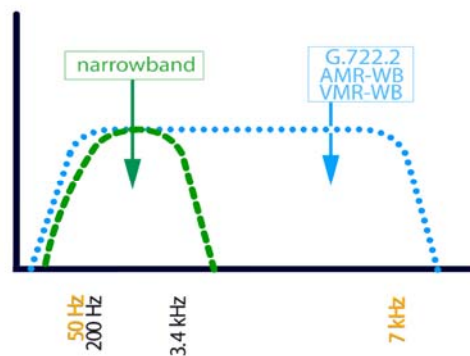


## AMR Wideband Speech Codec AMR-WB/G.722.2

The **Adaptive Multi-Rate Wideband speech codec (AMR-WB)** is the mandatory codec for next-generation wideband (50-7000 Hz) telephony. AMR-WB dramatically improves the user telephony experience by enhancing naturalness, presence, and comfort and improving intelligibility. Greatly superior to traditional toll quality telephony, it's the next best thing to being there! In addition to telephony, it opens the door for a new generation of services, for example, great-sounding ringtones and enhanced-quality VoIP.



Building on the same technologies used in the AMR codec, AMR-WB is the first and only codec that can interoperate directly between 3GPP and 3GPP2 wireless and ITU-T wireline systems without transcoding. This versatility will ease the implementation of wideband voice applications and services across a wide range of communication systems and platforms.

In rigorous comparative testing by the ITU-T, 3GPP, and 3GPP2 standardization bodies, AMR-WB out-performed all competitors and exceeded all requirements for robustness to packet loss, bit errors, and background noise, also demonstrating consistent performance across multiple languages. AMR-WB supports dynamic adaptation to network conditions, using lower bit rates during network congestion or degradation while preserving audio quality.

## Benefits

### Next generation speech

- Bandwidth of 50-7000 Hz not only improves the intelligibility and naturalness of speech, but adds a feeling of presence, eases speaker recognition, and improves automated speech recognition performance.
- Compatible with existing/deployed network equipment.
- Gives outstanding quality on standard GSM and 3G channels without sacrificing capacity.

### Robust

- Provides consistent quality across multiple languages.
- Works well in background noise conditions, whether in the car, in the office or on the street.
- Includes built-in efficient packet loss concealment.
- Very robust to high bit error rates (BER).
- Superior performance across various operating conditions at all bit rates was proven in the selection and characterization phases of the ITU-T and 3GPP standardization processes.

### Feature rich

- Coded AMR-WB media can be encapsulated in 3GPP (.3gp, i.e., MMS) or MPEG-4 (.mp4) file formats and used along the entire delivery chain in multimedia applications.
- Built-in voice activity detection/discontinuous transmission/comfort noise generation (VAD/DTX/CNG) dramatically frees up network resources and prolongs terminal battery life.
- RTP payload and file storage formats defined by IETF, supporting forward error correction (FEC), interleaving, and VAD/DTX/CNG for enhanced VoIP service efficiency and robustness.
- 9 different bit rates, enabling seamless, dynamic link adaptation to network congestion or degradation on a frame-by-frame basis, ensuring consistent high service quality.
- Low complexity encoder and decoder.

# The AMR-WB/G.722.2 Standard for Wireline and Wireless Services

The AMR-WB codec is the first codec adopted as a standard for both wireless and wireline services. It was standardized by ETSI/3GPP in December 2001, and approved by the ITU-T in January 2002. The ITU-T standard is referred to as G.722.2. AMR-WB interoperates with the latest 3GPP2 wideband standard, VMR-WB at mode 3.

References: • 3GPP TR 26.190 • ITU-T RFC G.722.2 • 3GPP2 C.S0052-0 v1.0

## AMR-WB at a Glance

Standardization	Approved as AMR-WB by ETSI/3GPP in 2001 Approved as G.722.2 by ITU-T in 2002
Technology	Algebraic Code Excited Linear Prediction (ACELP®)
Bit rates (kbps)	23.85, 23.05, 19.85 18.25, 15.85, 14.25, 12.65, 8.85, 6.6, plus CNG rate of 1.75 kbps
Delay	Frame size: 20 ms Lookahead: 5 ms
Quality	@23.05 kbps = G.722@64 kbps      @12.65 kbps > G.722@48 kbps @15.85 kbps >= G.722@56 kbps      Good performance at 6.6 and 8.85 kbps
Complexity	38 wMOPS (including VAD/CNG processing)
Fixed-point	Bit-exact C code available (for both DSP and ARM platforms)
Floating-point	C code available
VAD/DTX/CNG	Included

## Applications

### Telephony

GSM and 3G circuit switched telephony  
• VoIP • Wi-Fi telephony • Satellite telephony • Push to talk • Video telephony

### Multimedia and Internet

Audio and video conferencing • Chat and virtual reality immersion environments • Streaming • Content downloads • Multimedia Messaging Services • Digital radio broadcasting • Audio books • Multimedia real-time collaboration tools • PDA/handset-hosted applications • Portable audio devices • Ringtones • Content creation tools • Multimedia transcoders • Multimedia gateways • Interactive gaming

### Others

Satellite applications • Network analysis and simulation tools • Test and measuring equipment • Static answering machines • Voicemail/Unified Messaging • Consumer electronics • Toys

## Hearing is believing . . .

Hear AMR-WB for yourself. Visit the Listening Room at <http://www.voiceage.com> to experience the depth and richness of wideband speech delivered by AMR-WB.

## About VoiceAge®

VoiceAge Corporation is the forerunner in the development and dissemination of speech and audio compression technologies and solutions at the convergence of wireless, 2.5G, 3G, Wi-Fi, and Internet protocols. Using designs based on our flagship ACELP® technology platform, VoiceAge® codec solutions deliver unsurpassed quality experienced daily by hundreds of millions of users worldwide.

VoiceAge and ACELP are registered trademarks of VoiceAge Corporation in Canada and/or other countries. All other trademarks are the property of their respective owners.

