



**VoiceAge**<sup>®</sup>  
www.voiceage.com

The World's Premier Supplier of Speech and Audio Codecs





The World's Premier Supplier of Speech and Audio Codecs



# VoiceAge sets the standard —

# Superior quality voice on ALL networks

*As a leader in the VoIP revolution, you know that now is the time to innovate, and you can do it with hi-fi telephony powered by VoiceAge G.722.2/VMR-WB wideband speech codecs.*

The wideband spectrum adds a new dimension to speech communications, and VoiceAge wideband speech codecs deliver speech with unmatched quality and robustness. Already deployed in wireline, wireless and Wi-Fi networks for VoIP, conferencing, and multimedia applications, the VoiceAge family of codecs is your best choice for all your services.

VoiceAge codecs have been standardized by major industry-based international standards organizations, so you know you are getting the best. They won the standards because they performed significantly better than any competitor in rigorous comparative testing across multiple languages and operating conditions. Moreover, unlike any other solution on the market today, the VoiceAge G.722.2/VMR-WB wideband speech codecs provide transcoder-free interoperability across wireline and wireless networks worldwide – preserving top quality even at very low bit rates and in adverse network conditions.

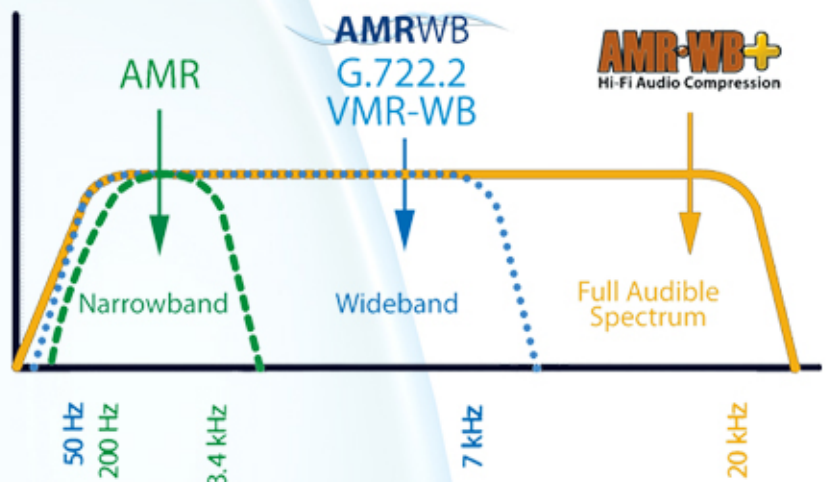
### Wideband telephony for enhanced quality

Let's face it, narrowband (PSTN) telephony is outdated. It's time to provide users with an experience that's more natural and more intelligible – an experience that's equivalent to talking face to face.

G.722.2/VMR-WB, the breakthrough in wideband speech coding technology, delivers on this promise, expanding the communicated speech spectrum to 50-7000 Hz to provide a much richer sound quality.

### Hi-fi audio, the key differentiator

Hi-fi telephony raises the customer experience – and expectations – to a new level, so you can use it to set your VoIP offering apart from the competition, increasing customer retention and attracting new customers. It's also an opportunity to boost revenue by deploying other outstanding value-added services – at minimal cost.



## Designed for real-world network deployment

G.722.2/VMR-WB's integrated robustness features can adapt to any network conditions, making them ideal for use in packet networks:

- ✓ Bit rate scalability enables adaptation to different network conditions
- ✓ Packet loss concealment methods add to robustness
- ✓ The codecs' transport layer (RTP payload as defined by the IETF)
  - Provides enhanced error protection for the most sensitive bits within the payload, enabling efficient Wi-Fi communication
  - Allows for forward error correction (FEC)
  - Supports packet interleaving to maintain quality for multimedia streaming in degraded network conditions
- ✓ VMR-WB includes built-in state-of-the-art noise suppression for background noise types like street noise, office noise and car noise so sound quality is clear and clean even in noisy conditions

VoiceAge G.722.2/VMR-WB wideband speech codecs include multiple built-in features for optimizing your services at no extra cost:

<b>Wideband speech spectrum</b>	<ul style="list-style-type: none"> <li>✓ Delivers VoIP communication with hi-fi voice quality that substantially exceeds (narrowband) wireline quality</li> <li>✓ Supports improved performance in automated speech recognition and speaker verification systems</li> </ul>
<b>Bit rate scalability</b>	<ul style="list-style-type: none"> <li>✓ Makes efficient use of network capacity at bit rates ranging from 4.5-23.85 kbps, with flagship rates of 12.65 kbps for fixed bit rate (G.722.2) and 5.5 kbps for variable bit rate (VMR-WB)</li> <li>✓ Is adaptable to network conditions, maximizes QoS</li> </ul>
<b>Interoperability across networks</b> Wi-Fi, ITU-T, 3GPP, 3GPP2, PacketCable 2.0 (See the figure on the facing page.)	<ul style="list-style-type: none"> <li>✓ Is easy to integrate (current infrastructure supports wideband deployment)</li> <li>✓ Provides VoIP interoperability between wireline, Wi-Fi and wireless networks</li> <li>✓ Eliminates the need for transcoding and tandeming, therefore preserving speech quality while reducing network costs and transmission delays</li> </ul>
<b>Carries narrowband signal</b>	<ul style="list-style-type: none"> <li>✓ Interfaces effectively to the PSTN for narrowband voice signals</li> <li>✓ Delivers even better voice quality than narrowband speech codecs</li> <li>✓ May well be the only compression technology required in your network</li> </ul>
<b>Low complexity</b>	<ul style="list-style-type: none"> <li>✓ Lowest complexity for the quality delivered at equivalent bit rates</li> <li>✓ Can be implemented on low-cost mass-market CPUs</li> </ul>

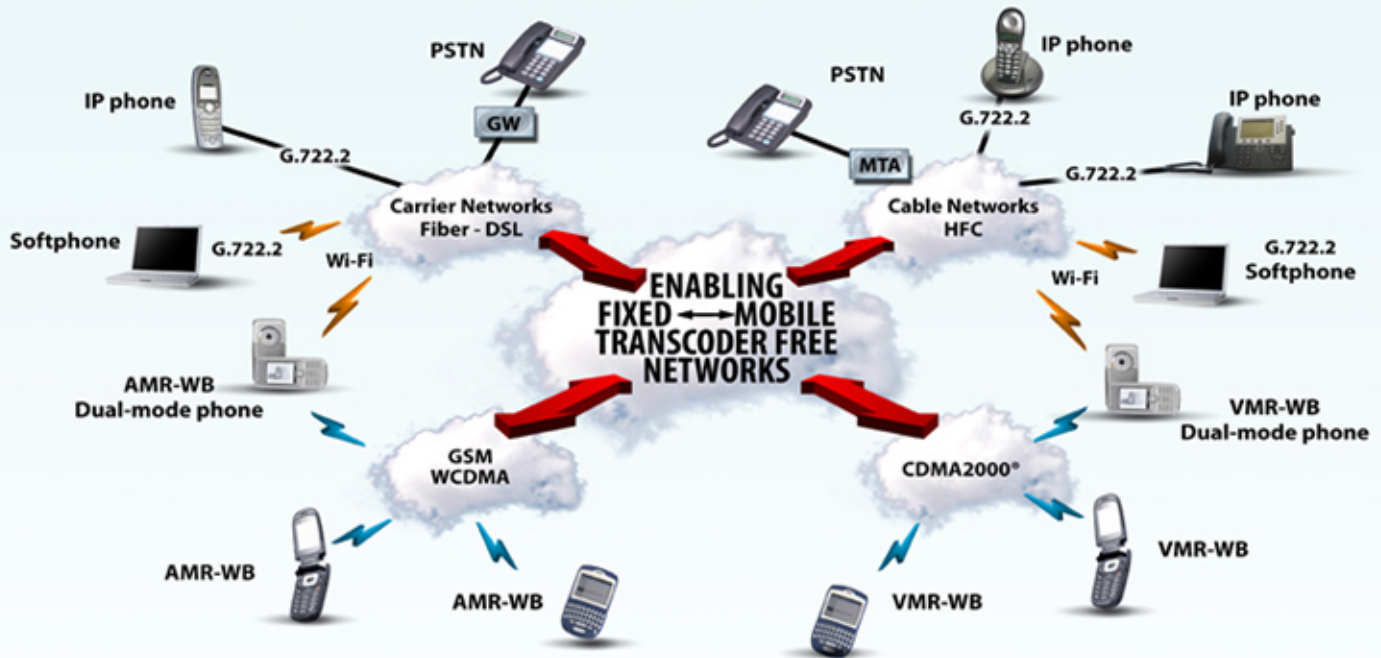
## Advanced VoIP services and applications

Wideband speech coding opens the door to a broad range of advanced VoIP services, enabling service providers to attract new subscribers and retain existing ones. And the good news for manufacturers is that VoiceAge® offers codec implementations to suit all customers' needs for equipment that supports and delivers these services.

The G.722.2/VMR-WB codecs were developed for use in multiple hi-fi speech applications, including these packet-based VoIP applications:

- |                |                                |
|----------------|--------------------------------|
| ✓ IP phones    | ✓ Audio/videoconferencing      |
| ✓ Softphones   | ✓ Media gateways               |
| ✓ Call centers | ✓ IP PBX systems               |
| ✓ Voicemail    | ✓ Test and measuring equipment |
| ✓ VoiceXML     | ✓ Automated speech recognition |

## The Fully Interoperable Wideband Codec Standards AMR-WB (G.722.2) / VMR-WB



Transcoder-Free Interoperability Eliminates Costs, Latency, Impairments

### VoiceAge codec interoperability gives you best speech quality, lower delay, lower costs

The people who brought you the G.729/G.723.1 VoIP narrowband speech codecs now offer these next-generation codecs for VoIP:

- **G.722.2** for wireline, Wi-Fi, PacketCable 2.0 and GSM and WCDMA wireless networks
- Variable Rate Multi-Mode Wideband (**VMR-WB**) for wireline, Wi-Fi, PacketCable 2.0 and cdma2000® wireless networks

Adopted first as the mandatory wideband speech codec standard by 3GPP for wireless networks (as AMR-WB), **G.722.2** was also adopted by ITU-T. As such, it is the first codec to be adopted for both wireless and wireline services. It's the mandatory codec for wideband speech in both GSM and WCDMA networks, supporting a broad range of bit rates from 6.6-23.85 kbps. It was also recently included in the CableLabs® PacketCable 2.0 specification.

**VMR-WB**, a source-controlled version of G.722.2, was adopted by the 3GPP2 as the mandatory speech codec for cdma2000® wideband telephony services and is also included in the PacketCable 2.0 specification. This variable-rate multi-mode wideband codec operates in a range from 0.8-13.3 kbps, including one mode of operation (mode 3) that is interoperable with G.722.2.

These codecs eliminate the need for transcoding and ease the implementation of wideband applications and services across a wide range of wireline and wireless communication systems and equipment. They also interface effectively to the PSTN and carry narrowband voice signals.

An extension of this same technology, the **AMR-WB+** hybrid speech and audio codec, is a 3GPP standard for mono and stereo hi-fi multimedia services. AMR-WB+ is backward compatible with G.722.2 and can encode the entire audible spectrum from 50 Hz - 20 kHz.

### Compare the quality!

This table compares the bit rates needed by G.722.2 and G.722 to deliver the same quality speech. G.722.2 uses about one third the bit rate of G.722.

G.722.2/AMR-WB at fixed bit rate	Quality	G.722 at fixed bit rate
23.05 kbps	≥	64 kbps
15.85 kbps	≥	56 kbps
12.65 kbps*	=	56 kbps

\* Interoperable with VMR-WB mode 3.

This table compares the quality of VMR-WB with source control at several average bit rates for a speech signal that is 60% active speech and 40% background noise/silence.

VMR-WB mode	VMR-WB at average bit rate	Quality	G.722 at fixed bit rate
1	5.5 kbps	=	56 kbps
2	4.5 kbps	>	48 kbps
3*	6.7 kbps	≥	56 kbps

\* Interoperable with G.722.2.



# The VoiceAge® offering

Available now – low-cost implementations  
for a variety of platforms and environments

## Codec implementations...why reinvent the wheel?

VoiceAge® is proud to offer the market off-the-shelf implementations of the **G.722.2/AMR-WB** and **AMR-WB+** codecs for various platforms. Consider our turnkey codec solutions for platforms such as ACM, ARM, Java, Texas Instruments, and operating systems including general-purpose floating-point (Windows®, Linux, Mac OS®, Solaris™), embedded (Symbian™, WinCE/Win Mobile, Linux, Palm™ OS® 5 and OS 6), RTOS and Java.

They're already optimized for various processors. We've already solved the development and integration problems, so you don't have to. Our solutions save you valuable time, giving you an advantage over the competition.

We also offer **CodecLib**, our common application programming interface. CodecLib was developed as an integration tool to deploy multiple combinations of audio codecs, including **G.722.2/AMR-WB**, **VMR-WB** and **AMR-WB+** as well as G.711, G.722, G.723.1, G.726, G.728, G.729 and its annexes, AMR (narrowband)/(GSM-EFR), GSM-FR, GSM-HR, Microsoft GSM, EVRC (IS-127), QCELP-13, and 16-bit to 8-bit Linear Transformation. Its OS-independence and open interface enable easy integration on any floating-point platform running under the Windows®, Mac, Linux and Solaris™ operating systems.

For information about our wideband codec implementations, contact us at [sales@voiceage.com](mailto:sales@voiceage.com).

## About VoiceAge

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

Our mission is to maintain our global leadership in low bit rate, high-quality, digital speech and audio compression. Our business activities focus on three areas:

- **Codec Solutions.** Adapting existing codecs to custom environments, optimizing codecs for specific processors, and – as leaders in our field – always offering the best quality
- **Coding Technology R&D.** Maintaining our leadership in the research and development of narrowband and wideband low bit rate speech and audio coding technology so that we can offer state-of-the-art standardized and proprietary codec solutions to meet specific market requirements
- **Licensing.** Creating and managing, with other patent holders, patent pools to facilitate access to licenses that are required for the use of standardized codecs

Our ACELP® technology platform is internationally recognized and was adopted at 3GPP and 3GPP2 as the core wideband speech-audio coding technology for wireless applications. The ACELP® platform was also adopted at ITU-T for teleconferencing and voice-over-packet applications. Most recently, it was included in the CableLabs® PacketCable 2.0 specification. Today, VoiceAge® occupies a strategic position in the sphere of emerging wideband speech and audio compression technologies.

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

## Experience the depth and richness of our wideband codecs for yourself

Visit the Listening Room at <http://www.voiceage.com>.

