Get Ready for Hi-Def Phone Calls
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Radio ads running in the former Soviet republic of Moldova feature a variety of emotional phone conversations, evidence of how the world's first high-definition cell phone system can carry not tinny-sounding speech but voices full of raw human feelings: love, fear, exhilaration. "You can feel emotions; it is completely different," says Liudmila Climoc, chief executive of wireless carrier Orange Moldova.

For 40 years the quality of cellular phone calls has changed very little. The shift in the 1990s from analog to digital phones held the promise of crisper quality, but that never panned out. Struggling to cope with 30% annual increases in traffic, cell phone companies used the improved technology to add capacity, not quality. Today demand for cellular minutes is nearing its peak, with growth of 3% in the last year. Now the relentless advances in digital technology can be used for purposes other than simply packing more calls into the cellular airwaves.

So far the big American carriers plan to use their growing capacity to add all sorts of data services. Eventually the U.S. will catch up to Moldova, as the cost of better-sounding voice calls becomes too cheap to ignore. Today's carriers convert calls into 6,000 digital bits per second, a tight squeeze and the major reason the calls sound so poor. In tiny Moldova, where capacity is relatively abundant, French wireless carrier Orange now uses double that number of bits. The highs and lows of the human voice are not so badly truncated.

In the U.S., chipmaker Broadcom is hard at work on gear that will allow even better-sounding calls. Nambi Seshardri, who oversees that work at Broadcom, says that with 32,000 bits per second he'll be able to produce voice quality that is virtually indistinguishable from face-to-face conversation. A demo of the technology shows a clearly audible improvement over not just ordinary cell phones but also landlines, which chop off high frequencies.

The other big problem with cellular quality is also about to disappear. Right now there's an annoying lag that occurs between the moment when one caller speaks and the time his voice reaches the other person's ear. Many people assume that's an inherent drawback of cell phones. It's not. Wireless signals fly through the air at the speed of light just as they do in optical fiber. The delays come from slow software and circuitous routing. The new Long Term Evolution gear set for deployment next year should cut that lag by at least 75%, so most human ears won't notice it.

The same quality advances are at work in wired phones as well. Orange already has 500,000 high-definition phones installed in Europe that use voice-over-Internet technology. When this style of phone connection hit the scene it was roundly criticized for its poor quality relative to traditional phone lines. Yet Orange has shown that better technology can close that gap and then some. Both cellular and Internet phone calls may soon sound so good it might even make you want to cry.

I *Can* Hear You Now!

A quick look at how the problems with today's cell phones will soon be fixed.

PROBLEM: "Tinny" Sound.
To save capacity, today's phones drop high-pitched sounds. The letters "f" and "s" sound similar, and "p" is easily confused with a "t."
SOLUTION: More capacity, less compression. New networks that begin rolling out next year can triple the number of bits a call uses, leading to better-than-land-line sound.

PROBLEM: Pops and Clicks.
Cell phone calls are often interrupted by peculiar, and annoying, sounds caused by the connection briefly failing and tiny snippets of speech getting lost.
SOLUTION: New chips from Broadcom integrate "packet loss concealment," letting the phone fill in the small gaps with less grating sounds.

PROBLEM: Wind Noise.
SOLUTION: Clever software that identifies wind noise and suppresses it.

PROBLEM: Overlapping Speech.
Talk from one cell phone to another and you notice a big lag between when you speak and the other person hears you, often leading to overlapping conversations.
SOLUTION: The next generation of cell phones is designed to waste less time transmitting calls and to eliminate any noticeable latency.