



Agenda Item 1

Featured Start-Up -- OmniSpeech



BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION
INFORMATION OR DISCUSSION

TOPIC: Featured Start-Up -- OmniSpeech (information item)

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: November 21, 2013

SUMMARY: At the request of Committee members to hear more about successful USM-facilitated start-ups, OmniSpeech, founded by Dr. Carol Espy-Wilson, professor of Electrical and Computer Engineering at UMCP, is the first featured start-up.

OmniSpeech offers innovative solutions to enhance voice communications in digital mobile devices and speech-enabled applications and has won numerous awards. Further, OmniSpeech's software-only solution requires no additional hardware, enhancing design flexibility and reducing productions costs. Dr. Espy-Wilson received her Ph.D. in Electrical Engineering from the Massachusetts Institute of Technology in 1987.

ALTERNATIVE(S): This item is for information purposes.

FISCAL IMPACT: This item is for information purposes.

CHANCELLOR'S RECOMMENDATION: This item is for information purposes.

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Joseph F. Vivona (301) 445-2783



University of Maryland
Board of Regents

November 21, 2013

The Pain in the Market that OmniSpeech is addressing

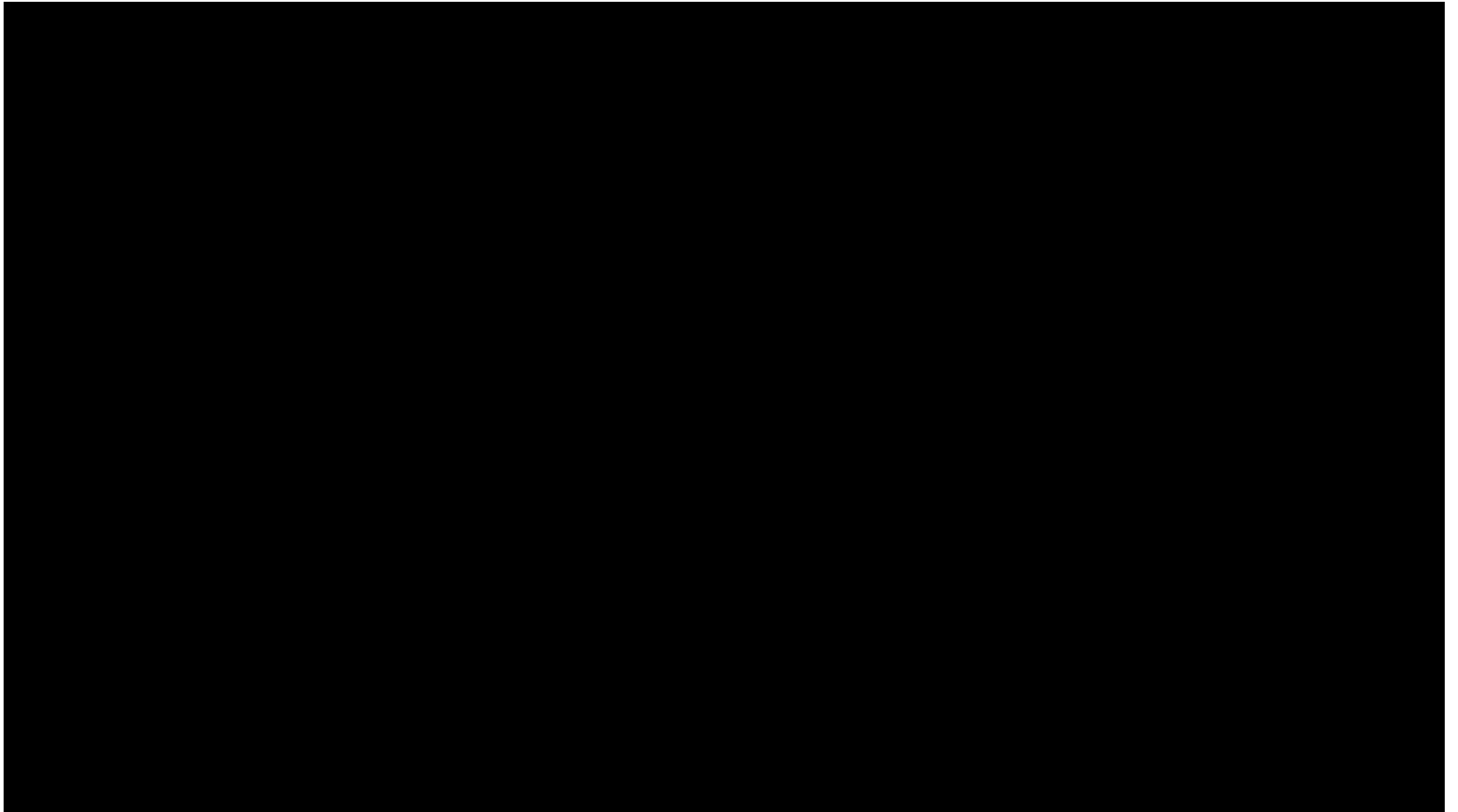


Fig 1: Without OmniClear™, the sound of the subway is overbearing.

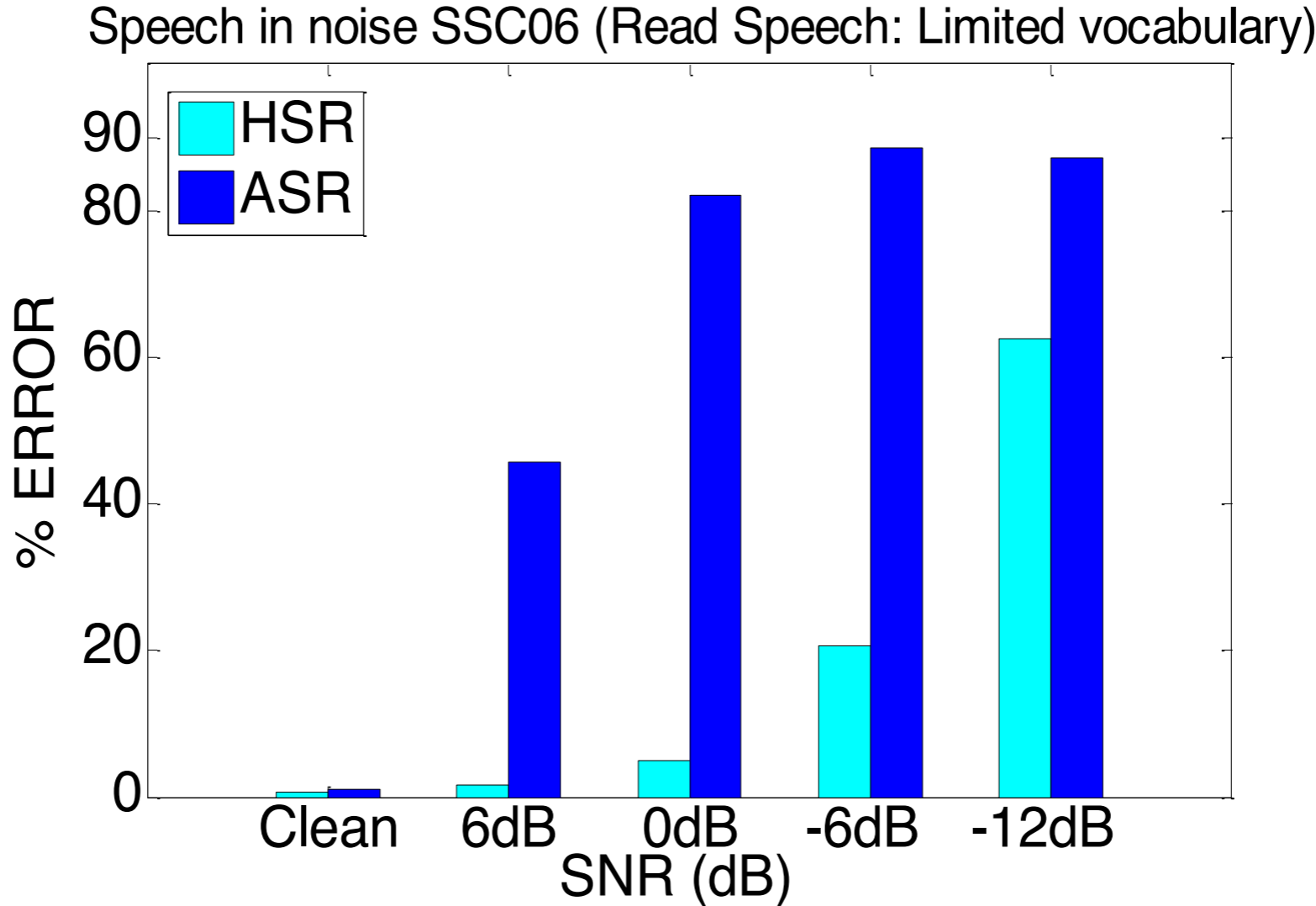


Fig 2: With OmniClear™ the subway noise is now unnoticeable and the call is clear.

Noise Suppression as a Market-Worthy Cell Phone Differentiator









Identify the Pain in the Market that you are going to address



Recognition accuracies for noisy speech
[Cooke et al. 2006]






OmniClear™ at work

Noise	Unprocessed	Processed
Wind		
Clicking		
Music		

OmniClear™ at work

Comparison of Noise Suppression Performance on Background Music

In these clips, the post-processing background noise was amplified to illustrate performance.

Noise Suppression Algorithm	Background Music
Original	
OmniClear™	
Leading Smartphone A (3 mics)	
Leading Smartphone B (2 mics)	
Leading Smartphone C (2 mics)	

Value proposition

OmniClear™ will provide better performance on metrics such as voice quality, power consumption, and device space constraints that are important to handset manufacturers and wireless service providers, for a fraction of the cost of current noise suppression products.

OmniSpeech Solutions

- ◆ Based on novel, **groundbreaking research** using speech-specific characteristics and knowledge of human perception to extract speech from noisy signal
- ◆ **Focus on speech extraction** vs. noise suppression
- ◆ Software-only, single microphone solution
- ◆ Extract speech from **stationary and non-stationary noise**
- ◆ Superior and natural voice quality and intelligibility, in a **software-only solution**
- ◆ **Enhance voice clarity in noisy environments** for users of IP communications, speech recognition applications and, soon, in mobile devices

OmniClear™ X

- ◆ Server-based implementation
- ◆ Enhances performance of Speech Recognition-enabled solutions
- ◆ Deployed commercially

OmniClear™ M

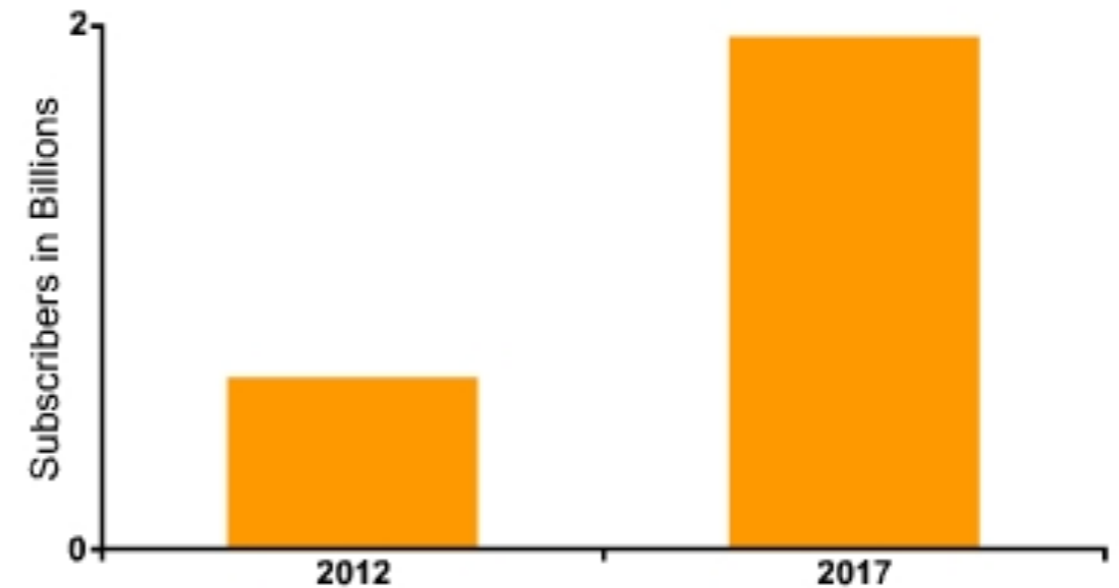
- ◆ Integrate directly onto DSP/ARM processor
- ◆ Can process near- and far-end noise
- ◆ Demo platform in development

Market Size – Over-the-Top/VoIP/IVR Segment

- ◆ Global OTT mobile VoIP subscribers **shot up more than 550% in 2012**, to over 640 million, and are **expected to approach the 1 billion mark in 2013**.
- ◆ Combined, over-the-top mobile VoIP and VoLTE services are expected to become **a \$16 billion business by 2017**.
- ◆ Global **market for interactive voice response (IVR) systems is projected to reach \$2.78 billion by 2017**, with the most robust growth expected to be in the U.S.

Source: Global Industry Analysts

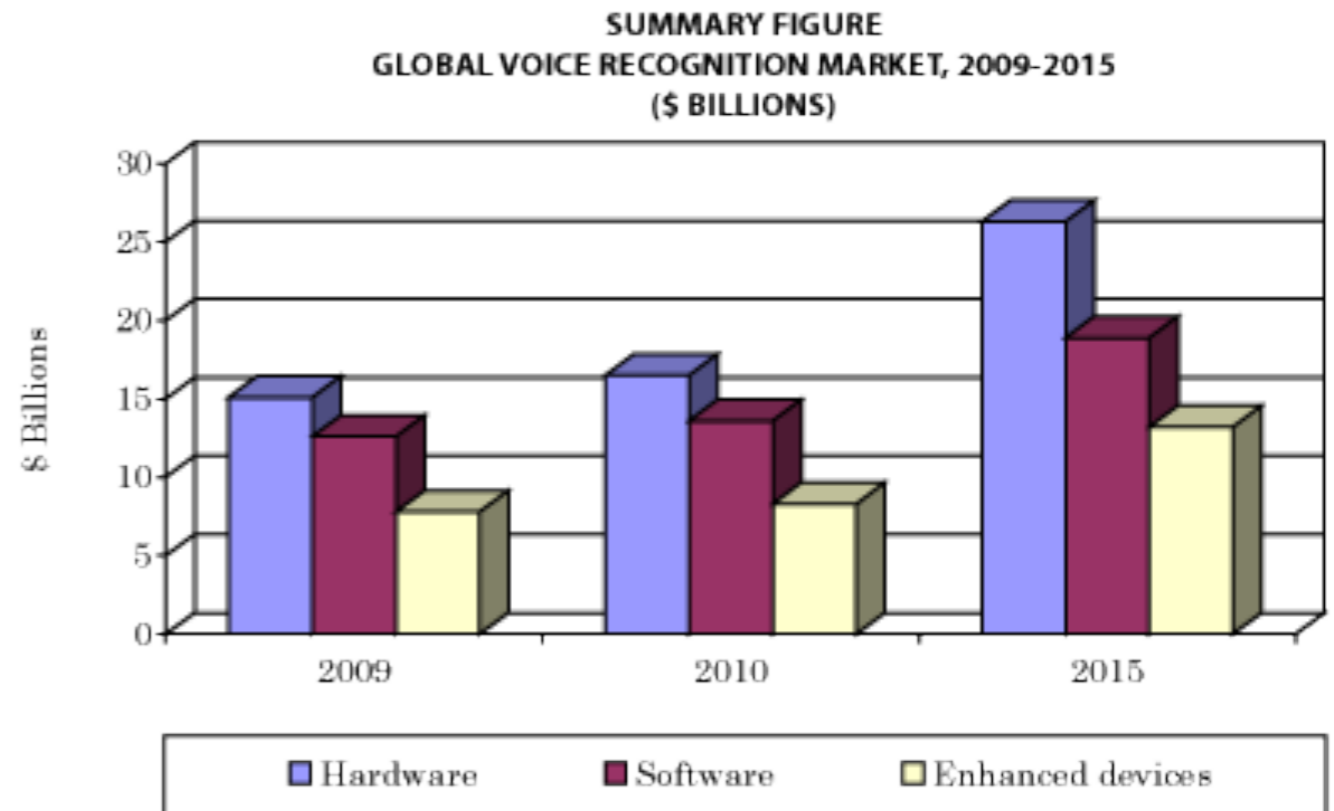
Infonetics expects VoLTE and OTT mobile VoIP subscribers to near 2 billion worldwide by 2017



© Infonetics Research, *Mobile VoIP Services and Subscribers Annual Market Size and Forecasts*, June 2013

Market Size – Voice Recognition Technologies

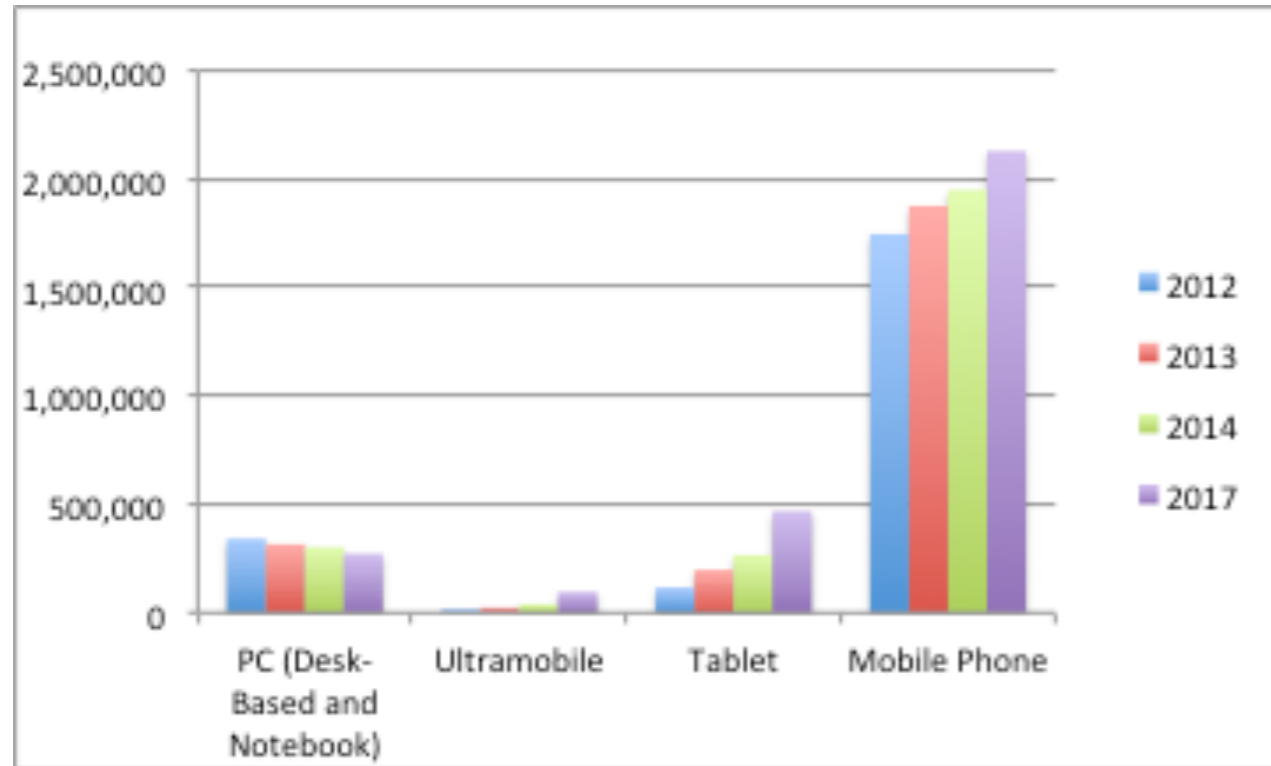
- ◆ **Voice recognition software technologies need hardware to transmit the signals as well as abate ambient noise. This sector of the market is worth an estimated \$16.5 billion in 2010 and will grow at a 9.8% compound annual growth rate (CAGR) to reach \$26.3 billion in 2015.**
- ◆ **Automatic speech recognition and text-to-speech software work together to voice-enable many applications. Software sales will increase at a compound annual growth rate (CAGR) of 6.8%, from a value of \$13.6 billion in 2010 to a value of \$18.9 billion in 2015.**



Source: BCC Research

Market Size – Mobile Device Segment

Worldwide Devices Shipments by Segment (Thousands of Units)

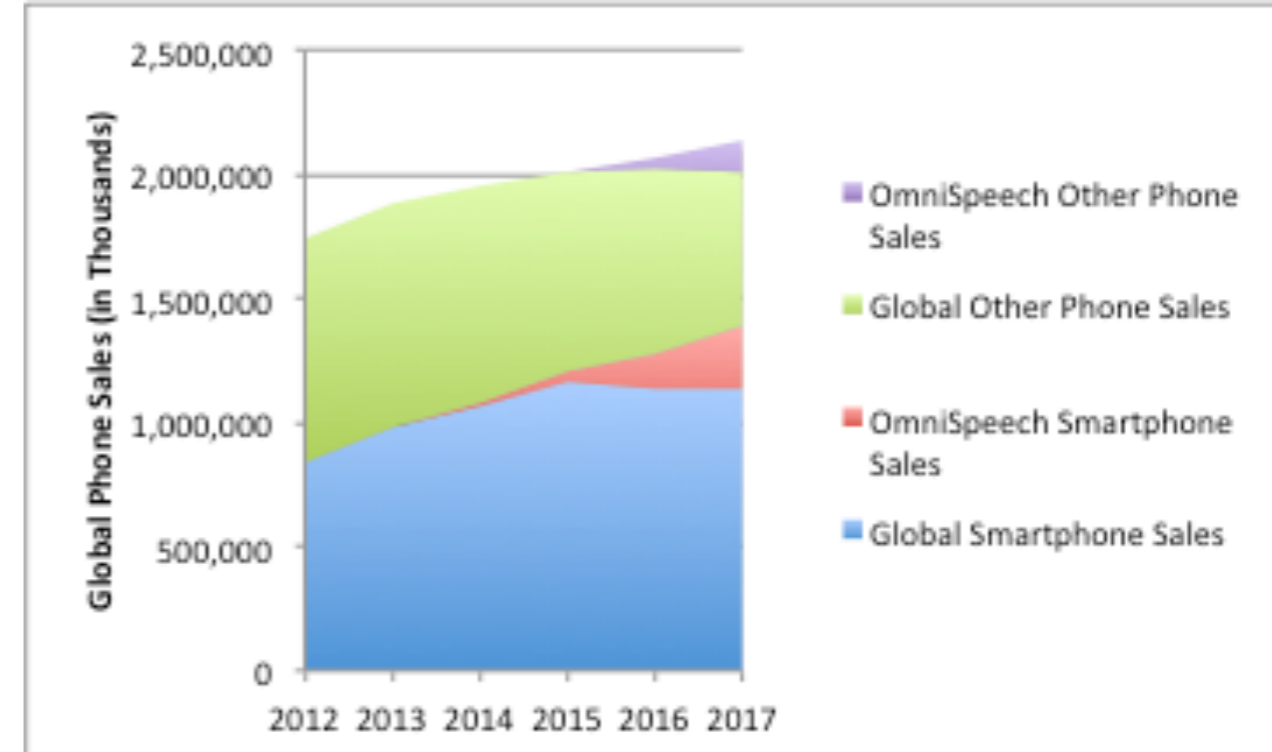


- Mobile phone sales projected to reach 2.1B by '17
- Smartphone share up 44% over previous quarter; will likely continue to exceed feature phone share
- Feature phone sales down 21% year-over-year

Source: Gartner April 2013

Assumptions for Market Share Projection

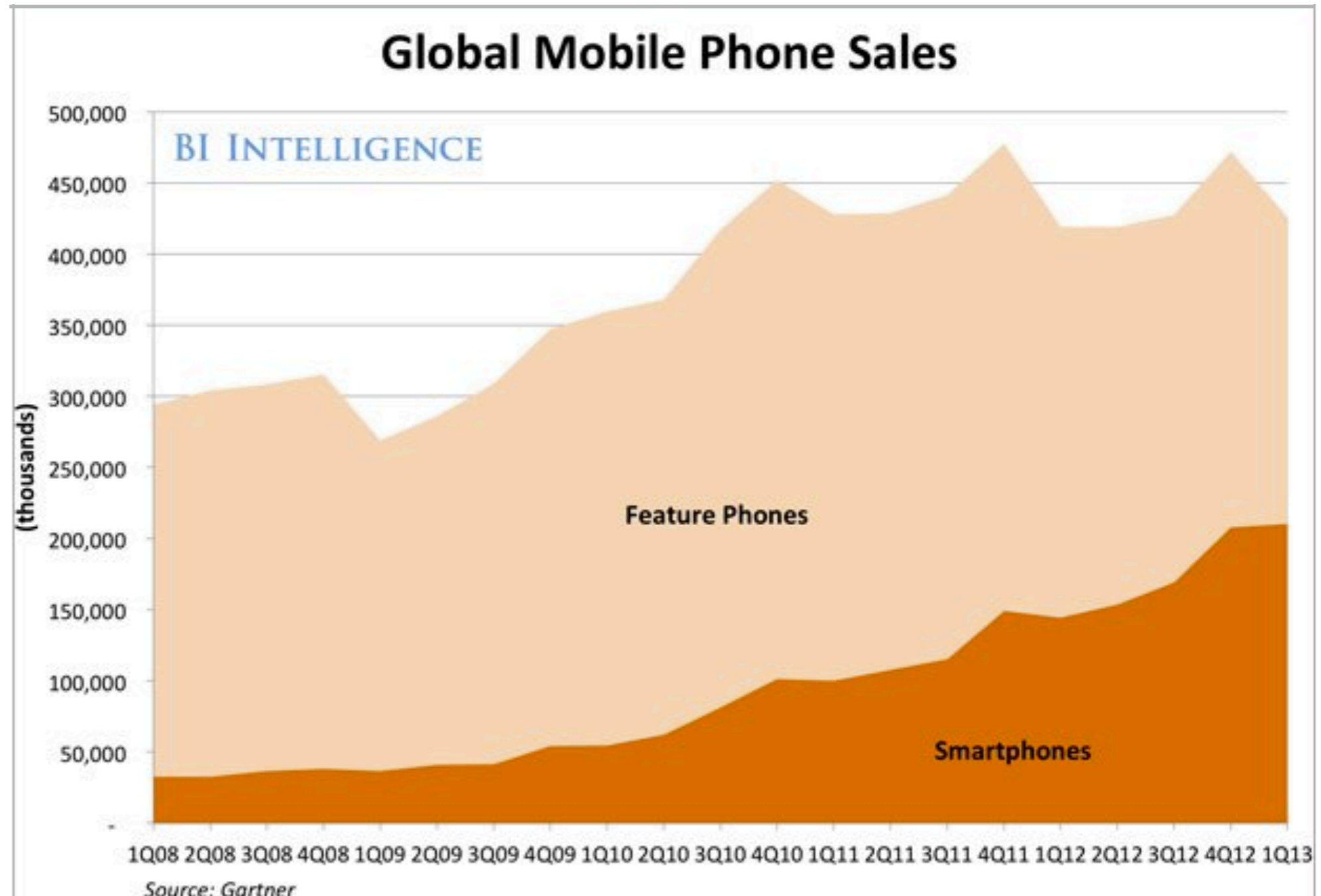
- 51.6% of Q1 2013 mobile phone sales were smartphones (IDC Worldwide Quarterly Mobile Tracker)
- Smartphone percent likely to increase over time (assumed 65% in 2017)
- OmniSpeech projected to take .4% market share initially, rising to 18% market share or 249M smartphones and 15% market share or 116M other phones by 2017



Market Size – Smart vs. Feature Phone

Key Data Points

- 49% of mobile phone sales in Q1 2013 were smartphones (51.6% according to IDC)
- Smartphone share up 44% over previous quarter, 34% over Q1 2012
- Smartphone share will likely continue to exceed feature phone share going forward
- Feature phone sales down 21% year-over-year, down 18% just from previous quarter



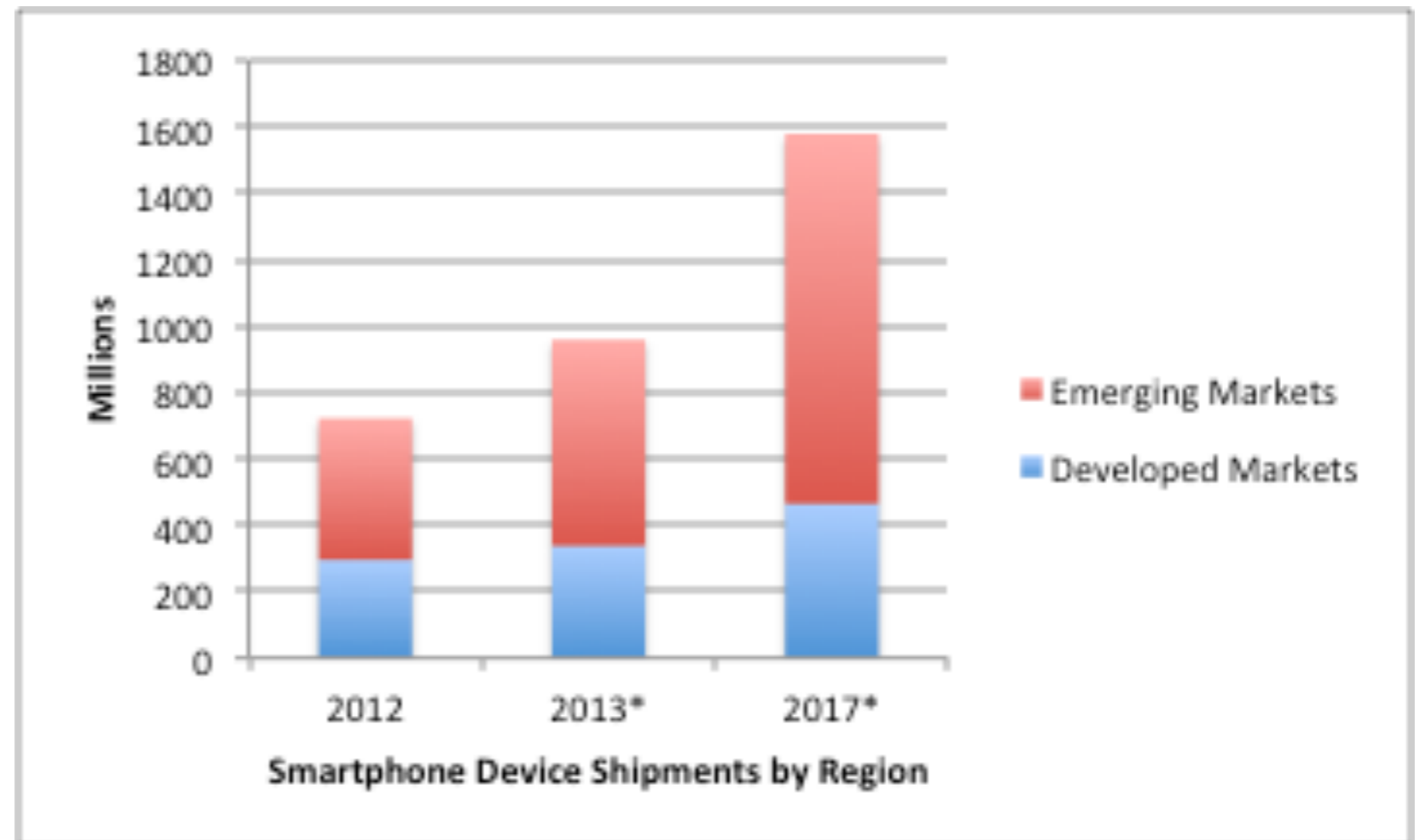
Source: Gartner June 2013

Smartphone growth forecast by region

Key Data Points

- BRIC countries expected to surpass total shipments to developed markets by 2014
- Emerging markets expected to grow at 17% CAGR over the forecast period (compared to 7% in developed markets)
- Strong gains in emerging markets and sub-\$200 smartphone segment.
- Low-cost smartphones to account for 46% of smartphone shipments by 2018—up from 28% in 2012 (ABI Research, Oct '13)

Smartphone Device Unit Shipments by Region, 2012-2017



* Forecast estimates
Source: IDC, May 2013

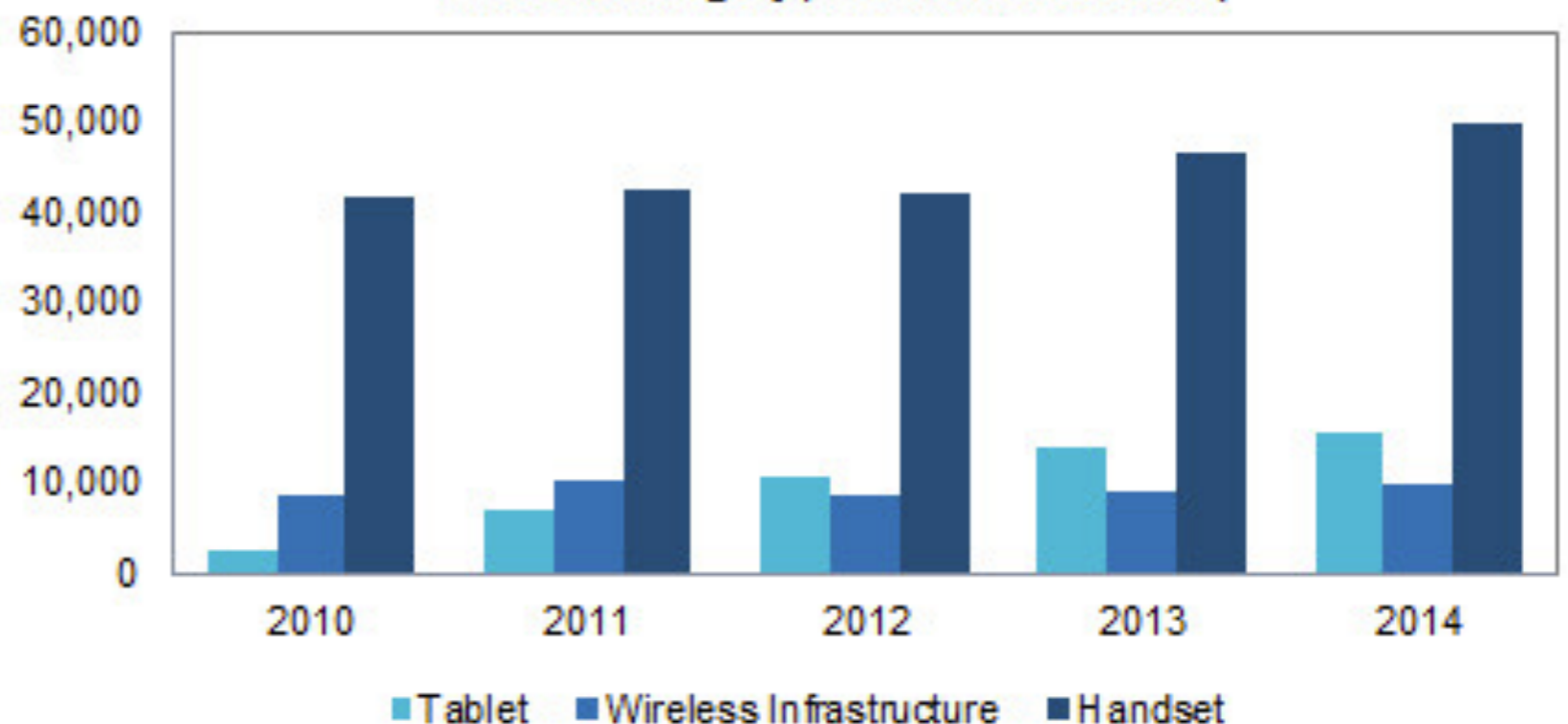
Shipments of low-cost smartphones (sub \$US250) will grow from 259 million in 2013 to 788 million in 2018, according to ABI Research.

Market Size – Semiconductor Segment

Highlights

- Largest submarket will continue to be handsets, at \$46.7B.
- “... growth in wireless semi-conductor spending ... reflects strong and sustained consumer appeal of smartphones and media tablets . . . **Mobile handsets continued to be the leading category for wireless semiconductor spending**, but tablets are on the rise . . .”

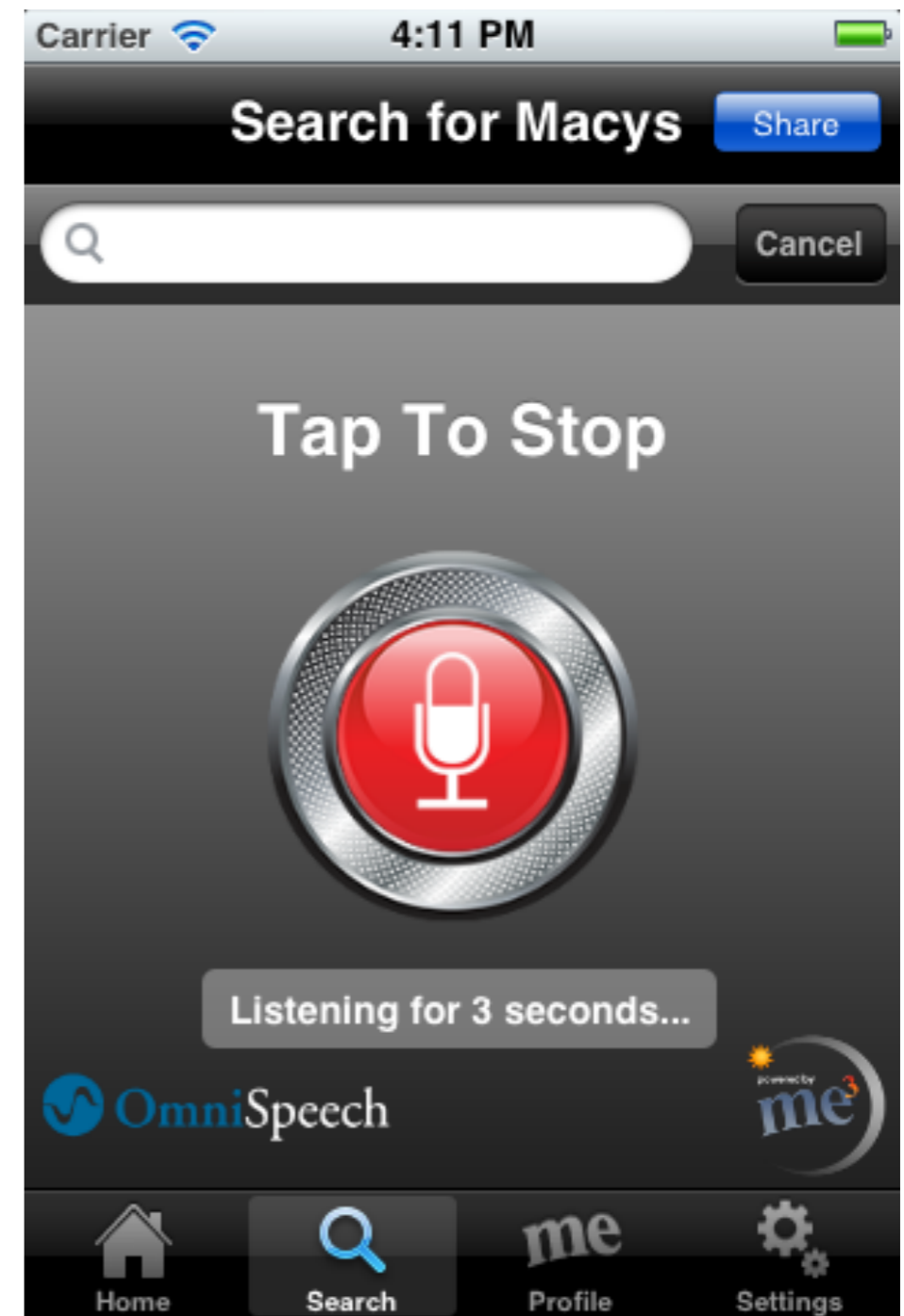
Worldwide Forecast of OEM Wireless Semiconductor Spending by Product Category (Millions of US Dollars)



Source: IHS iSuppli Research, February 2013

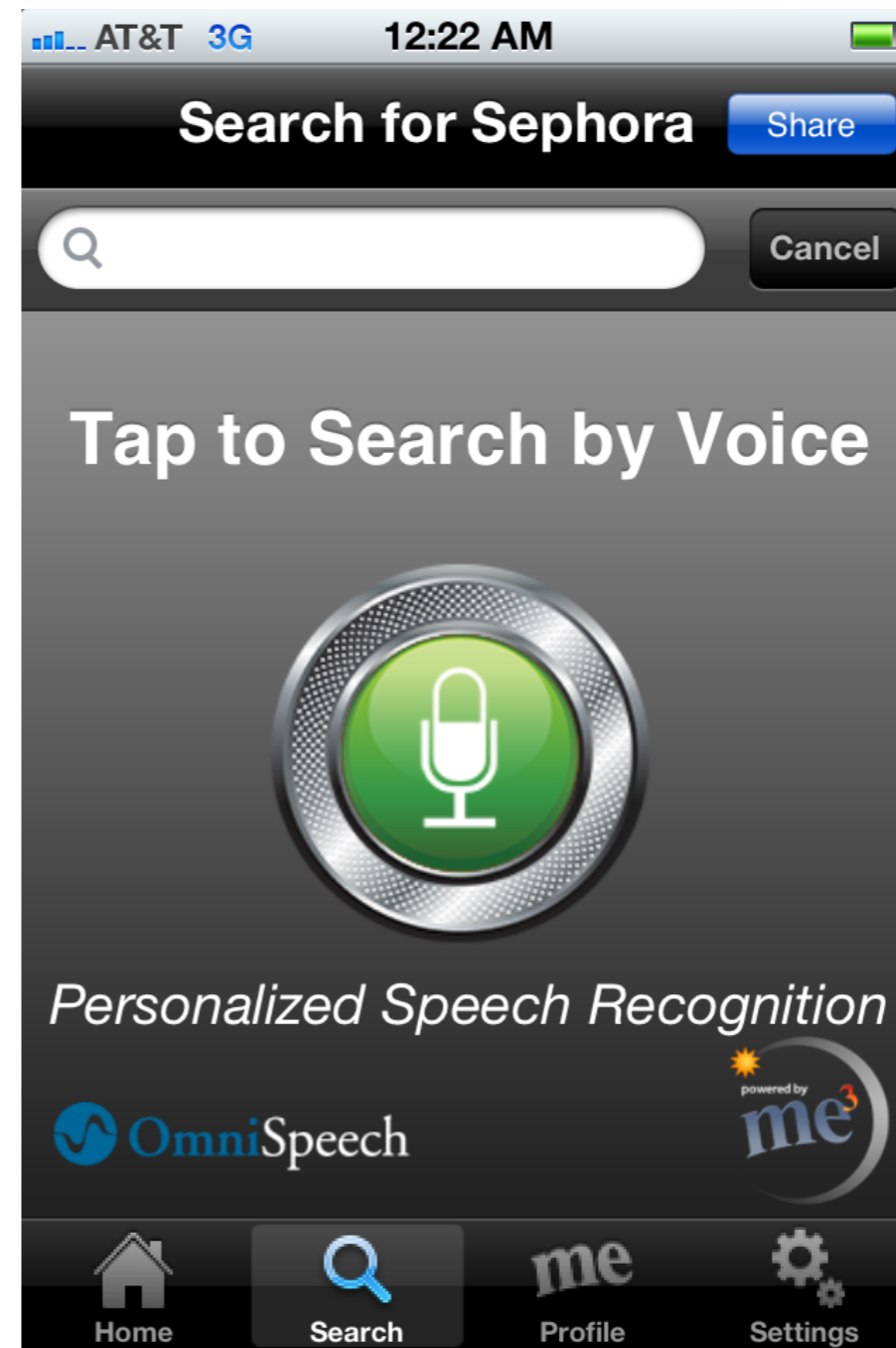
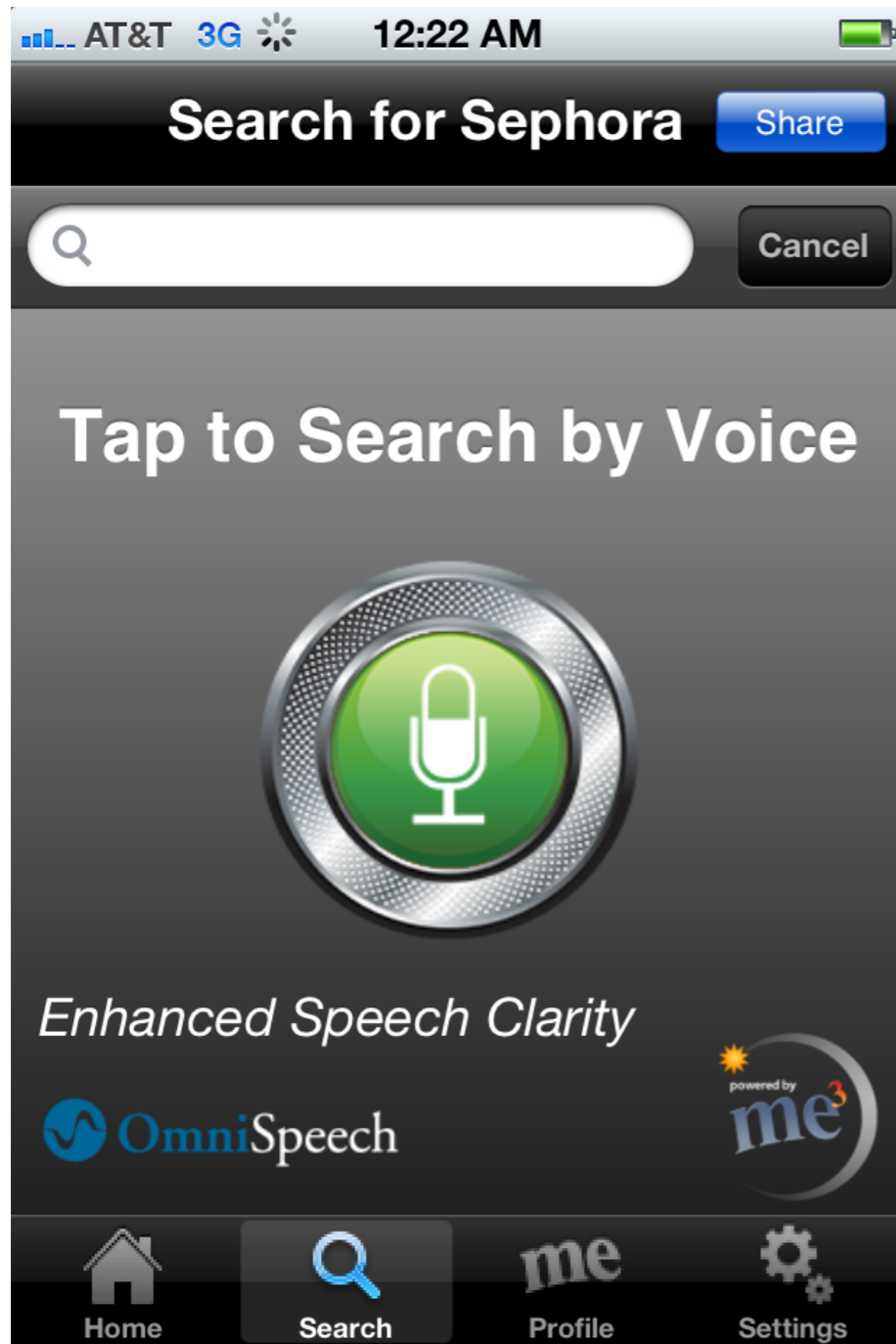
OmniClear™ at work

Partnership with MeMeMe, Inc.

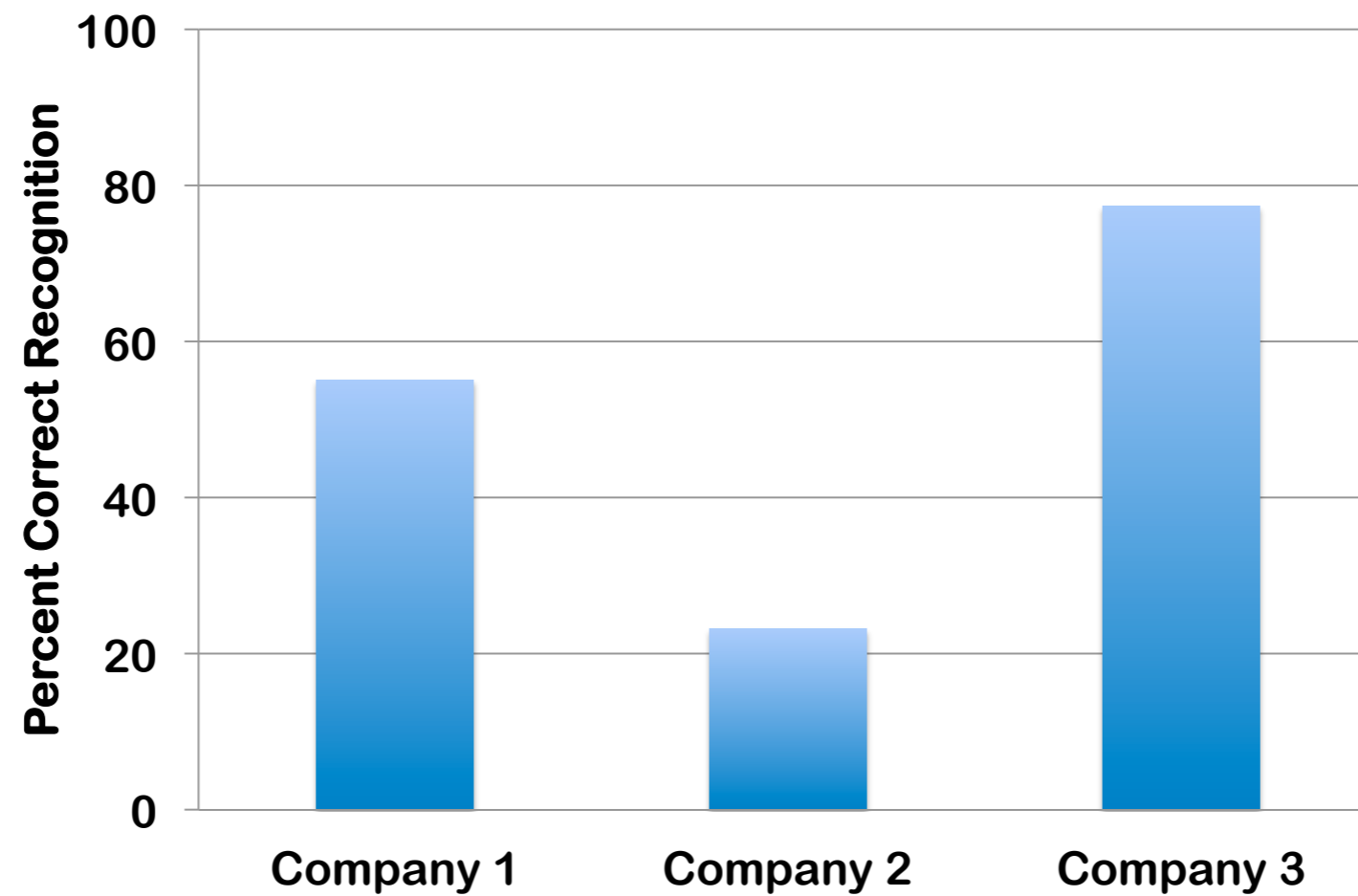


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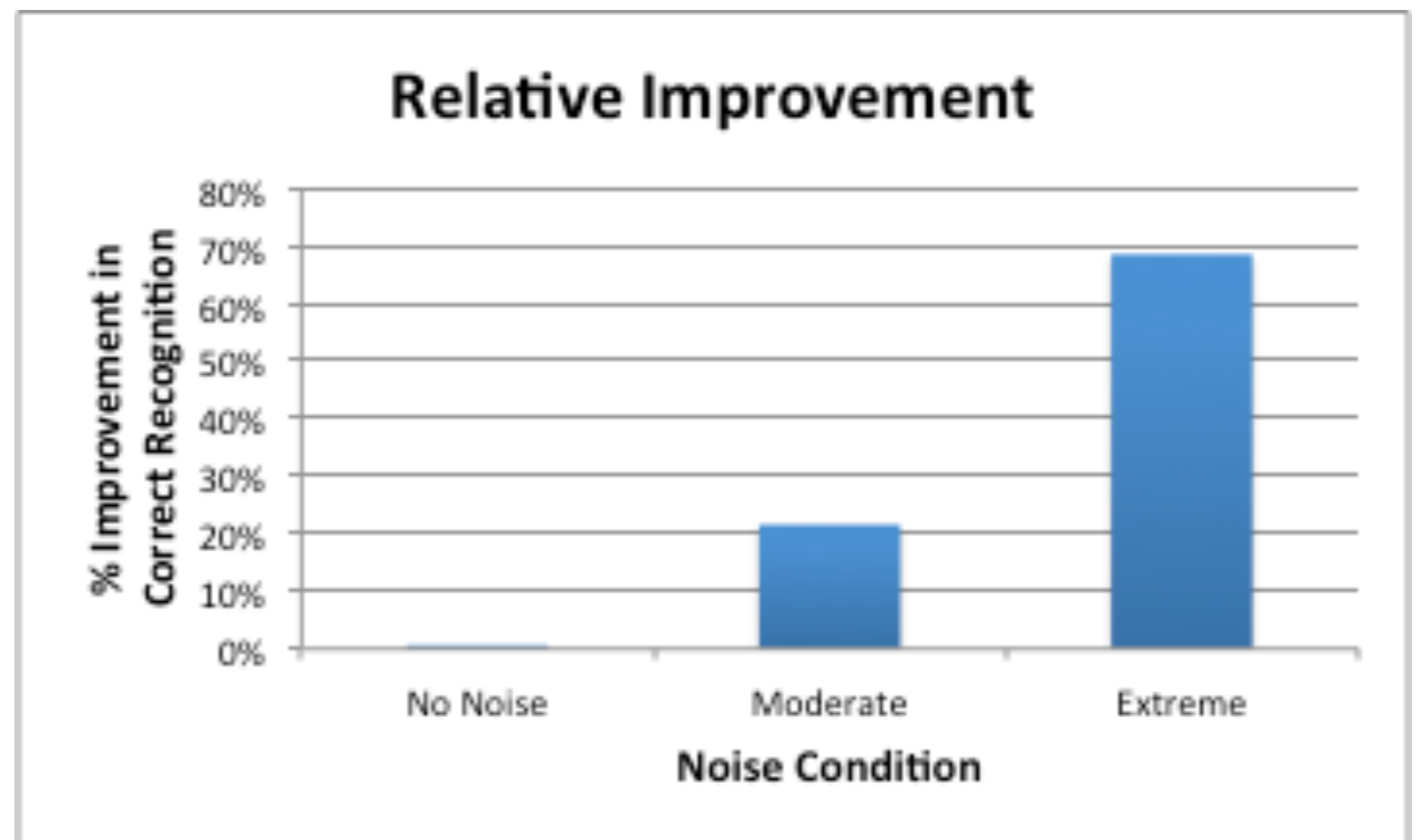
Relative Improvement in Utterance Recognition



OmniClear™ at work – Case Study, Leading ASR Platform

Results from a leading provider of a cutting-edge voice recognition and natural language technology platform to tier 1 OEMs.

OmniClear significantly improves the performance of the provider's recognition engine, especially in extreme noise conditions.



* Results from testing performed in October 2013.

Turning Points

- ◆ Positive feedback received at Faculty Venture Fair on ECE Research Review Day (October 9, 2009)
- ◆ Learning about the Venture Accelerator Program and being accepted into the program
- ◆ Further validation from friends who have considerable business experience
- ◆ Getting an advisor (Morgan O'Brien) that I could meet with face to face who has done what I want to do
- ◆ Independence of children
- ◆ Meeting with Motorola Mobility
- ◆ Independent Testing of technology by a Third Party Company

Key Steps

- ◆ Incorporated Nov. 23, 2009 online as an LLC
- ◆ Applied for NSF SBIR Phase I with Dec. 3, 2009 deadline
 - ◆ Too early – no business plan
 - ◆ Informative – feedback from reviewers
- ◆ Applied for and received a TEDCO Techstart grant for \$5000
 - ◆ Paid consultants to help write initial business plan
 - ◆ Started process for a Freedom to Operate
- ◆ Joined the VA program and began weekly meetings (Engineer's Company vs. Market-Driven Company)
 - ◆ Learn how to think like a business person
 - ◆ Develop business model
 - ◆ Continue to refine business plan
 - ◆ Make important connections

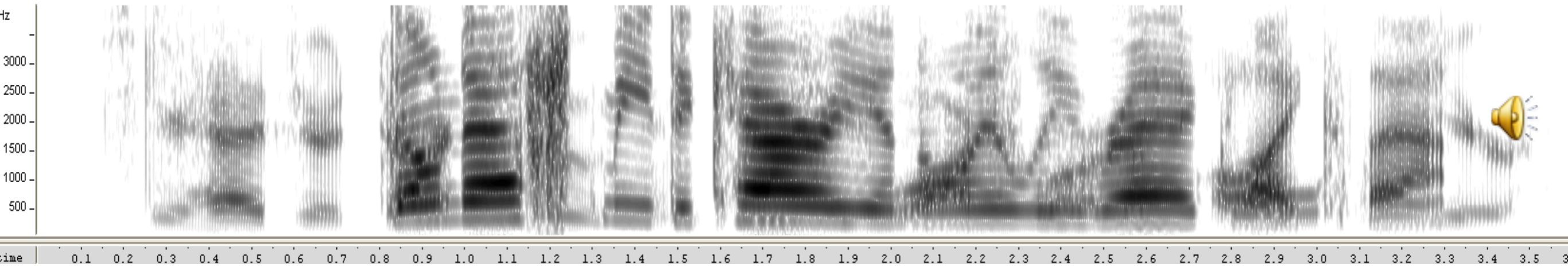
About OmniSpeech™

- ◆ Recipient of several awards to fund operation:
 - ❖ SAIC Venture Accelerator Award \$50,000
 - ❖ 2010 – UMD Business Plan Competition Winner \$40,000
 - ❖ 2010 – REDI Women’s Business Plan Competition \$10,000
 - ❖ 2010 – UMD Invention of the Year Award
 - ❖ 2010 – State of Maryland Techstart Grant \$5000
 - ❖ 2011 Maryland Industrial Partnership Grant with UMD
 - ❖ 2011 – National Science Foundation Small Business Innovation Research Program (SBIR) -- Phase I \$150,000
 - ❖ 2011 – Maryland TEDCO Award \$75,000
 - ❖ Angel Investment ≤ \$2M
 - ❖ 2012 – National Science Foundation SBIR – Phase II \$500,000

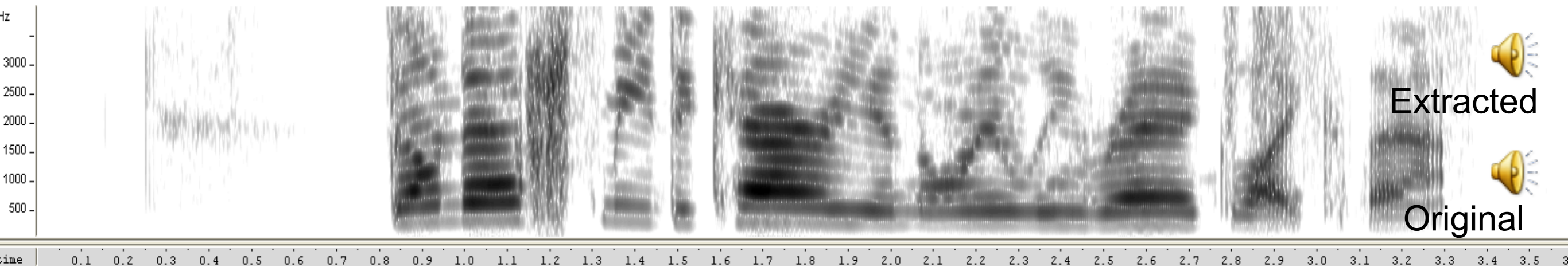
About OmniSpeech™

- ❖ 4 engineers and one postdoc (MIPS)
- ❖ A VP for Business Development and senior business analyst
- ❖ Administrative Assistant
- ❖ Planning to hire a Project Manager and Applications Engineer

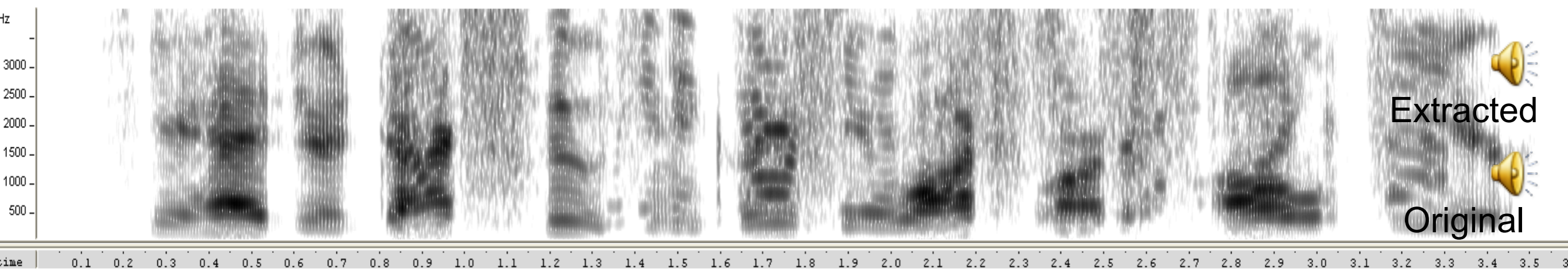
Separating the Speech of Two Talkers (6 dB SNR)



Signal 1



Signal 2



Thank you