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# Recommendation ITU-T P.863.1: Application guide for Recommendation P.863 Perceptual objective listening quality prediction POLQA

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Editor P.863 & P.863.1

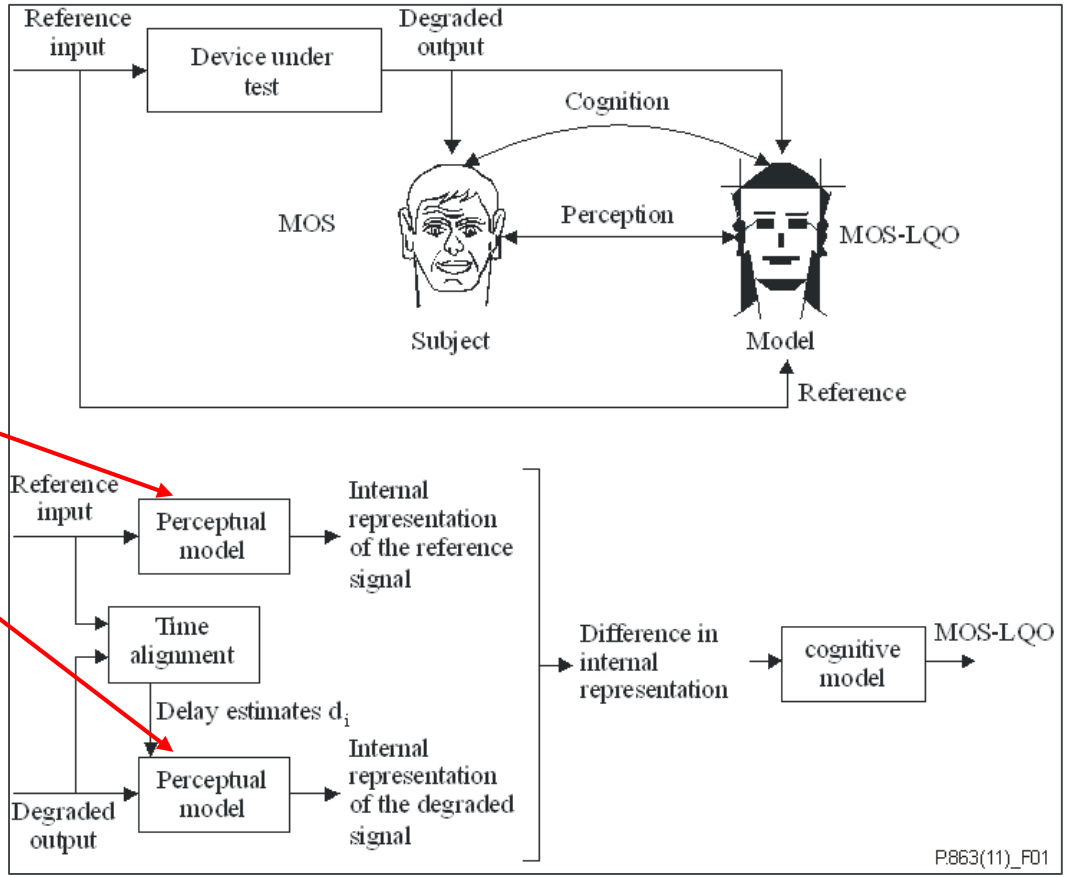
P.863 v2 (09/14)

P.863 v3 (03/18)

P.863.1 (09/14)

P.863.1 (06/19)

# Perceptual Model



# P.863 operational modes

- Fullband (50 Hz-20 kHz)
  - Preferred, future oriented scale
- Super-wideband (50 Hz-14 kHz)
  - Superseded
- Narrowband (300-3400 Hz)
  - If backward compatibility is required

# Operatinal modes (ctd.)

- It is important to understand and consider the two different operational modes supported by the ITU-T P.863 algorithm:
  - fullband mode for listening over fullband headphones;
  - narrowband mode for listening over loosely coupled IRS type handsets.

# Improvements from P.863 v2 to P.863 v3

- Expands scope of application to fullband speech codecs e.g., OPUS, EVS
- But there is much more:

# Improvements in P.863 v3

- ‘Shift-jitter' which could be observed by repeated measurements with slightly differing delay, is decreased;
- Now adequately considering:
  - Gain variation introduced by automatic gain control;
  - Slowly time-varying linear frequency distortions;
  - Test conditions with inserted gaps in speech;
  - Discrimination of wideband (WB) and super-wideband speech;
  - Reverb conditions.

# NOTE 1

- For the two operational modes, the quality ratings are obtained on two different scales
  - The traditional scale for the narrowband mode
  - The future oriented scale for the fullband mode.

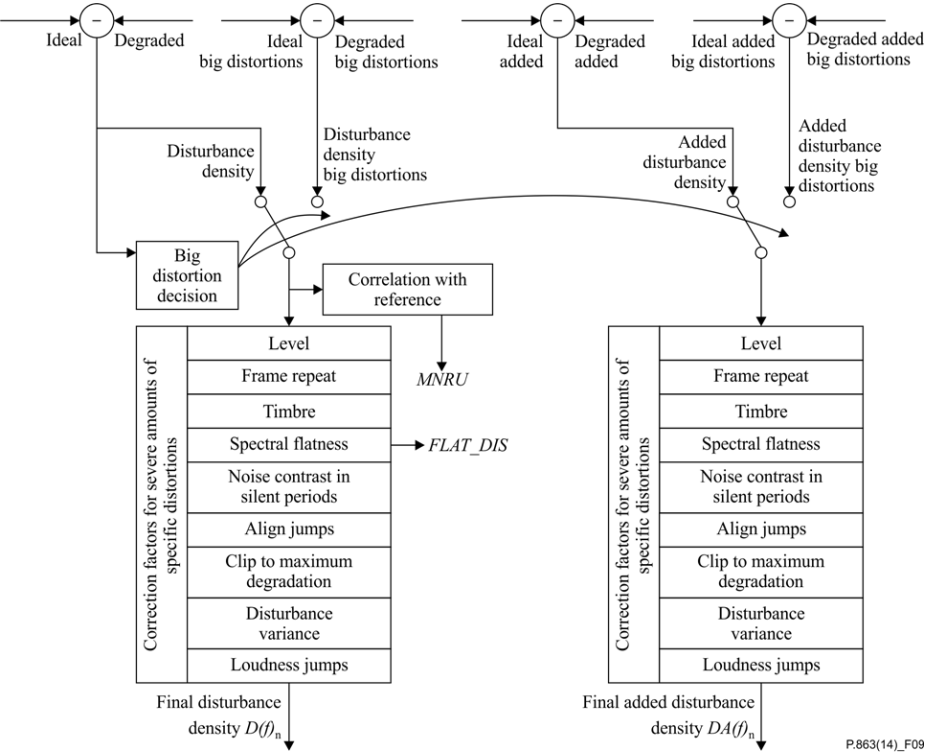
# NOTE 2

- Acoustical recordings, as well as the influence of the presentation level, can only be predicted in fullband operational mode.
- The narrowband operational mode is restricted to electrical recordings and a nominal presentation for compatibility with P.862/P.862.1] application areas.

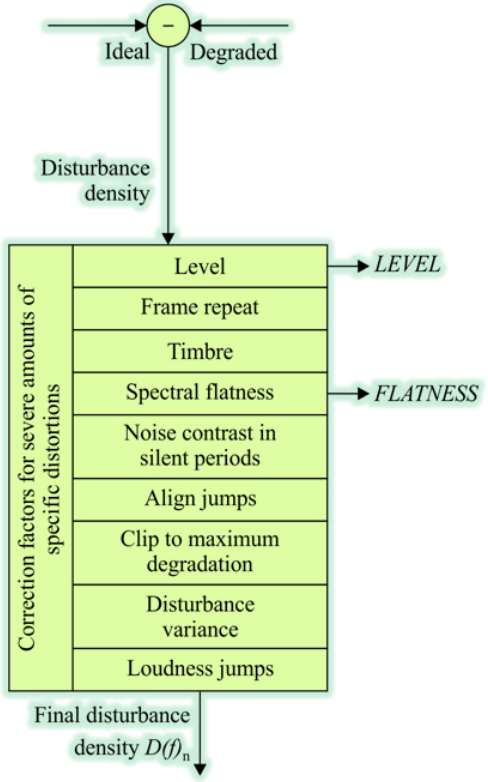
# NOTE 3

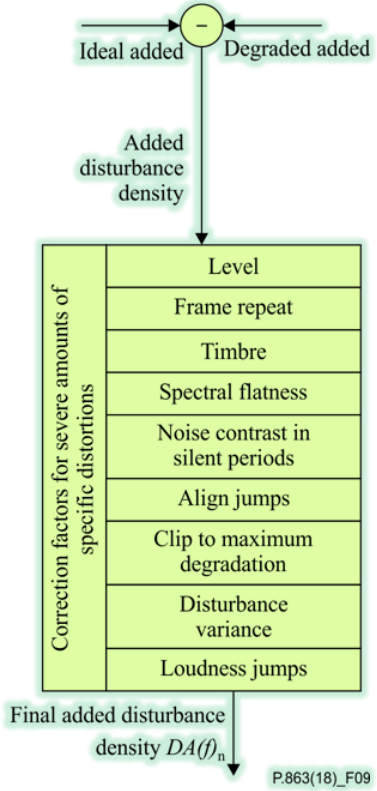
- For backward compatibility, super-wideband reference files can be used in fullband mode as well.
- Distortions in the frequency range between super-wideband and fullband may lead to significant differences
- If the degraded signal is also bandwidth limited to the super-wideband range, the results of ITU-T P.863 v3 and ITU-T P.863 v2 will be equivalent.

# 2nd part of Perceptual Model




NOTE – See clause 9.7.12.



# Factors and applications included in the requirement specification and used in the selection phase of the ITU-T P.863 algorithm

| Test factors |
|---|
| Speech input levels to a codec |
| Transmission channel errors |
| Packet loss and packet loss concealment |
| Bit rates if a codec has more than one bit-rate mode |
| Transcodings |
| Acoustic noise in sending environment |
| Effect of varying delay in listening-only tests |
| Short-term time warping of audio signal |
| Long-term time warping of audio signal |
| Listening levels between 53 and 78 dB(A) sound pressure level (SPL) in fullband mode |
| Packet loss and packet loss concealment with pulse code modulation (PCM) type codecs |
| Temporal and amplitude clipping of speech |
| Linear distortions, including bandwidth limitations and spectral shaping ('non-flat frequency responses') |
| Frequency response |

# Factors and applications included in the requirement specification and used in the selection phase of the ITU-T P.863 algorithm

| Coding technologies |
|---|
| ITU-T G.711, ITU-T G.711 PLC, ITU-T G.711.1 |
| ITU-T G.718, ITU-T G.719, ITU-T G.722, ITU-T G.722.1, ITU-T G.723.1, ITU-T G.726, ITU-T G.728, ITU-T G.729 |
| GSM-FR, GSM-HR, global system for mobile communications (GSM), enhanced full rate codec (EFR) |
| AMR-NB, AMR-WB (ITU-T G.722.2), AMR-WB+ |
| PDC-FR, PDC-HR |
| Enhanced variable rate codec (EVRC) (ANSI/TIA-127-A), EVRC-B (TIA-718-B) |
| Skype (SILK V3, iLBC, iSAC and ITU-T G.729) |
| Speex, QCELP (TIA-EIA-IS-733), iLBC, CVSD (64 kbit/s, "Bluetooth") |
| MPEG-1 audio layer 3(MP3), advanced audio coding (AAC), AAC-LD |
| EVS |
| OPUS |

# Factors and applications included in the requirement specification and used in the selection phase of the ITU-T P.863 algorithm

| **Applications** |
|---|
| Codec evaluation |
| Terminal testing, influence of the acoustical path and the transducer in sending and receiving direction. (NOTE – Acoustical path in receiving direction only for fullband mode.) |
| Bandwidth extensions |
| Live network testing using digital or analogue connection to the network |
| Testing of emulated and prototype networks |
| Universal mobile telecommunications system (UMTS), code division multiple access (CDMA), GSM, terrestrial trunked radio (TETRA), WB-DECT, voice over IP (VoIP), plain old telephone system (POTS), public switched telephone network (PSTN), video telephony, Bluetooth |
| Voice activity detection (VAD), automatic gain control (AGC) |
| Voice enhancement devices (VEDs), noise reduction (NR) |
| Discontinuous transmission (DTX), comfort noise insertion |

# Any questions ?

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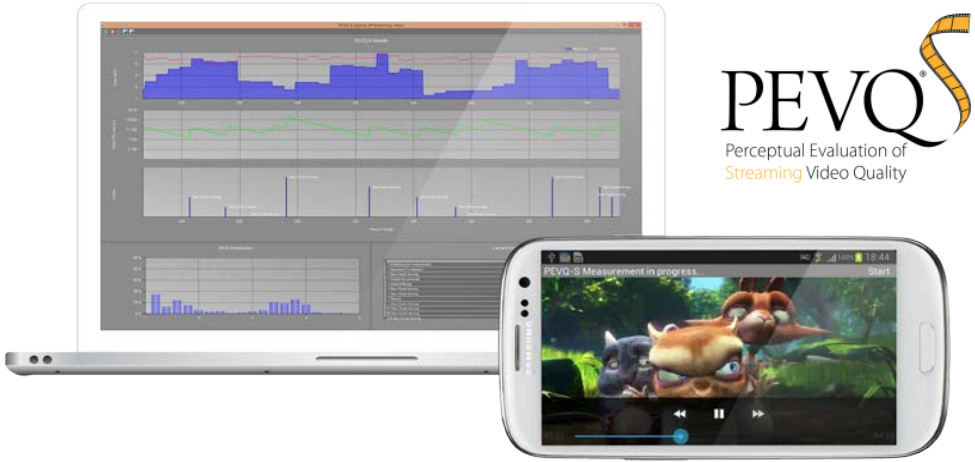


PEVQ
Perceptual Evaluation of Streaming Video Quality

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|---|---|
| Company Homepage: | www.opticom.de |
| POLQA Voice Quality Microsite: | www.polqa.info |
| PEVQ Video Quality Microsite: | www.pevq.com |