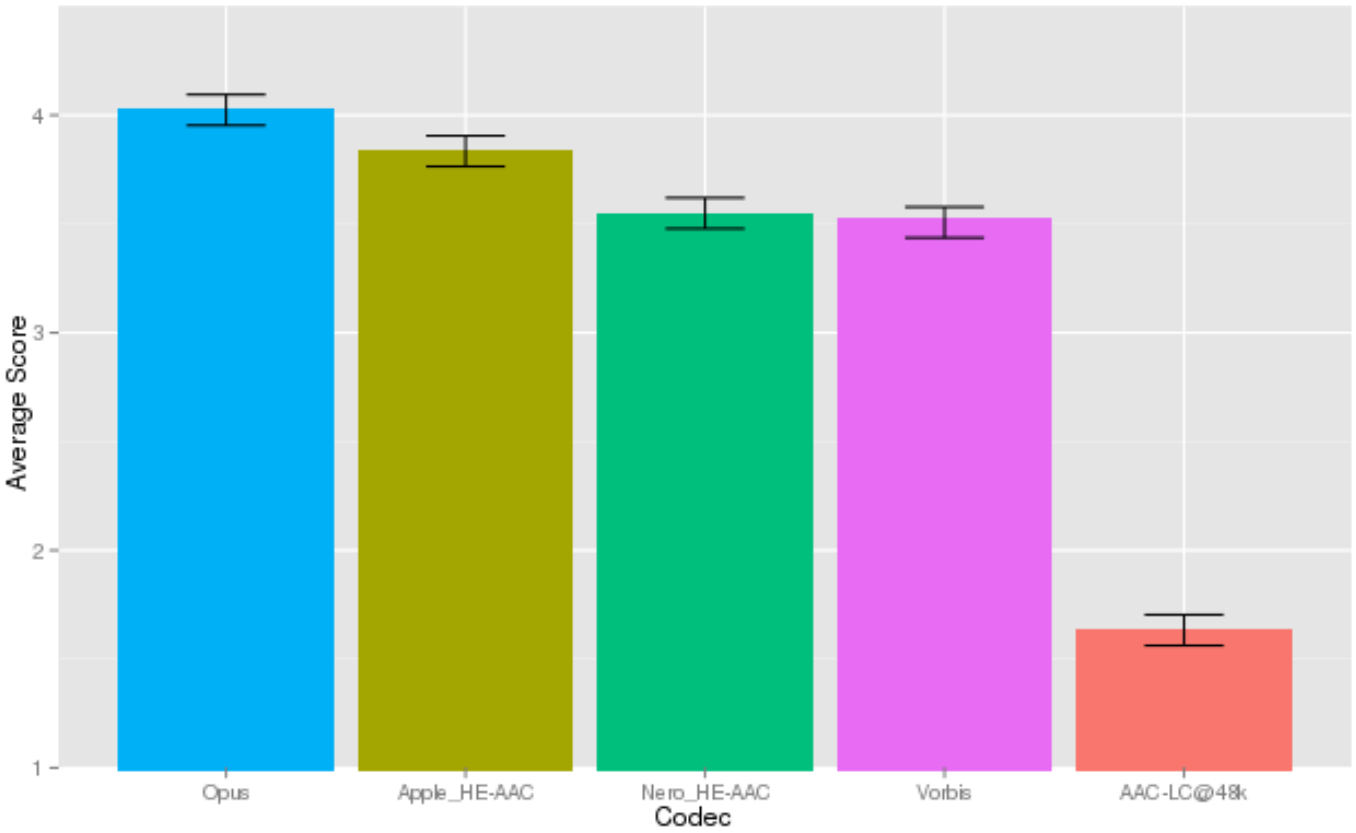
Listening test results



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Transitioning from ISDN to IP is taking place

Let’s not make it at the expense of Audio Quality

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Thank you!

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Thank you!

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