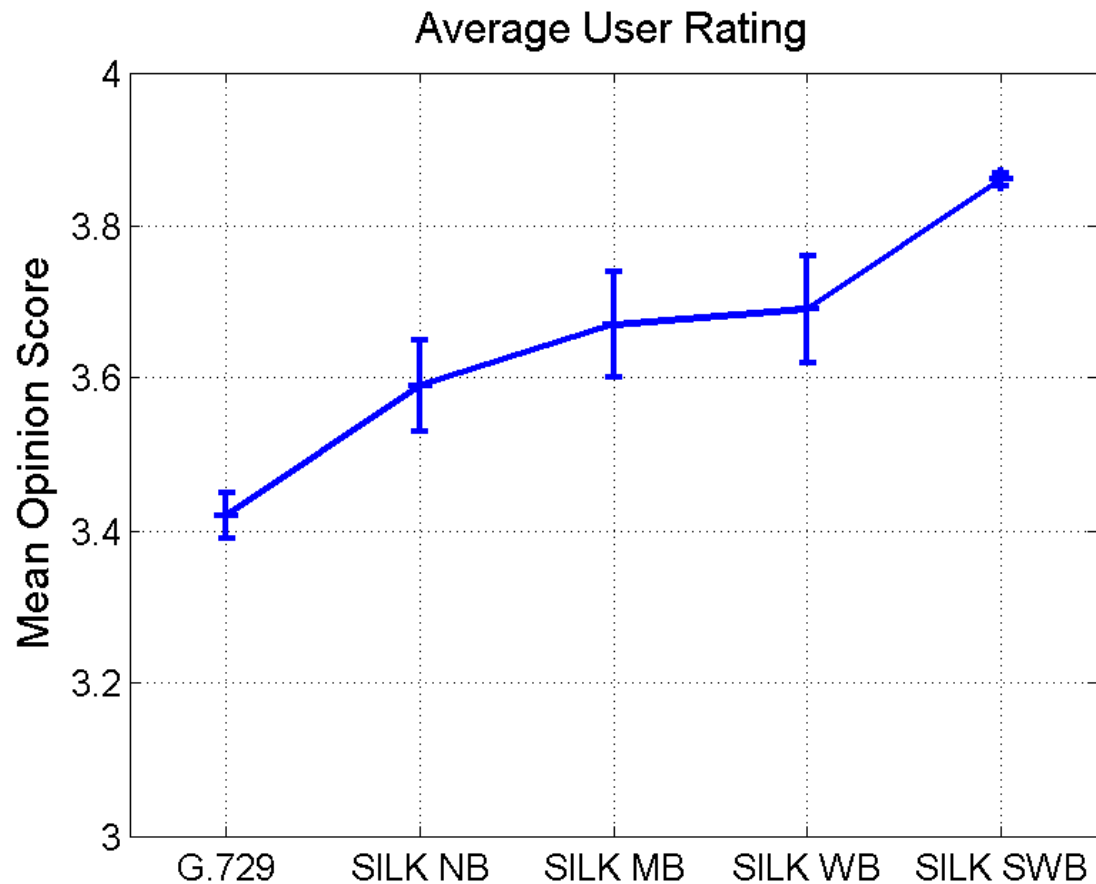# SILK

IETF codec WG, March 22, 2010

Koen Vos, Karsten Vandborg Sørensen,
Søren Skak Jensen, Julian Spittka

Quality Matters I
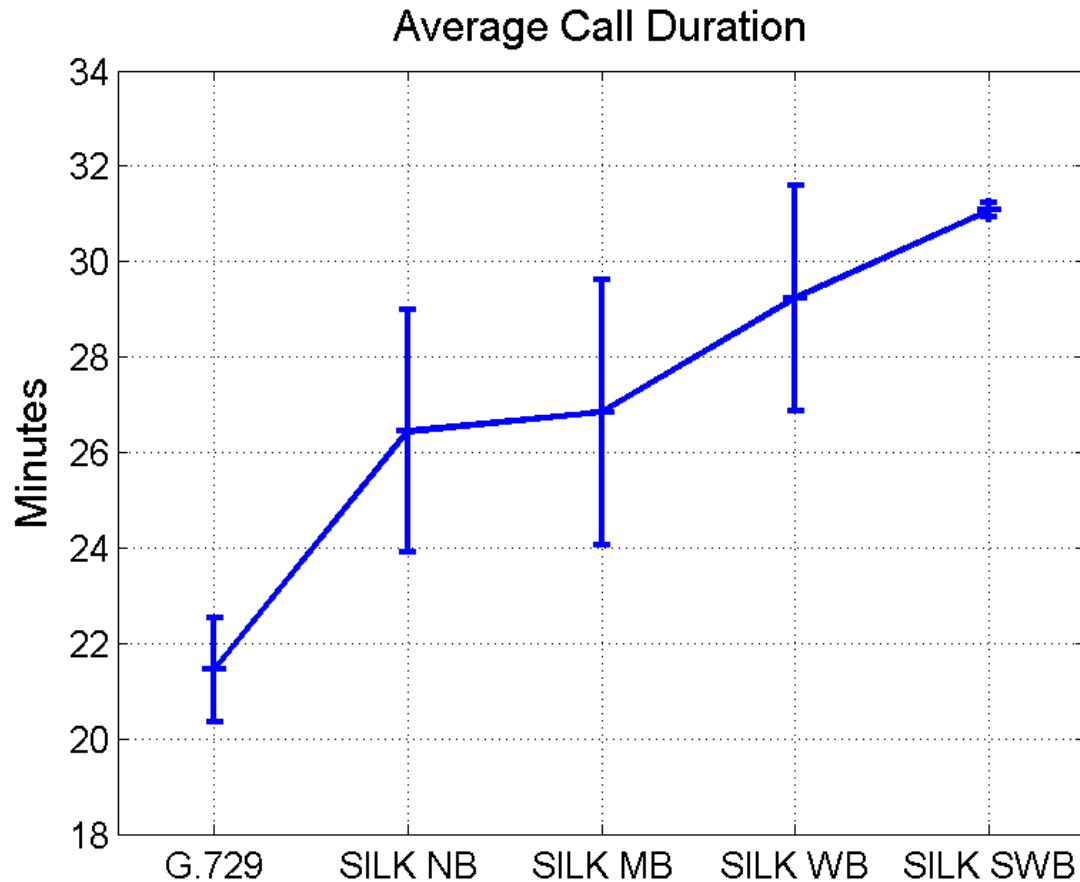

Average User Rating

Measured by randomly assigning a codec to Skype-to-Skype calls
- between Skype 4.1 clients
- with sufficient network bandwidth to run that codec at its maximum bitrate
Confidence intervals indicated are 95%

Quality Matters II

Average Call Duration

Measured by randomly assigning a codec to Skype-to-Skype calls
- between Skype 4.1 clients
- with sufficient network bandwidth to run that codec at its maximum bitrate

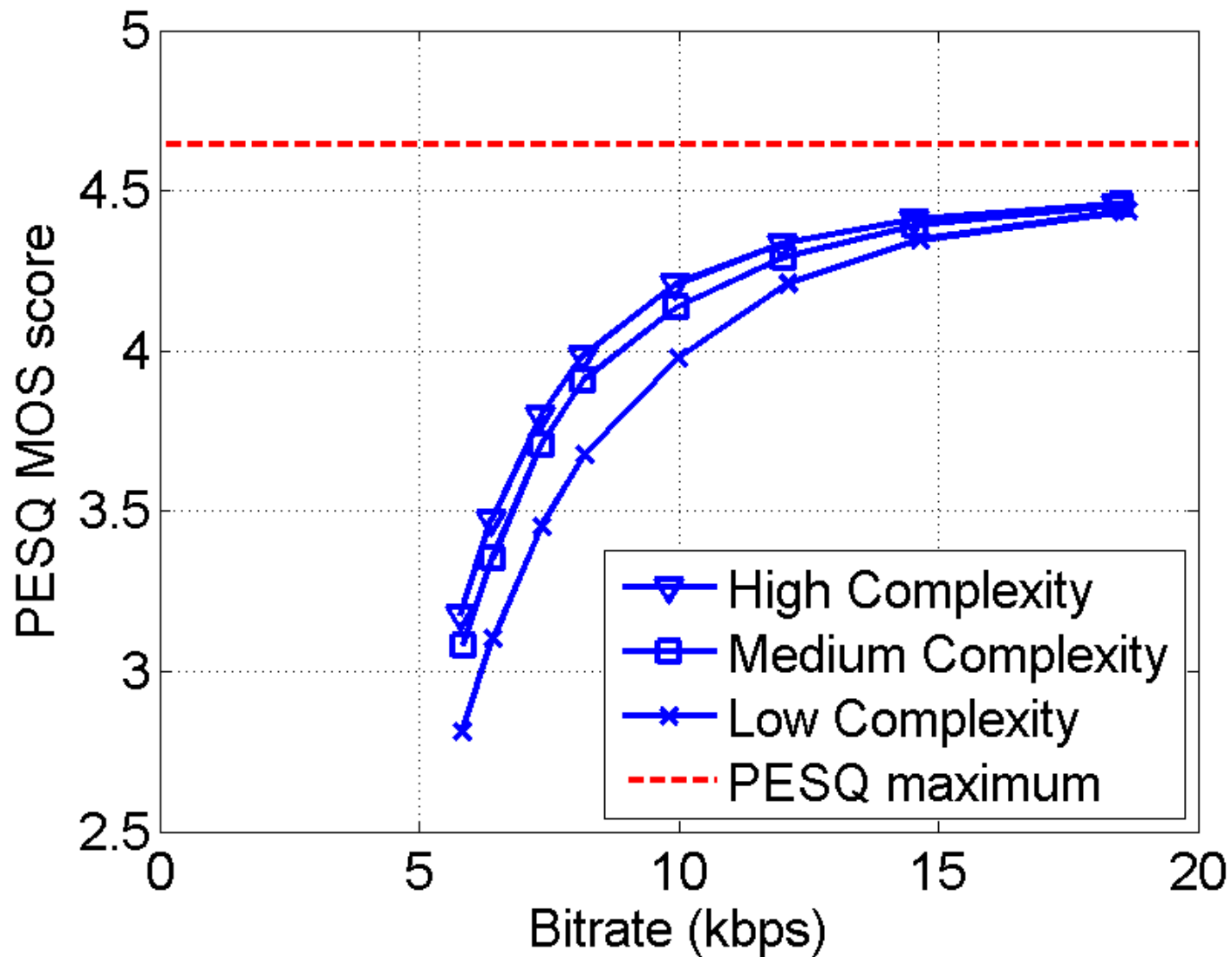Confidence intervals indicated are 95%

SILK Features

- 4 sampling rates: 8, 12, 16, 24 kHz
- Configurable bitrate: 0.5 ~ 2 bits/sample
- Variable bitrate
- 3 complexity settings
- Memory usage:
  - Tables ROM: 22 kB
  - Static RAM: 28 + 14 kB (Enc + Dec)
- Optimized for IP networks

Complexity Impact on Quality (WB)
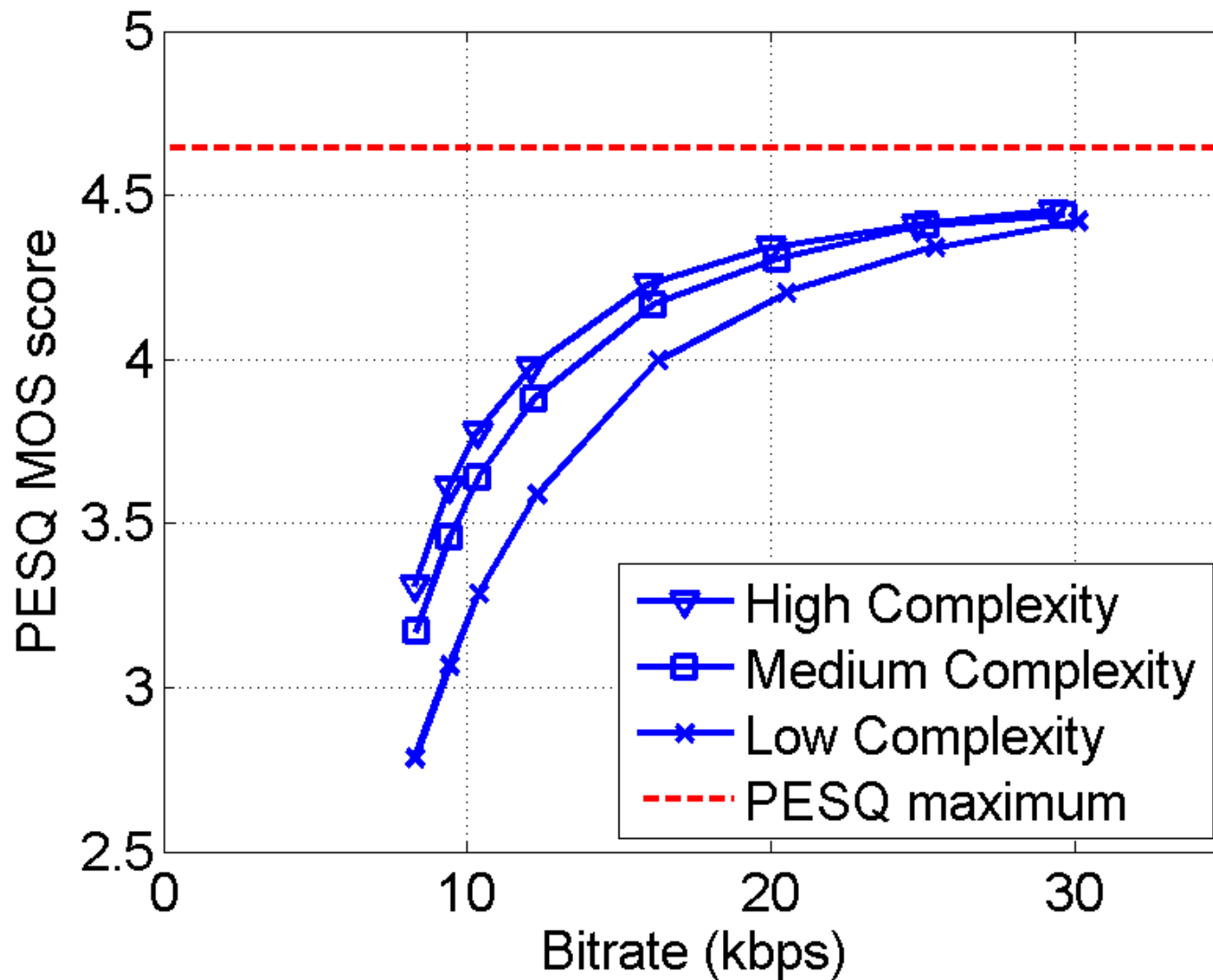
Complexity Impact on Quality (NB)

Complexity (WMOPS)

	Enc: Low	Enc: Mid	Enc: High	Decoder
NB	17	22	30	2.5
MB	24	33	52	4
WB	28	39	59	5
SWB	38	50	78	7

Peak complexity, without in-band FEC. Error margin: +/- 20%

Packet Loss Robustness: In-band FEC

- Aka Low Bit-Rate Redundancy
- Include coarser encoding of a previous packet in current packet
- Decision to include depends on:
  - Sensitivity of input signal to packet loss
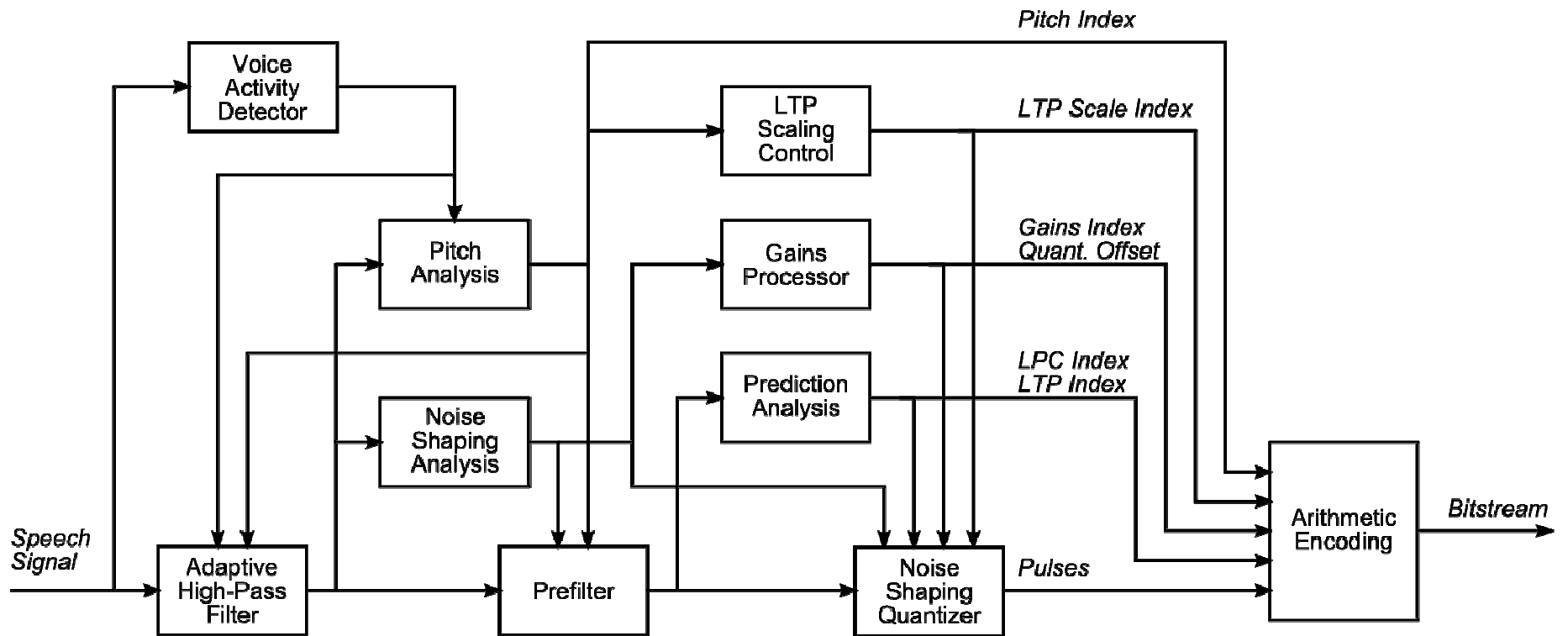 - Packet Loss Percentage input parameter

Packet Loss Robustness: LTP State Scaling

- Scale down the state of the long-term prediction filter at the start of a new packet
- Scale factor depends on:
  - Long-term correlation of input signal
  - Packet Loss Percentage input parameter

Packet Loss Concealment

- Extrapolate signal by using LPC and LTP synthesis filters

Encoder

Decoder