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SIGNALS Flash!

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Let's go to the video – XOHM and HSPA

Cliff notes for two new video clips

- ◆ We just posted two new video clips to our website of the Sprint XOHM network in Baltimore and the AT&T Mobility HSPA network in Oakland.
- ◆ Both videos were shot using a webcam and streamed live at 300kbps-500kbps to an Internet site where they were cached for posterity purposes.
- ◆ While the video suffered from direct sunlight the quality was generally good for both networks and a far cry from the early days of UMTS.
- ◆ Both video clips were a bit choppy at times and we are not convinced there is an outright winner after factoring in variables such as vehicular speed and terrain. We'll let you cast your vote.
- ◆ We endured several dropped calls on the XOHM network but no dropped calls on the HSPA network.
- ◆ And the winner of the WiMAX iPhone is....

Thoughts and Implications

When we were in Baltimore for the launch of the XOHM network we shot some video footage of our experience in order to anecdotally demonstrate the capabilities of the network. Just recently, we repeated the same test using the AT&T Mobility HSPA network in and around Oakland, CA. Both videos are now available for viewing on our website (www.signalsresearch.com). The videos, which are about 10-12 minutes each, are located in the lower left-hand corner of the site.

Both video clips were shot using the Livecast Pro software and a Logitech webcam with the video streamed to a server on the Internet at speeds of 300-500kbps. In Baltimore we used a Samsung PCExpress data card and in Oakland we used a notebook computer with an embedded module based on the Icera Semiconductor chipset that supports HSPA/EDGE.

When viewing both video clips you should try to ignore the poor quality of the video due to the bright sunlight which played havoc on our ability to shoot scenes outside of our moving vehicle. Instead, viewers should focus solely on whether or not the video is choppy. In other words, it is the relative quality of the videos that is important and not the absolute quality of the videos. We should also point out that the issue with the sun is most obvious at the beginning of the XOHM clip since we were just figuring out the limitations of the camera.

Then again, it is still possible to see the choppyness of the video while we are entering onto the freeway.

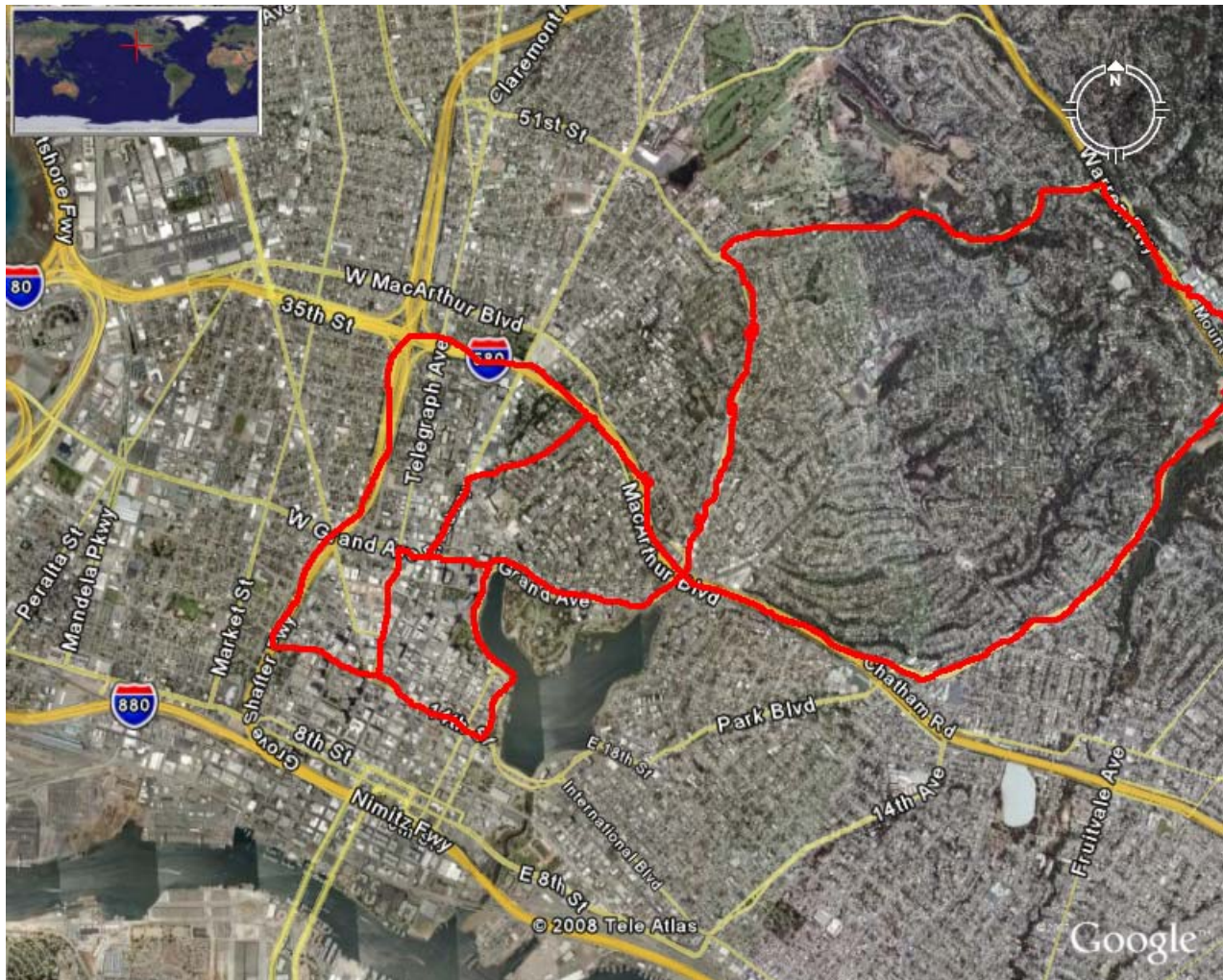
We have done a fair degree of editing in order to remove poor scenes due to sunlight or long stop lights. At the same time we have tried to preserve the integrity of the test so we refrained from removing choppy video clips just for the sake of making the video look better.

It isn't obvious which service delivered the higher quality video. Both video clips have their fair share of choppy scenes with perhaps a few more scenes in the HSPA network. The HSPA video also looks a bit grainier, which could be due to the use of more video compression or the light setting of the webcam.

Then again, since we had more time and knew the Oakland area we probably did a better job of kicking the tires of the AT&T network, in particular when it came to freeway driving (see below map).

One other important observation pertains to the combined DL/UL test which used an FTP file transfer in the downlink while simultaneously streaming a video clip in the uplink at 500kbps definitely favored the XOHM network.

In the WiMAX network we recorded downlink data rates of ~2.5Mbps while streaming a video clip at 500kbps. In the HSPA network the downlink was limited to ~1.2Mbps with the simultaneous uplink transmission taking place at the same time. Without the uplink transmission we were able to average as



high as 1.9Mbps. Our belief is that this is largely due to backhaul constraints versus a limitation of HSPA. We hope to prove this point right in the coming weeks.

One point that definitely favors the HSPA network is that despite driving all over creation, we never encountered a single dropped call, despite shooting more than 30 minutes of video and uploading hundreds of MBs of data. In comparison, we encountered several dropped calls in Baltimore while driving on the city streets in regions where full coverage was promised. For people that are using the network while stationary the probability of a dropped call isn't that high, but if mobility is important then there would likely be some dissatisfaction until the issue is resolved.

Finally, we are proud to announce that we have a winner for our first trivia contest. The correct answer was that the title paraphrased the lyrics of the opening song to the children's television show called Zoom which aired on PBS in the early to mid 1970s. The winner resides in Finland and answered the question within 14 minutes of the newsletter being distributed. Hopefully by the time Apple gets around to introducing a WiMAX-enabled iPhone our winner will have forgotten about our little contest.

If you would like to cast your vote for your favorite video, please do so. We will report the results in our next issue of Signals Ahead. Hopefully next time we repeat this test we will be able to use a higher quality video camera so that the strengths and limitations of the underlying network are more obvious.

Biography

Michael Thelander is the founder of Signals Research Group, LLC (SRG), a research consultancy that offers thought-leading field research and consulting services on the wireless telecommunications industry. SRG's primary research focus is on emerging wireless technologies and the services, applications and content that these technologies will enable.

Its flagship research product is a research newsletter entitled "Signals Ahead," which has attracted a strong following across the entire wireless ecosystem with corporate subscribers on five continents.

Previously, Mr. Thelander was an analyst with Deutsche Bank Equity Research, a consultant with KPMG (now known as BearingPoint), and a communications officer with the United States Army. Mr. Thelander has also published numerous articles for leading trade publications and engineering journals throughout his career.

He has been an invited speaker at industry conferences and company-sponsored events around the world and he is frequently quoted by major news sources and industry newsletters, including The Economist, BusinessWeek, The Wall Street Journal, Investors Business Daily, Reuters, Bloomberg News, and The China Daily.

Mr. Thelander earned a Masters of Science in Solid State Physics from North Carolina State University and a Masters of Business Administration from the University of Chicago, Graduate School of Business.

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