Tablets, Smart Phones, And 4G/LTE Dominate 2011 CTIA Wireless Conference

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(/tutorials/ctia-conf-fig1.jpg)

Fig 1. Supertooth's latest Bluetooth mobile accessory on the sunvisor lets you text safely while driving. This voice to text and vice versa device also lets you email, Facebook, and Twitter hands-free.

Last week I attended the International CTIA Wireless conference at the Orange County Convention Center. Although CTIA has been at Las Vegas the past few years, this year it was held at Orlando,

and next year it is going to be in New Orleans. CTIA is primarily a cellular industry show, but also covers other wireless segments like WiMAX and wireless broadband, Wi-Fi, and Bluetooth. This year, the show was excellent as usual but seemed smaller. One attendance estimate was 35,000, which is down from 40,000 and 45,000 in past years. CTIA will release the final count shortly.

CTIA is enormous but still less than half the size of the International Consumer Electronics Show (CES). I heard several say that this year CES was just as much a wireless show as CTIA. Anyway, it is just not possible to see it all in three days. So again this year I tried to focus on the highlights and a few areas of interest. The most visible at a first glance were the hundreds of new cell phone introductions and new tablet computer announcements. Other big areas covered were retail sales, accessories, and applications. There were also some focus zones like machine-to-machine (M2M) communications, health, RF/microwaves, and backhaul. The hot topics continued to be smart phones, tablet computers, 4G, and Long-Term Evolution (LTE) and applications.

CTIA Opening Keynote

The opening keynote was a killer event. Dan Hesse, CEO of Sprint Nextel, led off with an overview of the industry statistics. Some highlights included a 23% growth in mobile data over last year, the fact that about one-third of all cell phone users now have smart phones, 83% of all 17 year olds and 58% of 12 year olds now have cell phones, and Android is now the leading smart-phone operating system (OS). It has about 150,000 apps compared to Apple's estimated 350,000 apps. Also, for the first time ever, in 2010 mobile data passed voice traffic in revenue.

Other highlights indicated that the M2M sector is growing rapidly with an expected 2.1 billion devices to be connected by 2020. And in 2012, it is expected that there will be a single standard microUSB charging device for all cell phones. This I will only believe if I see it happen.

Next on the opening keynote was Julius Genachowski, the Federal Communications Commission (FCC) chairman. His comments focused on achieving broadband for everyone in the U.S., as put forth in the FCC's National Broadband Plan announced last year. He feels that wireless will play a major role especially in the rural areas. He did not have much to say about net neutrality, which he called the "open Internet," and he emphasized that the FCC was concentrating on getting more spectrum.

Almost all of the keynote speakers mentioned that the growth of wireless depended on more spectrum, especially if broadband goals are to be achieved. Genachowski suggested a voluntary incentive auction of spectrum that could potentially generate $30 billion. Wireless has become a huge part of the U.S. gross domestic product (GDP), making wireless broadband a key policy objective. Additionally, he mentioned that this past year smart phones outsold PCs in the U.S. and that this year, there is expected to be 55 million tablet sales.

The most interesting segment of the keynote was a panel of the big wireless carrier CEOs, including Dan Hesse of Sprint, Dan Mead of Verizon Wireless, and Ralph de la Vega of AT&T. The panel moderator was Jim Cramer of CNBC's Mad Money. It was a pretty lively discussion with Cramer asking some tough questions that made the CEOs squirm.

Of course the main topic was the potential forthcoming $39 billion acquisition of T-Mobile by AT&T.

AT&T argued that this acquisition would help the wireless broadband effort, but Hesse disputed it was anti-competitive and would hurt consumers. Dan Mead had little to say about this. Cramer concluded with a comment about the Department of Justice (DOJ) and FCC being the eventual decision makers on the acquisition. In any case, the acquisition was the main topic of discussion at the conference.

In another keynote, LightSquared reported on its forthcoming wholesale-only LTE network. LightSquared plans to build a nationwide LTE 4G network and sell service to carriers and others who want to implement wireless services but can't afford the usual carrier pricing. LightSquared uses a geosynchronous satellite to provide uninterrupted nationwide coverage. It is expected to play a major role in the roll-out of wireless broadband services in the years to come.

CTIA Subshows

CTIA is also accompanied by several sub-shows where companies present their products to the press. I went to the ShowStoppers event on Monday night and visited with Berkeley Varitronics Systems. The company showed its 4G LTE YellowFin Analyzer, which targets those deploying LTE. This interesting new product is a cell phone receiver designed to detect illegal cell phone use in prisons, apparently an unexpected and big problem.

I also talked to BridgeWave Communications, a maker of 60-GHz and 80-GHz backhaul gear. The company announced a new low-cost 60-GHz unit that was designed for the many expected new picocells to be deployed for LTE. It uses Ethernet but can also handle legacy time-division multiplexing (TDM) protocols.

Another stop was at Navteq, the huge mapping company owned by Nokia. It has already mapped the world for GPS receivers and are developing mapping for "interior spaces." The company's demo showed how it is mapping the shopping centers around the world for faster and more focused travel in a big mall.

Novatel showed its MiFi device, which connects up to five Wi-Fi devices to the cellular network. This is a cool device and one of several that I saw at the show. With most tablets being Wi-Fi-only for now, this is going to be a popular accessory and more carriers will be selling one.

Finally, I saw a neat product that helps the user text safely while driving. It is a voice-to-text and text-to-voice translator that works over the Bluetooth connection in a cell phone. It is made by French company Supertooth *(see figure 1 (/tutorials/ctia-conf-fig1.jpg))*.

Exhibits

Tuesday, I had interviews and made videos with six companies. It started off with Ceragon, a backhaul equipment manufacturer. Backhaul is a hot topic these days because it is the bottleneck in the cellular networks. The antiquated backhaul system, which has mostly been T1 time domain multiplexing (TDM) lines, is now totally insufficient for handling 3G, much less 4G with video.

Most carriers are going with fiber where they can run it economically, but wireless backhaul is a great option with new systems pushing into the gigabit region for data rates. Ceragon showed off some new modular Ethernet IP protocol backhaul units that can operate in the licensed 6- to 38-GHz range.

Cinterion, the largest M2M module maker, was next on my list. It makes embedded cell phone modules to implement any one of thousands of M2M applications. Centerion has a wide range of modules covering 2G GSM/GPRS/EDGE modules and some for UMTS 3G. Its latest module, the PH8, implements high-speed downlink packet access (HSDPA), which can send data at rates of 3.6 Gbits/s *(see figure 2 (/tutorials/ctia-conf-fig2.jpg))*. It will most likely find its way into security cameras.

(/tutorials/ctia-conf-fig2.jpg)

Fig 2. Cinterion's PH8 HSDPA M2M module for video and other high-speed mobile data applications implements HSDPA, which can send data at rates of 3.6 Gbits/s.

I visited Anritsu next. This test equipment manufacturer was showing off its wide range of LTE and multiple-input multiple-output (MIMO) testing gear. I got a demo of its MD8475A Signaling Tester, which was designed to test applications like games on LTE networks without having to use a real and expensive basestation. Another interesting new product was its MW8219A PIM Master. It is used to test and measure passive intermodulation (PIM) distortion in cables and other passive components of the system. PIM has become a major issue in LTE and MIMO installations.

Next I stopped by the LG booth to see its new tablet computer, the G-Slate. It looked and felt like all the other tablets I saw, with a slick 8-in. high-definition touchscreen and a Wi-Fi wireless connection. Other models are on the way.

I had a good update on the femto phenomenon with Simon Saunders, chairman of the Femto Forum. He said that the femtocell movement is alive, well, and growing worldwide. Femtocells are now used by most of the world's cellular operators to extend coverage and fill in the dark zones that inevitably occur in most networks, and, according to Saunders, femtocells will play an important role in the development of LTE. Also, femtocells have grown in the enterprise to extend coverage in company offices, buildings, and other facilities.

I wrapped up the exhibits with a visit to Metrico, which tests cell phones under real-world conditions for the carriers prior to deployment. Its sophisticated test methods ensure that the handsets work well in as many real-world situations as possible.

mobilefocus

Tuesday night I went over to another sub-conference event called mobilefocus. I saw the new HTC Thunderbolt 4G LTE phone that Verizon is now selling. HTC also makes the EVO, which is Sprint's 4G WiMAX phone. HTC also has a tablet and a huge line of handsets too extensive to cover here.

Radio Shack was there showing off some neat cell-phone battery chargers. These are small lithium-ion batteries about the size of a deck of cards that can recharge your cell phone in about an hour. You charge the battery via a built in USB port. There are two models, one for the iPhone with its 30-pin connector and a generic model for most other phones.

(/tutorials/ctia-conf-fig3.jpg)

Fig 3. The Nokia Astound C7 smart phone uses HSDPA/HSUPA to achieve high data rates on the 3G/4G networks. It also has Wi-Fi, GPS and mapping, Bluetooth, and an 8-Mpixel camera with LED flash. It runs Symbian 3.0 and will soon be available from T-Mobile.

Nvidia was showing off its new Tegra-1Gb/s dual core processor. It will be the basis for some new smart phones and many new tablets.

I also got a look at some of Nokia's new models. I was particularly impressed with its Astound C7 smart phone *(see figure 3 (/tutorials/ctia-conf-fig3.jpg))*. It runs Symbian OS and does everything you want a smart phone to do. Nokia is still the biggest cell-phone handset manufacturer in the world, but it has done poorly in the U.S. smartphone market. Most of the major carriers do not carry Nokia probably because of its high cost. Yet, performance-wise it is tops.

Until recently, its Symbian OS dominated cell-phone OSs worldwide, but Android has now assumed that position. Nokia has also joined up with Microsoft to come up with some new Windows Mobile 7/8 OS handsets. I think if more users could see Symbian OS user interfaces (UIs), they would be

impressed.

More Exhibits

Wednesday was another exhibit-heavy day. I started out with Spirent Communications, which was showing off its VR5 HD Spatial Channel Emulator. This is a box that contains multiple channel "faders" that emulate wireless paths for MIMO testing. MIMO is a very tough testing challenge, as there are so many variables. Yet LTE and LTE-Advanced are based on MIMO, so basestations and handsets need to be tested under real-world conditions of path attenuation, fading, noise, and other effects. Spirent's new box is expensive but solves the MIMO test problem, making it worthwhile.

Next, I visited Taoglas, an antenna maker. It focuses on antennas for embedded M2M applications. M2M devices have a wide range of physical packaging arrangements, making the antenna a tough part to accommodate in the design. Taoglas has a wide range of models that can fit most applications. Some of them are of the "peel and stick" variety. Taoglas also makes specialty antennas for GPS and military applications.

Sierra Wireless was next. It makes USB dongles and card modems for 3G and 4G, as well as embedded M2M modules for laptops and tablets. It showed several new models for embedding 3G and 4G in other devices like wireless gateways. Its AirPrime modules handle LTE and dual carrier HSPA+. It also showed a wireless device that lets up to 10 Wi-Fi devices to talk over a 3G/4G cellular connection.

Agilent Technologies also showed off a new test product for the forthcoming 802.11ac wireless standard. It is a software accessory to the company's 89600B Vector Signal Analyzer. IEEE 802.11ac is an extension to the current 802.11a standard that works in the 5.8-GHz unlicensed band. Using 4 by 4 MIMO or some combination of up to eight MIMO streams, 256QAM, and up to 160 MHz of bandwidth, it can easily deliver data rates of up to 1 Gbit/s. The standard is not ratified yet but is expected to be by the year's end. Testing of devices is beginning now, and this Agilent product promises quick, accurate results for new products, mostly consumer HDMI applications.

I also talked with Chuck Riggle of SkyCross. SkyCross makes handset antennas using its multi-feed iMAT design that lets one antenna act like two for a compact 2 by 2 MIMO design. Riggle showed off two new 4G antennas for LTE handsets and data cards.

Finally, I got an update from Mike Ueland of Telit, an M2M module manufacturer. It recently acquired Motorola's M2M module line, making Telit the second largest module maker for embedded cellular. He said that the M2M space keeps growing and more applications are being discovered as service expands and modules get smaller and cheaper. Ueland believes the day is coming when embedded cellular devices will exceed the total number of handsets now out there, an estimated 5 billion at least.

I stopped on my way out to see the new Samsung Galaxy Tab products. Its initial 7-in. screen model has done well, but Samsung also showed its 8.9-in. and 10.1-in. screen models at the show. All use Wi-Fi for connectivity, but cellular models are on the way. Because tablets all look the same and do essentially the same thing, it is hard to distinguish one from the others. I think this will be the design challenge for engineers making tablets. Product differentiation will be the key to success. That's hard

to do if you aren't Apple.

Overall, CTIA was a great show as usual, with too many products and so little time. The wireless business is continuing its enormous growth with a lot more products and technological developments to come.

Check out some of my video interviews on Engineering TV (www.engineeringtv.com (http://www.engineeringtv.com)).

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