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environment

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November 2010

BEACHHEAD APPLICATIONS FOR WHITESPACE RADIO

THIS ISSUE

ZIGBEE: RANGE TESTING AND DENSE NETWORKS

BLUETOOTH BITES

WHAT HAPPENED TO WIGIG?

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the bluetooth steamroller

Over the last month I have been agonising. Why, you ask? Well, it's always been my goal to provide our readers with the best possible overview of what is happening in the short-range wireless world. However, Incisor has never managed to become as well-established with the Wi-Fi, ZigBee, Z-Wave or any other short-range wireless sector as we have done with the Bluetooth community

This is not through lack of trying. Those of you with a long memory may recall that for most of 2009 we ran a monthly feature in which we invited the bosses of the Wi-Fi Alliance, DECT Forum, ZigBee Alliance, EnOcean Alliance and the NFC Forum to contribute. In a moment of intellectual brilliance, we called this the Incisor WPANel. Cool, eh?

No money was involved. We were just opening up our pages so that we could encourage these organisations to communicate with us and our readers. I have to tell you that most of the time it was like pulling teeth. I know this is a busy world, but when you can't even get people to get off their butts when free, high-quality PR is on offer, what can you do?

I don't want to blow up anybody's skirt, but the Bluetooth SIG was reliably the most ready to contribute, and came up with interesting and even entertaining copy.

Is this symptomatic of what goes on in the bigger, wider world? Could this have something to do with why Bluetooth has enjoyed the success it has? I don't know. You must judge for yourselves.

However, this is no time for the other WPAN technologies to assume that a magic wand will wave them ahead of Bluetooth. Read the article 'Bluetooth bites' in this issue to understand how the Bluetooth SIG is going to make sure it stays ahead.

Vince Holton
 Publisher & editor-in-chief, Incisor / IncisorTV

INCISORTV FOCUS THIS MONTH:



IncisorTV produced this movie for the Bluetooth Special Interest Group, to promote the ATLAS training programme.

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Wireless experts say the signal is clear for whitespace

The United States Federal Communications Commission (FCC) recently released the final rules for whitespace radio devices, freeing up unlicensed bands to the public. Those highly desirable "super Wi-Fi" whitespace connections can travel through walls and transmit at a distance ten times today's Wi-Fi signals. Experts suggest the rest of the world will not be far behind in legalising unlicensed use of those unused TV channels freed up by the digital switchover, creating the potential for a \$100B market. Cambridge Consultants has highlighted three applications ripe for innovation and market growth due to the newly freed whitespace spectrum: rural broadband provisioning; municipal wireless networks; and in-home media distribution.

"The last time a significant allocation of spectrum was released was in 1985 when the 2.4GHz band was written off as 'junk spectrum' due to its relatively poor range and wall penetration abilities," said Luke D'Arcy, head of cognitive radio at Cambridge Consultants. "But this action led directly to Bluetooth and Wi-Fi technology, both now at the heart of multi billion dollar businesses. Similarly, the FCC decision is significant because it levels the playing field by making high quality spectrum available to all, and free of charge when it had previously cost billions, which will rapidly accelerate innovation in ways we can't imagine today. That being said, it took more than ten years for volume production technology to be developed to take advantage of the 2.4GHz band. But our experience and IP tells us that this does not have to be the case for whitespace radio."

Earlier this year, Cambridge Consultants issued a report, which looked at how the highly desirable TV band could fundamentally change today's wireless provider model while spotlighting technology hurdles that will limit immediate disruption. As well, the InCognito

whitespace radio developed by Cambridge Consultants can allow any radio product to transmit without interference over the whitespace frequencies.

For a full overview, see also '**Beachhead applications for whitespace radio**' in this issue.

Researchers predict continuing Bluetooth domination of WPAN

The cockles of the Bluetooth community will be warmed by the findings of research company In-Stat, which is saying nice things about the WPAN technology. Already dominant in mobile phones, In-Stat believes that Bluetooth technology will maintain its control in the communications segment while making significant gains in mobile PCs and, as a result of adoption of Bluetooth Low Energy, in industrial/medical and consumer segments. The 2009 economic downturn resulted in a reduction in the total number of Bluetooth-enabled device shipments. However, shipments of Bluetooth-enabled devices will grow to over 2 billion in 2013, says In-Stat.

"Even though there are competing technologies to Bluetooth, the fact that its core business is mobile phones means that the technology will continue to roll out over time in large volumes," says Brian O'Rourke, Principal Analyst. "With the adoption of wireless connectivity by additional market segments such as PCs, automotive, and the growing industrial & medical markets, the long term projections for the technology remain very positive."

Recent research by In-Stat found the following:

- Classic Bluetooth technology will remain dominant in phones indefinitely.
- Bluetooth 3.0, the new high-speed

standard that combines Bluetooth with Wi-Fi, entered into the market in mobile phones in 2010.

- PMPs, game consoles, and game controllers are the main drivers of CE growth.
- Bluetooth is becoming common in mid-size cars, which are the sweet spot of the automotive market.
- Industrial/medical growth will be driven by Bluetooth Low Energy.

Contact In-Stat if you want to hear more of the Bluetooth good news.

CSR adds HD voice call, music streaming to mono headsets

CSR claims that its BC6145 is the first ROM based mono device to support consumer-centric features including High Definition voice ("HD voice") call quality, A2DP music streaming and advanced intelligibility enhancements. BC6145 also supports bi-directional noise reduction and ultra low power Wind Noise Reduction (WNR).

As well as low-cost mono headsets, CSR told Incisor that the BC6145 is also suitable for mass-market car-kits and speakerphones where it can reduce the impact of speaker distortion and enhance the echo cancellation performance in the noisy environment of a car.

BC6145 is available now in mass production volumes.

news



Parrot manages nav apps on your smartphone

There's not much doubt that Parrot has been one of the Bluetooth trailblazers and has gone further and done better than most companies developing in-car handsfree systems.

Its latest product, the Minikit Smart is a Bluetooth hands-free kit with a docking bay designed for all smartphones, whatever their size (from 56mm to 70mm width). The device connects two peripherals via Bluetooth and allows the Minikit Smart to simultaneously manage hands-free conversation and communication with the navigation applications available on smartphones. Calls and GPS guidance will go through the 2W speaker integrated in the Minikit Smart.

Depending on the capability of each smartphone, the Minikit Smart can pause the GPS functions, and restart them once the conversation ends. This does sound like one of those functions that sounds great in theory, but finding a phone capable of managing this with Parrot's kit might be a bit more difficult to achieve.

Parrot told Incisor that the Minikit Smart is compatible with all navigation software available (free or paid) and all operating systems: Android, iOS, Windows Mobile, Blackberry, Symbian, Bada, etc, etc... And for long trips, the Minikit Smart can recharge the smartphone thanks to one of the USB cables included in the box. (Micro USB, Mini USB, Apple).

The Minikit Smart is equipped with a swivelling suction cup that fixes to the windshield or the dashboard of the vehicle. The docking bay has an embedded magnet to hold on to the smartphone. Once in place, the Minikit Smart can be rotated for portrait or landscape mode and is equipped



with a retractable microphone that can be positioned according to the interior of the vehicle.

Incisor is on the review sample list, and we will try this one out as soon as it arrives. The Parrot Minikit Smart will be available in November 2010. The UK price is £99.

Nokia describes 1800 job losses as 'company transformation and increasing effectiveness'

It's amazing the language that companies use to announce redundancies. Nokia has let its employees in on the little secret that they may soon be joining the ranks of the unemployed by telling them that it plans to 'accelerate its transformation and increase effectiveness'. Working out what this means will probably delay the depression by about, er, 20 seconds?

Nokia says that its plans include simplifying operations in product creation in its Symbian Smartphones organization, as well as the Nokia's Services organization and certain corporate functions. The plans are expected to result in a reduction of up to 1800 employees globally.

"Changes impacting personnel are always difficult. We are committed to managing these changes in a way that reflect Nokia's values, and will support affected employees with alternative solutions, such as helping them find new positions within the company," commented Juha Åkräs, Nokia's EVP, Human Resources. "The announcement today is the result of careful evaluation and planning; the plans have now been reviewed and endorsed by the new management. The aim is to accelerate the company's transformation towards a leading mobile solutions provider, and to do this we are simplifying and integrating operations



within our product creation and corporate functions."

It doesn't matter in what words you couch these decisions, it's bad news for all concerned when once untouchable companies like Nokia are shedding people like this. It boils down to the fact that people aren't buying as many phones as they were, and that has the obvious domino effect on the rest of the supply and associated industries.

The global recession? Its still a bummer.

New appointment to TRaC Partner Programme

Guangzhou Certitek Testing Service, which is based in the Panyu District of Guangzhou, China has joined TRaC's Partner Programme.

The approvals service provided by TRaC via Certitek covers the Machinery Safety Directive 2006/42/EC in support of CE Marking, testing and certification.

Under the agreement Certitek will be able to assess machinery against the European Machinery Safety Directive in China making the service to manufacturers exporting to the EU much more cost effective. TRaC is a UK Notified Body for the Machinery Safety Directive and as such underwrites and signs off the work carried out by Certitek. This gives assurance to EU importers that the machines fully comply with the requirements of the Directive.

Mark Heaven, CEO at TRaC, stated: "Certitek is a professional and respected test and inspection company and I am delighted it has joined the TRaC Partner Programme. Certitek is a very positive addition to the Programme, giving manufacturers in China direct access to TRaC's certification services. The company also affords our European and North American clients direct access to the China Compulsory Certification or CCC Mark covering 19 product groups."



Bluetooth Innovation World Cup 2010 finalists selected

The Bluetooth Special Interest Group (SIG) has announced the finalists of the second Bluetooth Innovation World Cup (IWC). After a first edition of the competition in 2009, the SIG once again called on developers, entrepreneurs and students to submit concepts for applications making use of the new Bluetooth low energy wireless technology, focusing on applications for the sports & fitness, health care and home information and control markets.

The nine best ideas out of all 270 international submissions have now been selected and are in the running to become Bluetooth Innovator of the Year and to win prizes worth USD 50,000.

Among the finalists in the healthcare category is an ear worn sensor for activity recognition developed by Louis Atallah from Great Britain. It permanently measures balance, body posture or heart rate and seamlessly transmits that information to a medical help desk. Ahang Baghschomali from Germany submitted an ambient assisted sensing system which combines Classic Bluetooth technology with Bluetooth low energy technology and makes life easier for people with hearing problems as it gives instructions through the hearing aid. The Oxygen Flow Controller by Jimmy Vincent from India describes an innovative way to optimize the monitoring of blood oxygen with automatic adjustment of the oxygen supply for the patient.

In the category home automation three ideas were selected: an automatic refill and security alert for Liquefied Petroleum Gas (LPG) used for heating and cooking submitted by Nicholas Pau from New Zealand; a Bluetooth technology

Multimeter gadget for engineers by Wojciech Giergusiewicz from Poland using the cell phone or laptop for displaying electric parameters of electric devices; and the iGrill, enabling a remote controlled barbecue thermometer which was submitted by Christopher Allen from the US.

The finalist ideas in the sports & fitness category include an impact sensor invented by Biju Thomas from the US for detailed measurement of shocks in sports accidents, e.g. in helmets or protection material; a concept for a training assistant for the intelligent integration of sensors into sports equipment to measure intensity of usage (of the tennis racket for example) submitted by Anindya Bakshi from India; and last but not least, the VeloComputer Bicycle Sensor developed by Vlad Savchenko from the US which enables accurate measurement of distance, speed, and acceleration via one small sensor attached to the bicycle.

This year's Bluetooth Innovation World Cup 2010 is sponsored by Anritsu, Nordic Semiconductor, STMicroelectronics, Suunto and Texas Instruments.

Gentlemen, start your engines: mobile processor market to approach 4 Billion units by 2014

Mobility and mobile devices are reshaping the entire high-tech industry, says In-Stat. Everything from silicon chipsets to software to services are being reshaped by mobility. Smartphones will continue to be the innovation driver in mobile processor technology, particularly with the integration of multiple cores, GPUs and baseband modems. While there will be

some convergence of devices and usage models, consumer patterns and the history of the high-tech market indicate that the total number of mobile devices will continue to expand, increasing the TAM of mobile processors to nearly 4 billion by 2014.

"Currently, two architectures, ARM and x86 dominate the low and high-end of the mobile market, respectively, and are battling it out for the mid-range convergence devices like e-readers, tablets, and netbooks," says Jim McGregor, Chief Technology Strategist. "However, other architectures, such as MIPS and SH, are equally suited to power mobile SoCs. As more emphasis is placed on the OS and mobile applications, the use of a particular processor architecture or instruction set is likely to become less important. The differentiating factors become price, power, and performance."

Recent research findings include:

- Nearly 75% of all mobile processors will be multi-core in 2014, and an even higher percentage will have integrated baseband.
- The trend toward integrated baseband modems will become a critical differentiator for mobile processors over the next few years.
- Tablets represent the fastest growing market segment for mobile processors with a compound annual growth rate (CAGR) of 123.6% from 2009 through 2014.
- Cellphones, including feature phones and smartphones, represent the largest opportunity for mobile processors today and for the foreseeable future.

Recent In-Stat research, Mobile Processors: The Battle Heats Up in 2011, examines the overall TAM of the mobile processor market by application, as well as the trends and what and who are likely to emerge on top as the industry evolves.



Sony Ericsson – unit sales down, profits up

The Q3 2010 consolidated financial summary for Sony Ericsson Mobile Communications AB (Sony Ericsson) showed that while handset sales were down approximately 26% over the same period in 2009, gross margin percentage had almost doubled. What's more, the average handset selling price was up from Euro 114 to Euro 153m and consequently Net income for the quarter was Euro 49 million, an increase of Euro 213 million year-on-year and of Euro 37 million sequentially.

Bert Nordberg, President & CEO of Sony Ericsson commented, "Our third consecutive quarter of profitable results illustrates that Sony Ericsson's overall performance is stabilising. Our strategy to focus on the smartphone segment is succeeding and smartphones now comprise more than 50% of our total sales. During the quarter, we launched our Android-based Xperia models in new markets, such as China and the U.S., and it is our ambition to become the global number one handset provider on the Android platform."

Sony Ericsson's net cash position as of September 30, 2010 was Euro 538 million. The negative cash flow from operating activities was Euro 54 million, mainly due to payments during the quarter related to the transformation programme.

Market share in unit base for the quarter remained flat sequentially and is estimated to be approximately 4%. The value market share is estimated to be approximately 6%.

Sony Ericsson maintains a forecast of slight growth in units in the global handset market in 2010.

Bluetooth hits the campaign trail in NZ

To kick off the final month of his campaign, a New Zealand politician called Rob Thomas used a new billboard that talks back. Yup, that's right, a Bluetooth-enabled billboard.

Now, jokes about New Zealand being somewhat backward where technology is concerned are plentiful, but NZ is, in fact, one of those countries that has introduced a ban on talking on mobile devices while driving, so Bluetooth devices have become an increasingly popular hands-free option.

"Bluetooth is an emerging technology and it's wonderful being able to trial this technology on my campaign," said Thomas.

If you're standing near the billboard and your Bluetooth device is switched on, you can choose to receive a campaign message from Rob. He is yet to disclose what the message from the billboard will say, apart from the fact it is "short and sweet".

Throughout Thomas's campaign, he has apparently used many technologies including a campaign intranet for his team to share files, sharing videos on YouTube and advertising on Facebook and Google..

"The new wards are so large, candidates need to stay connected with people. This is one way to do that."

Despite all this new found technology, Thomas added "Using new technology has been a key component of my campaign, but nothing beats meeting people face-to-face."

CSR collaborates with Infineon

CSR is collaborating with Infineon Technologies to pre-integrate its wireless connectivity platforms onto Infineon's cellular reference designs. This new cooperation allows mobile phone OEMs to add connectivity functionality beyond Infineon's existing product portfolio to their products.

"'Connected everywhere' has become an integral part of the consumer lifestyle. By collaborating with CSR we are able to enhance our reference designs with pre-integrated Wi-Fi and wireless connectivity software framework, in addition to our in-house integrated connectivity IP," commented Stefan Butz, Vice President of the Wireless Solutions Division and General Manager of Business Line Entry Phones at Infineon Technologies.

CSR's connectivity platforms offer Bluetooth and Wi-Fi. Targeted at a variety of types of handsets, the Infineon platforms feature highly integrated basebands with specifications that deliver full multimedia experiences.

Infineon platforms with integrated CSR's wireless connectivity will be available in 2011.



Luke D'Arcy,
Cambridge
Consultants.

Beachhead applications for whitespace radio

Luke D'Arcy, Head of Whitespace Radio
at Cambridge Consultants

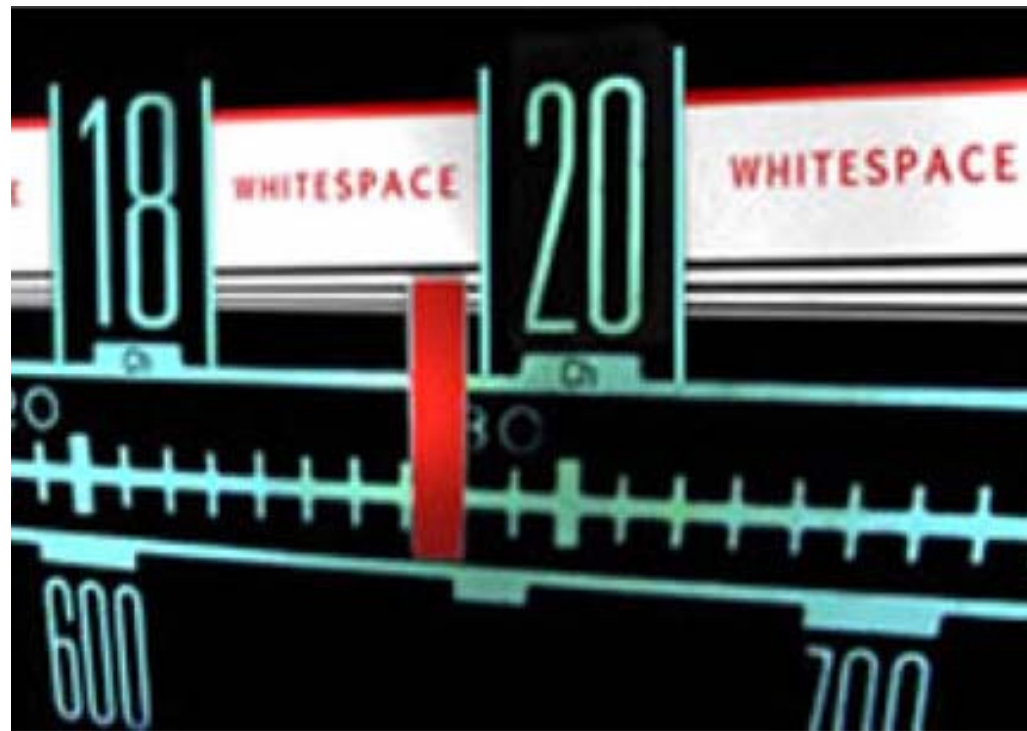
The United States Federal Communications Commission (FCC) recently released the final rules for whitespace radio devices, freeing up much of the TV band for unlicensed use. These highly desirable frequencies can travel through walls and transmit at a distance ten times today's Wi-Fi signals. Experts suggest the rest of the world will not be far behind in legalising unlicensed use of unused TV channels freed up by the digital switchover, creating the potential for a \$100B market¹.

Cambridge Consultants, with one of the world's largest independent wireless team in the world, has been working on whitespace radio technology from the beginning, in areas such as novel sensing receiver technology. In this article we highlight three applications ripe for innovation and market growth that could exploit this newly-freed whitespace spectrum: rural broadband provisioning; municipal wireless networks; and in-home media distribution.

But what is whitespace radio? All over the world TV broadcasters are switching from analogue to digital transmissions. In the US this has already happened. The UK plans to be completely digital by 2012. The rest of Europe and the world will likely follow suit over the next few years.

Digital broadcast technology standards, such as ATSC and DVB-T, are much more spectrally efficient than current analogue systems, meaning that they can transmit far more information in a given amount of spectrum. This property allows broadcasters to fit a huge number of digital TV stations into a small fraction of the TV band allocated for analogue transmissions.

The result is a "digital dividend" of TV



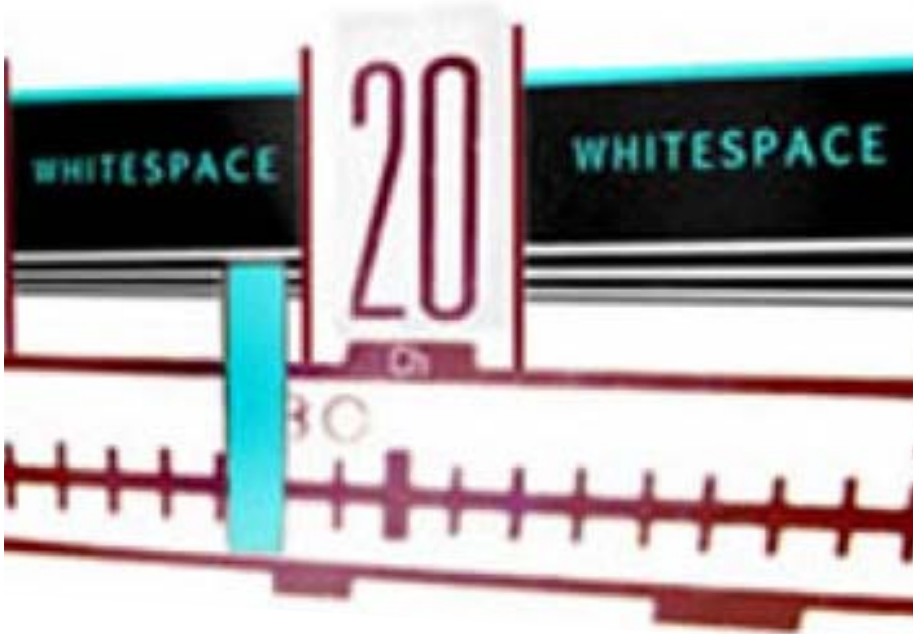
spectrum that can be put to good use in other ways. Some of this will be cleared of TV broadcasts and auctioned off to the highest bidder. In the US, the FCC raised more than \$20bn like this with the 700MHz auction in 2008.

However, a substantial part of the free spectrum is interleaved with ongoing TV broadcasts. There is plenty of free spectrum between the TV transmissions, but the precise frequencies that are free depend on your location. As a result, these "whitespaces" between TV stations cannot be cleared and auctioned in the normal way. Instead the whitespaces will be made available free of charge for unlicensed use.

The last time a significant allocation of spectrum was released for unlicensed use was in 1985 when the FCC opened up the 2.4GHz band. Naysayers initially wrote this off as 'junk spectrum' due to its relatively poor range and wall penetration abilities, but this action led directly to Bluetooth™ and WiFi technology, both now at the heart of multi-billion dollar businesses.

The TV whitespaces are certainly not 'junk spectrum'. If they were, operators in the US would not have paid so much in the 700MHz auction. The FCC decision is particularly significant because it levels the playing field, making high quality spectrum available to all, free of charge when it had previously cost billions. This will rapidly





accelerate innovation in ways we can't imagine today, but three particularly promising short term opportunities include:

1) Rural Broadband Provisioning

There are around 3000 wireless internet service providers in the US, mostly serving rural communities. By upgrading to whitespace radio these providers will be able to extend the range of their access points by at least 300 percent, and remove the need for a line of sight between subscriber's premises and the access point. The overall result will be to greatly reduce the number of access points needed to cover a particular community, reducing the cost of installing a network by up to 75 percent. Spectrum Bridge already has a rural network set up in Claudville, VA, a small rural community lacking broadband connectivity.

2) Municipal Wireless Networks

In the utopian days after WiFi first emerged many cities planned city-wide free, or very low cost, wireless networks. Unfortunately few of these have been successful, because the relatively short range of standard WiFi means that a large number of access points are required to provide reasonable coverage, and the number of access points is the main contributor to the costs for the network operator. Municipal whitespace networks will be able to deliver coverage with a huge reduction of the number of basestations, potentially making municipal networks profitable. Microsoft already has a network like this set up on its campus in Redmond, WA. Dell and others have said that they will include such technology in their products.

3) In-home media distribution

There is increasing demand from consumers for a reliable way to stream personalized video to TVs throughout the home. Existing WiFi networks struggle to provide the high bandwidth and quality of service needed to support video streaming, particularly for high-definition video. The ability of whitespace radio to penetrate walls makes it an interesting technology for video distribution around the home.

Taking advantage of whitespace spectrum for these and other applications requires new technology, particularly in the area of location aware radios. It's easy to forget that it took more than ten years for volume production technology to be developed to take advantage of the 2.4GHz band. But our experience and pre-existing intellectual property tells us that this does not have to be the case for whitespace radio. We anticipate that early adopters will start to make use of the new spectrum as early as next year. The opportunities enabled by whitespace are just too compelling to wait any longer.

¹"The economic value generated by current and future allocations of unlicensed spectrum" [online] (UK, Perspective Associates [cited 28 September 2009]) available from Internet:

http://www.ingeniousmedia.co.uk/website/files/Value_of_unlicensed_-_website_-_FINAL.pdf



Cambridge Consultants Blogs

Why are we blogging? We believe that the technology market is much better when it is highly connected, and social media is a fantastic tool that instantly connects people who face similar challenges, irrespective of whether they are budding entrepreneurs running their first high growth start up company or a captain of industry in charge of a global bluechip company. So, if you'd like to add to the debates, please feel free to comment on any of our blogs. It would be great to hear from you.

Patrick Portage
Marketing Communications Director
Cambridge Consultants.

Corporate Blog

Our corporate blog covers new product development, open innovation, accelerating start up companies and other topics that involve using innovation to achieve market leadership, along with technology stories that we hope you will find interesting/

Consumer Products Blog

Topics include connected devices, beverage dispensing, eco innovation, new product introduction (NPI), open innovation, novel control interfaces and other topics related to our development of innovative consumer electronics, domestic appliances and fast moving consumer goods.

Wireless Medical Blog

Examining mobilehealth and telehealth technology ad market challenges, this blog provides insight from implantable and hospital communications to consumer health applications.

Mobile Wireless Technology Blog

Smartphones, netbooks and tablet PCs are making mobile connectivity an essential part of everyday life for many people. This blog examines the issues faced by technology professionals, network operators and industry analysts working to keep people connected on the move.

Short Range Radar Blog

Devoted to the topics surrounding short range radar systems in the 0 to 10km range. Examples of systems covered include in-wall, through wall, short range border surveillance and in-fill radar for both ATC and military applications.



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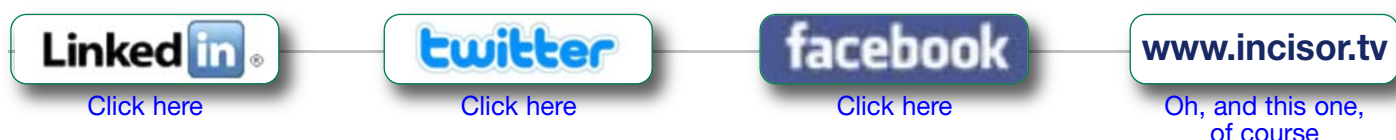
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Vince Holton represents Incisor on a number of Internet networking sites. Many interesting discussions take place, and this feature will allow Incisor to keep its readers in touch with diverse - and different - viewpoints from experts all across the world.

From this point forwards, you can read a selection of these views in Incisor, and you can follow the discussions as they happen on the various sites. And why not join in!

Currently, Incisor is represented at these sites:



ON THE FORUMS:

A review of recent short-range wireless activity on various forums

Bluetooth SIG members at LinkedIn:

Thierry Dechatre of Beewi asked:

Does anyone know if SPP profile will be soon available on the iPhone Bluetooth Stack?

Mikko Savolainen, Bluegiga Technologies -

You kind of have SPP on the iPhone already. However you need to use the Apple specific iAP protocol to send any data over it. To get access to the iAP documentation and iPhone APIs you need to be part of Apple's MFI (Made for iPod) program.

I do not have information that Apple would open the standard SPP profile in iOS and I don't think it's very likely because they already have the iAP, but this is just my personal feeling.

Stephen Pearce, Cambridge Consultants -

Mikko is correct. To run iAP you will need an Apple authentication co-processor chip on your accessory hardware. These are only available to MFI members.

We (Cambridge Consultants) have the

software to enable you to drive the iAP-coproc from a SPP application running on a CSR BlueCore chip.

Mike Barker of BuildingPhysics asked about Bluetooth full duplex voice communications to multiple headsets?

Can anyone tell me where to find an equivalent of the Callpod PXC-0001 Phoenix Class 1 Bluetooth Conferencing Unit? We want to use it for sports - for rowing in particular. The cox will talk to 4 to 8 crew via waterproof headsets. Even better would be full duplex voice for all crew. And of course extra input for music and voice communication to the coach. I understand that Bluetooth can handle this type of multi node communication using OBEX push? If so, are there many products on the market and where can I buy them?

Mikko Savolainen, BlueGiga -

OBEX profile is meant for file transmission, not audio streaming. It's a packet based protocol originally derived from IrOBEX.

For speech quality audio you have profiles like Headset or Hands-Free you probably know from Bluetooth headsets.

However due to latency and throughput requirements you can only have 3 simultaneous audio connections at a time with a single Bluetooth radio.

Sathish Pandian, Mindtree Ltd

Having 3 Simultaneous bi-directional voice communications itself has good amount of restrictions, as with HV3 packet type, it will capture the complete Bandwidth for reserving to voice channels. 4 to 8 is impossible to have for bidirectional voice com.

Mike Barker responds:

How do you think the Callpod guys got their system to work? More importantly is there an alternative produce I can buy anywhere? Bi-directional is not that necessary - simple audio streaming to multiple headsets will do the job?

The cost and availability of water proof headsets make this an attractive proposition - if only we can find the



"base-station" to drive the system. Callpod has not answered any of my calls - I can't understand why their system is not selling like hot cakes?

Johan Zander, Anoto AB

My guess is that the Callpod contains multiple Bluetooth radios...

Mike Barker -

So it should not be so hard to make up a unit - 3 bluetooth transmitters communicating with 2 headsets each, and some effort in ensuring there is no cross talk? Wishful thinking on my part ...

Ashok Kelur, Mindtree -

Yeah!!, with eSCO and point to multi-point with A2DP technology in Bluetooth you can get 4-8 device connected and communicating using 2 radios.

Franz Dugand, RivieraWaves -

I think the Bluetooth standard has provision to support up to 6 voice channels (using eSCO links). But this feature is not yet supported in the headset profile. So I presume the Callpod is using a proprietary method.

Ashok Kelur, Mindtree -

Yes, I know. I was not thinking of off the shelf product which gives you the required stuff. I just wanted mention with latest Bluetooth Spec. you would not need more than one radio to communicate between 5 people.

Mobile Health - B2 Group Educational Group at LinkedIn

Markus Pohl of Research2guidance asked:

Will smartphone apps become the killer application of the mHealth market? And What impact will mobile applications have on the mHealth market?

mHealth solutions have been discussed since the end of the 90s. Positive market projections indicated that the mHealth market would soon become a billion Dollar market.

The following barriers prevented the old mHealth market from taking off:

1. Devices
2. Distribution
3. Patients and doctors
4. Regulations

Will the mobile apps economy eventually kick-start the mHealth market?

Ryan Arp, Medium -

The devices are ready. Distribution isn't a problem. It seems that regulations and doctors will be the determining factors in the velocity that mHealth will succeed. Most doctors by nature seem a little resistant to change. Regulations may take longer to develop than the speed at which the mobile market is moving.

That being said, I think we're finally getting close to the end of the "early adopter" stage and slowly moving into mass market.

Jim Tassone, eCardio Diagnostics -

The issue is the same but it is nuanced by which target you are considering for use of the "mHealth" you provide. On the patient side, there is interest but not a willingness to pay for it. On the care giver side, there is interest but the question of how they get paid by whom for using it. As long as patients expect healthcare to be paid for by others, and reimbursement is the primary means of paying caregivers, it will be a tough road to success for mHealth in the open market.

Snippets

137 Million web-enabled CE devices to ship by 2014

There are 30 million US broadband households currently viewing some form of online video on the TV, says In-Stat. In addition to downloading digital video, close to 90% of these households also stream online video to the TV. Over the next five years In-Stat expects that the majority of CE devices purchased, including digital TVs, Blu-ray players and gaming consoles will be web-enabled, with 137 million devices shipping in the US in 2014.

MindTree unveils Bluetooth low energy IP suite

MindTree has launched its BlueLitE, single mode Bluetooth low energy (Bluetooth 4.0) Intellectual Property suite. The BlueLitE IP suite consists of Software IP - stack and profiles, and Silicon IP - baseband controller, digital Phy (Physical Layer) and RF. The pre-integrated solution IPs for complete transceiver and connectivity chips are part of the roadmap.

"Annoyed" consumers want wireless charging

Approximately 44% of survey respondents found current mobile charging solutions are an annoyance, according to In-Stat. Additionally, up to 40% are willing to pay \$50 more for a wireless charging solution. As a result of this and other factors, In-Stat projects the market for wireless charging systems will reach \$4.3 billion in total market revenue by 2014.

UK government invests £200m in technology centres

More than £200m will be invested by the Government in a network of Technology and Innovation Centres to drive growth in the UK's most high-tech industries, it was announced by Prime Minister David Cameron. The centres will bridge the gap between universities and businesses, helping to commercialise the outputs of Britain's research base.

The centres, which will receive the money over the next four years, will be based on the model proposed by Hermann Hauser and James Dyson. The network will support businesses in developing and commercialising new technology.

Bluetooth bites

New programme addresses competitive encroachment

By Vince Holton

For a long time, WPAN industry observers have wondered why it is that the sector's most successful player – Bluetooth – has seemed content to suffer the slings and arrows cast at it by rival technologies. Whether it has been direct competitors in the PAN space such as the Wi-Fi clan, the – at one time reasonably aggressive – Ultra-Wideband and Wireless USB community, or ZigBee, or companies also pitching at the short-range connectivity space such as Wireless HD/Wireless HDMI, WiGig, etc, etc, it has been the massive market-share and consumer awareness that Bluetooth has built, that have been the target.

The reasons for Bluetooth's success are easy to identify. First, Bluetooth gained an unassailable foothold in the mobile phone physiognomy. Bluetooth does what it does very well, and, courtesy of the desirable applications that it enables – not least the ability to help people avoid being prosecuted for using their phones in their cars – the phone companies have embraced Bluetooth, pumping up chip production levels such that it is now a fiscal no-brainer to build Bluetooth into handsets. The huge handset market has spawned the huge headset market. And now, cars. The very same functionality, and low cost, have pushed Bluetooth into wireless games consoles such as the Playstation and Wii. These too are huge markets. Heck, even Apple has fallen for Bluetooth. As a result of all of this, annual Bluetooth chip sales are measured in billions, not millions.

The second factor that has driven Bluetooth forward is a remarkable phenomenon. At the outset, a bunch of companies, and, here's the point, companies that competed directly with each other, put their heads together to make the Bluetooth spec a good one. These companies were Ericsson, Nokia, IBM, Intel and Toshiba – giants in computing and telephony. Then they created an organisation, one that we all now know as the Bluetooth Special Interest Group, that has done a superb job of taking the technology to the world. And let's not lose sight of the most important fact – since the point that Bluetooth came to the world in 1998 (click here to download the [first ever](#)



[issue of Incisor](#), from December 1998!), competing companies have put aside their competitive instincts, and have worked together to develop and promote Bluetooth. This is pretty unprecedented, and its importance should never be underestimated.

Strength in numbers

The Bluetooth SIG has grown in the same sort of impressive way as the technology itself. The five founding companies expanded to create the Promoter Group, and the regular member company tally grew and grew. Today, the Bluetooth SIG has more than 12,000 member companies. Again, this is unprecedented. Most wireless technology alliances or SIG's consider they are doing well if their member stats achieve numbers with three figures in (and no decimal points). The Wi-Fi Alliance, which most people would agree is the most aggressive competitor to

Bluetooth, and which snaps at its heels constantly, can only state on its web site "Wi-Fi adoption continues to grow, and common goals still bind together more than 300 Wi-Fi Alliance member companies from dozens of countries". 300 members, hmmm.

That's not to say that Wi-Fi isn't an important, widely-used and very useful technology. It is! I'm using it here and now myself. And its growth in recent years has been impressive. But the Wi-Fi Alliance seems to be hell-bent on trying to snatch the consumer market off Bluetooth. I am not the person to set out a technological disposition as to why this isn't a great idea – there are far better qualified people to do that, and masses of data in the public domain that explain why Bluetooth is a better technology for WPAN applications. But, forget the technology for a moment. Again, there are a couple of important factors. First, it is widely



acknowledged that the Bluetooth SIG has done a better job of managing the development and roll-out of a wireless technology than any of the other wireless industry standard organisations. The SIG has rules about the way things are done. It doesn't allow products to ship prior to the standard being certified and ratified (that'll be you – the Wi-Fi industry!), it polices the use of the brand, and – most importantly – it has managed to continue to nurture an environment and community where companies that go head to head with each other on the open market, come together within the Bluetooth SIG to continue to develop Bluetooth, and to manage the growth of the technology for the common good. That's the common good of the industry and of the consumers themselves.

If you are still in any doubt – THIS IS PRETTY UNUSUAL!!! And it goes a long way to explaining Bluetooth's ongoing success.

And then, there is Bluetooth's reach. It is now in so many phones that are already on the market, and will be built into so many phones that ship in the future, that Bluetooth is not going away any time soon. It's increasing penetration into other markets – cars, games consoles, music players and home entertainment systems – is now being boosted further by an expansion into new, non-consumer electronics markets such as healthcare and wellness. There is no question, Bluetooth is here to stay.

Rampant avarice

But, let's get back to the opening observation. Bluetooth's highly successful penetration of key, volume generating markets has not gone un-noticed. It is pretty much beyond doubt that Bluetooth will continue to dominate in the handset. This, more than any other, is the market that has been key to Bluetooth coming very close to hitting its publicly-stated goal of 2 billion Bluetooth devices shipped in 2010.

It's the next 2 billion, 5 billion, 10 billion that the SIG is now thinking about. Organic growth

will take Bluetooth part of the way there, but the increasingly aggressive actions of some of the other technologies mean that Bluetooth as a technology has to consolidate, take a deep breath, and to plan carefully how to manage the next growth phase.

There is a lot of distracting noise out there. From the Wild West that is the Wi-Fi community we have Wi-Fi Direct. This is lining up its guns to attack Bluetooth in the heart of the WPAN. Once again, I'm not going to enter into the technology debate, but here's [one set of views that I read this week](#), and which seem to align with views expressed in an as yet unpublished blog from the CEO of another wireless semiconductor company. Whatever the technical merits or demerits of WiDi, there's no doubt that the Wi-Fi companies will push this new solution out onto the market.

Should I stay? Or should I go?

The main impact of actions such as this is to distract and confuse. I've met plenty of high-level decision makers at handset and CE companies. No disrespect meant, but the majority of these people look to the outside to know which technologies to use, which directions to go in. If a bunch of big name companies suddenly starts shouting about a solution such as Wi-Fi Direct, it is going to grab their attention. And it could take them six months or a year to decide whether this is worth a technological realignment and a diversion of resources. In the meantime, the pen that was poised over the purchase order for XX million bits of whatever technology they have been supporting, gets put back on the desk for a while.

The luminaries at the Bluetooth SIG know this. And they know that they don't want to be deflected from their own growth plans. So, in a move that is a little bit 'progressive' for the SIG establishment, a re-structure is taking place that will position Bluetooth and the Bluetooth SIG better for the next phase of Bluetooth's campaign for continuing global domination (imagine a smiley emoticon here!).

So, what does this boil down to? Well, to use its own words, the SIG has put into place a 'new structure to allow the SIG to better address specific market requirements. The new structure now in place involved the reorganization of the Ecosystem Committee to form a new Bluetooth Ecosystem Review Board (BERB). The BERB is composed of the Bluetooth SIG Chief Marketing Officer (CMO) (VH: *this is a completely new position, by the way*) and the team leads that represent five Bluetooth Ecosystem Teams (BETs). This reorganization enables each BET to focus their efforts on making Bluetooth technology successful within their particular market segment.' The BETs currently in place include:

- Automotive
- Consumer Electronics/PC
- Health and Fitness
- Mobile Phone
- Smart Energy

I spoke to Bluetooth SIG exec director Mike Foley about the BETs programme while in Seattle a couple of weeks ago. You can watch the movie of our discussion by clicking on the screen in this article.

For those of you without the energy to click that mouse button, it boils down to this: Bluetooth isn't going to change its ways and get involved in slanging matches with rival technologies and their management companies. The SIG will continue to do what it has always done, but will now do more of it.

The core structure that lifted the Bluetooth baby off the ground in the first place is now going to be replicated across each of the key markets that have been identified by the Bluetooth SIG members. Instead of one set of people trying to manage Bluetooth's roll-out across all sectors, there will be a set of experts in each sector. Once again these will come from companies that ostensibly compete in the open market. These people will ensure that all of the correct attributes and requirements for their individual markets are developed and satisfied. These teams will be overseen and co-ordinated as part of the SIG structure, all with the aim of making sure that the Bluetooth specification embraces the needs of each of these market sectors, and continues to move forward in a businesslike, correctly managed and professional manner.

Just like it always has done.

Unquestionably, Bluetooth will continue to find its position assaulted by technologies that would just love to steal some of the WPAN standard bearer's sales volumes. However, as long as the Bluetooth SIG continues to operate in a way that develops the technology in a logical and progressive manner, and continues to be able to align the most important companies in the computing, telephony and consumer electronics industries, it is hard to see how Bluetooth won't hit those multi-billion device sales targets.





ZigBee: Range Testing and Dense Network

Authors: Joe Lomako & Jon Harros, TRaC

There are many challenges which the designer or implementer of a radio network may face, which can quite often be frustrating. One of these “frustrations” is performance in the field.

For instance; after all of the work put into developing the technology and getting devices to work properly on the test bench, it is found that it is the physical properties of the topology of deployment that could cause failure of the network. This could include a variety of impediments but the main questions which are asked tend to be of co-existence with other radio networks, multi-node networks and RF attenuation through buildings. The ZigBee Alliance has already addressed the initial issue with the co-existence of other wireless networks (a white paper can be obtained from the ZigBee Alliance website!). However, it was not really possible to take a ZigBee product and test in a dense network of many nodes or set up a network in a building which had a variety of attenuation characteristics. That is, of course, until now! We at TRaC have established facilities to address these specific issues:

- A Range of Performance Testing Facility
- A Dense Network Test Range

Two of TRaC’s experts provide an insight:



Range Testing - Joe Lomako

This facility was initially set up to provide ZigBee manufacturers with a means to determine how their devices operate in the

“real” world when placed in structures with variable, non-homogenous attenuation characteristics.

Of course, the first question that may pop into your mind is – “isn’t ZigBee a mesh network which can go round corners?” That is very true, but if a manufacturer can assess how his product performs in a real building he may be able to advise his




customer on how to set up a network with less nodes, thus saving him money. This is just one of a number of reasons to assess its performance. But this service isn’t just for ZigBee devices; it can, and is, applied to other devices such as WLANs, Bluetooth, 433MHz devices, in fact any radio device.

The next question that you may ask is likely to be – “well can’t we just set up a screened room with an attenuation barrier to simulate building attenuation?” Possibly... but it would prove an expensive set up, and to vary the attenuation of the barrier would be a cumbersome and again expensive task due to the materials required. That’s one reason why TRaC uses a real building; but not the only reason.

Within a real building, real-life impedance characteristics are presented to the propagating RF wave. These impedance characteristics could be contributed from elements including traditional dense brickwork (not the hollow things we get today), changes in the dielectric properties of ageing building materials, varying thickness walls.

TRaC’s Range Testing Facility comprises of an approximate 60m x 40m, three storey brick building, with the internal structure being made up of single, double and triple thickness walls, hollow walls, long corridors and deep stairwells?

So from a scientific and engineering point of view we have a true real world test facility. 



Apart from all this – it's good fun setting up a network in an old building!

The applications in which ZigBee devices are employed are extremely numerous and continually growing, particularly with the increasing number of profiles available. The profiles developed see devices being placed in a variety of topologies, sometimes as open field sites such as on an industrial pipeline, or an agricultural monitoring system; but typically they are placed inside domestic or commercial / industrial properties. Hence, why our range testing is performed inside a building.

TRaC has a wealth of expertise and experience in RF metrology and we understand how RF devices are affected in real situations. We have developed a unique performance evaluating system where a product developer can bring their ZigBee network, place it in a real building, see how it performs and then compare it to a control.

So how does it work? How the range test is performed, is probably best illustrated by an example:

Consider a medical device which is continually monitoring and recording the blood pressure of a patient throughout the day and periodically sending back the recorded information to a hub, which in turn sends this to a remote monitoring station.

The patient could be moving around the building, which continually presents a variety of communication paths from the monitoring device to the hub. For example, It could be in two adjacent rooms, on the same floor but separated by three rooms or in the opposite corner of the building (i.e. separated by three floors in a diagonal path). Therefore, these three possible communication paths (as well as any other determined by the manufacturer) can be simulated in the building and the performance evaluated.

The performance evaluation would be defined by the manufacturer and could be anything from packet loss to signal strength reports. Then control (reference) path loss measurements are made which can be used for comparison purposes. This can then be used as part of the overall system evaluation.

If the manufacturer wishes to perform some testing in a bespoke network arrangement, this can also be arranged with some simple reconfiguration of the devices within the reference building. How the results are interpreted is at the discretion of the manufacturer, and they can act upon them

as they see fit. That's the beauty of this facility; it is totally scalable and versatile and can be applied to any type of radio device.



Dense Network Test Facility - Jon Harros

The Dense Network facility was setup to address the major concern that people involved in dense wireless network deployment have. Namely, "will the devices suffer from the dense environment?"

There are several different scenarios that have to be considered for this and some of these scenarios are more relevant to technologies that make use of some kind of discovery/beaconing mechanism (eg. ZigBee)

The main problems that can arise in a dense network relate to frame storming (ie. when any given node suddenly receives frames from a large number of neighbouring nodes within a very short space of time). Remember that low power wireless devices tend to have very limited memory space and in turn possess finite frame buffering capabilities. There are a number of situations that can cause such an event. To illustrate the point, let's consider a couple of real life scenarios:

First, let us consider the case of a ZigBee device which is being installed within a dense ZigBee network. Upon power-up the device will attempt to discover any networks that are within radio range by transmitting a Beacon Request frame. On receipt of this frame, any device (with routing capabilities) that is within radio range will attempt to respond with a Beacon indicating its own capabilities and those of the network to

which it belongs. Within a dense network there are likely to be a large number of these devices all transmitting this Beacon at approximately the same time. This could cause a problem to any devices that have their receiver switched on at that time (including the device that wants to join the network) if their design is not sufficiently robust.

The second scenario takes into account the fact that most devices that have routing capabilities tend to be mains powered (as they usually require continual power and do not make use of any sleep mode). Now I don't know what it's like wherever you are reading this, but it seems to me that every so often (particularly when there are lightning storms) we get occasional mains generator switch over. This can sometimes cause a micro-interruption to the mains power which causes lights to flicker and some electrical appliances to reset.

There are of course other circumstances that can cause a mains interruption, but the effect on a ZigBee network will always be the same. As mains power resumes, the devices will all start to broadcast messages, in some cases this will be to find the network, in others it will just be normal status frames. However it is possible that there will be simultaneous transmission from a large number of devices. Once again it is necessary to confirm that devices have been designed in a sufficiently robust manner to handle this frame storming situation.

Once again I can hear you asking the obvious question "Why can't I check this myself using my own devices" Well, in setting up your own dense network, it is likely that the devices that you use are going to have the same chipsets (platform). This will go some way to confirming robustness, but only within networks making use of devices with this chipset. Different chipsets have slightly different tolerances and behaviour. Within a reference dense network that is made up of multi vendor chipsets (such as the one at TRaC) you're going to get a much better picture of robustness for all eventualities.

So, in conclusion, real life deployments have their own unique technical obstacles which have to be overcome in order to produce a successful high volume wireless product. Facilities such as those at TRaC can aid significantly with this and can provide real environments within which the effects of these obstacles can be safely assessed.

Catch us at the ZigBee Members Meeting in Dublin in November if you want some more information.





Whose 'Gig' is it anyway?

by Dean Anthony Gratton

I recall from last month's column that I intimated I'd look at a follow-up on Wi-Fi low energy. Well, I'm going to revisit that at some point but, for now, something else has indeed popped onto my radar. I'm looking at the 60GHz market and how Wi-Fi has seemingly dominated a sector that other short-range RF technologies have eagerly tried to conquer. Both Bluetooth and Wi-Fi continue to dominate the wireless personal area networking space, much to the detriment of the 60GHz sector and Wi-Fi surely hasn't made the path easy for WirelessHD and WiGig. In fact, Bluetooth wireless technology utilises Wi-Fi in their high-speed offering and, as Mike Foley, Executive Director, Bluetooth Special Interest Group (SIG), acknowledges, "The scenarios people are working on today can be achieved using Bluetooth and Wi-Fi." I assume the scenarios to which Foley refers are the highly desirable audio and/or video streaming across a wireless connection, something that has eluded the entire consumer electronics industry, leaving Wi-Fi as hitherto, a lone solution. Both WirelessHD and WiGig have been working on the 60GHz spectrum for some time as a significant solution to deliver wireless HDMI. Likewise, the Wireless Home Digital Interface (WHDI) group has been working on using the 5GHz unlicensed spectrum to also deliver wireless HDMI. Currently, 60GHz is arguably considered cumbersome, power-hungry and too expensive and, with numerous no-shows across the industry – something I will touch upon in a moment – the industry is now looking towards WHDI as the favoured wireless HDMI solution.

Wi-Fi's doing a pretty good job

Normally, I like to grab a beer or glass of wine at this point and turn on some music before I start exploring the subject matter



in my column. Unfortunately, I find myself sitting on a train bound for London, confined to a meager flip down table (and I have to breathe in to use this) and a lack of anything to quaff whilst I ponder on the issues at hand. There might be moments of the air turning blue, as I write this column using the wife's MacBook Air – I wonder if it can fly? Never mind!

When I look at Wi-Fi, I have to admit the technology is doing a pretty good job. I mean it's ubiquitous and most of us, if not all, have had some contact with it. You'll find the technology in your Smartphone and computer; you will find it at an airport; you'll find it in your supermarket; you will

even find it in your café, bar, bistro and restaurant. It's pretty much standard. I dare say, you could walk down any street in the UK and discover a multitude of (open or closed) access points or, if you're Google, you could go as far as breaching privacy by collecting a series of passwords, private emails, miscellaneous data and perhaps other confidential information (allegedly!). Anyway, I just wanted to demonstrate how prolific the technology is and how we have become accustomed to its presence despite a few of us lacking some basic security know-how. The technology has also reached many communications-based consumer electronic products, which further increases our awareness of it.



There is a growing emphasis today on the delivery of media content through IP-based mediums. Apple's updated TV offering; YouTube, the BBC's iPlayer and so on are testimony's as to how content is being received by the wider IP-enabled consumer. In another very recent example within the UK, Sky (a British satellite TV broadcaster) now offers a video on demand (VoD) service via broadband to compliment its existing satellite subscription. Sky's subscriber-base now has on offer over 600 HD channels to choose from and how we watch content within the home has also changed. For example, I have an LG BD390 Blu-ray player. It supports Digital Living Network Alliance (DLNA) to enable me to stream content from my PC and it also begrudgingly streams content from the wife's Apple iMac, along with any other device within our home that supports it. DLNA isn't new and has been around for many years and has started to reach a number of media-centric electronic products. So, when I start wirelessly streaming audio and/or video content from my designated computer, the player duly informs me that I may experience transfer problems, due to the volatility of the wireless connection, but invariably I tend to receive the content perfectly. I know my access point is 802.11n-based, but I can't recall if the LG Blu-ray player just has 802.11b/g – nevertheless, the experience is solid.

How does 60GHz fair?

So, how do other wireless technologies begin to fair with such a prevalent technology that has not only endured its highs-and-lows, but has been around the block a number of times over the last decade? Let's not forget, WirelessHD and WiGig have specifically adopted 60GHz as the spectrum to deliver wireless HDMI. I'm sure many of you are already familiar with the cabled version of the HDMI wonder. Anyway, the problem with 60GHz is that it's considered cumbersome, power hungry and too expensive, as I already touched upon. Moreover, the standard still remains in somewhat of a quandary – I assume they are just at a stage of crossing the 'Ts' and dotting the 'Is' – well I can only hope!

To further compound the issues surrounding 60GHz, a number of companies have hyped the technology (and this might sound familiar to some of you!). Nonetheless, as an engineer, I like to keep level-headed about making unqualified promises – damn those marketing people (sorry Vince)! As a consequence, the hype has generated a number of non-believers, since the technology was due to emerge a few years ago (circa. CES 2008), but failed to make its debut despite many promises and further promises thereafter. I'm not

going to name names, but you can undoubtedly imagine the industry's frustration and eagerness for the technology to become widely adopted, deployed and ultimately selling chipsets in its billions.

What about WHDI?

In the wireless personal area networking space meanwhile, someone can hear your frequency! In other words, many wireless technologies use case scenarios overlap and compete, in addition to the radio frequencies being commonly used across technologies. For example, WirelessHD and WiGig are competitors, both utilising the 60GHz spectrum and both offering comparable user scenarios. WHDI, on the other hand, uses 5GHz, a robust spectrum, which is not heavily overcrowded. Nevertheless, the use case scenarios offered by WHDI are similar, if not the same. Incidentally, another increasing factor is the over crowdedness of the unlicensed 2.4GHz Industrial, Scientific and Medical (ISM) band. Wireless technology's popularity is growing exponentially (that's a good thing!) and, as I already mentioned in my opening gambit, if an ordinary avenue in the UK has a number of Wi-Fi enabled access points, then issues inevitably arise surrounding coexistence. This will undoubtedly generate problems for everyday users where typically the technology compensates and moves channels – and channels are limited! Perhaps this doesn't need breaking down, but the inevitable crowded space will, in turn, impact on the overall usability and experience of most wireless technologies. WirelessHD and WiGig's 60GHz platform is indirectly aimed to alleviate the inevitable over crowdedness, but the industry remains muted and unmotivated, as Wi-Fi continues to deliver the golden streaming experience. Crikey, it even works for me!

I asked Mike Foley to provide his perspective on the use of 60GHz, as the future high-speed Bluetooth offering. You may recall that Ultra-Wideband and the SIG's Alternative MAC/PHY (AMP) abstraction layer was specifically architected to accommodate Ultra-Wideband, although its adaptability enables any high-speed technology to be firmly seated beneath, and then along came Wi-Fi when issues arose surrounding the WiMedia Alliance's members inability to agree on the transfer of technology know-how. Actually, I (and Incisor) understand this is still ongoing. So, to come back to Foley's perspective, he added, "If and when there are scenarios that require the capabilities of 60GHz technology, the Bluetooth SIG will determine how to best integrate that solution into the ecosystems enabled by Bluetooth technology."

Until next month ...

I suppose that's it. Wi-Fi is currently enabling me to stream content to my Blu-ray player and there isn't any motivation which will commit me to any future purchase of WirelessHD, WiGig nor WHDI. But then, industry circles suggest that the technologies will come, so I guess watch this space (delimited in MHz).

On a despondent note, prior to delivering this very late copy on a train that's trundling to London using a 3G connection, Incisor received the alarming news that a particular 60GHz semiconductor company, whose investors seem a little narked not to have seen a return on their substantial investment, is about to go 'belly-up' or, more specifically, is up for sale. A modicum of harsh reality in light of the struggling 60GHz industry; as I've already mentioned, the motivation and demand desperately needs to follow.

So, looking forward, and of course, I'm always thinking ahead about next month's column. I'll be looking at Bluetooth low energy and really trying to understand some of the rumours that BLE isn't as economical as first thought. If anyone wishes to dispel or confirm these rumours and scupper the rumourmongers, then please ping me.

Well, my journey is about to come to an end and I did manage to quaff a very expensive bottle of red 'plonk' on the train – just call it an addiction and leave it at that! So, this is where Dr G signs off for this month.

About the Author

Dr Dean Anthony Gratton is a bestselling author and columnist. He has authored several patents, contentious articles and a number of bestselling books on wireless technology. He has worked within the telecommunications industry for over sixteen years and provides consultancy to a number of high profile companies.

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high speed wireless news



ViaSat joins in-flight Wi-Fi broadband equipment market

US operator JetBlue Airways and ViaSat Inc. have announced the intent to provide in-flight broadband access and other services for customers on JetBlue's fleet of 160+ aircraft using ViaSat Ka-band satellites. ViaSat will provide Ka-band antenna components and SurfBeam2 modems for installation on the airline's EMBRAER E190 and Airbus A320 aircraft types along with two-way transmission bandwidth services using the WildBlue-1 and high-capacity ViaSat-1 satellites. JetBlue subsidiary, LiveTV LLC, will manage the integration of the ViaSat broadband and related components onboard the aircraft as well as providing the Wi-Fi enabled services into the overall cabin experience.

The two companies will compete for the in-flight broadband market with competitors such as Aircell, which uses ground antennas for its Gogo system. Aircell is currently the in-flight broadband provider market leader with announced airline partners including Air Canada, Air Tran, Alaska Airways, American Airlines, Continental Airways, Delta Airway, Frontier Airways, United Airlines, US Airways, and Virgin America. Row 44 and Panasonic Aviation Systems are competitors offering satellite based solutions.

The airlines are demonstrating significant commitment to providing in-flight broadband. Total in-flight broadband equipment investment should approach half a billion dollars globally from 2009 through 2013. In-flight Wi-Fi deployments have moved past the trial stage and are approaching critical mass with 2,000 airplanes to be deployed by the end of 2010. Research company In-Stat forecasts that revenues from in-flight broadband will reach \$95 million in 2010, up from just under \$7 million in 2009. Airlines that have reported offering or testing in-flight broadband or live TV include Air Asia, Air AsiaX, Air Blue, Air Canada, Air France, AirTran, Alaska Airlines,

American Airlines, British Airways, British Midlands Airways, Continental Airlines, Delta Air Lines, Frontier Airlines, Jazeera Airways, JetBlue, Kingfisher Airlines, Northwest, Oman Air, Qantas, Qatar Airways, Royal Jordanian, Ryanair, Shenzhen Airlines, Southwest, TAM Airlines, TAP Portugal, United Airlines, US Airways, Virgin America, and Wataniya Airways.

In-flight broadband service roll-outs by airlines is not without issues though. With current paid take rates for in-flight Wi-Fi service below 2 percent, providers have a lot of work to do to entice passengers to use the service. Significant investment has been made in on-board and on-ground infrastructure, and now the market will be tested as it tries to get more passengers to use the service.

No free Wi-Fi hotspot? I'll keep walking

Availability of free Wi-Fi does influence venue choice. According to In-Stat's new Wi-Fi Hotspot research, nearly two-thirds of respondents indicated that free Wi-Fi influences their choice of venue. An additional 31% indicated that free access may influence their choice, and just 5% said that it would have no influence over venue choice.

"Our research shows that while revenue may not always be directly gleaned from the hotspot offering, free Wi-Fi has a significant value in bringing customers to a venue," says Amy Cravens, Market Analyst. "It's no wonder then that over 150 thousand café/retail venues have now deployed Wi-Fi hotspots, although not all of these are free. That's in addition to the 10s of thousands of travel-related installations (hotels, airports, in-flight) worldwide."

Some of the research findings include:

- Worldwide annual hotspot connects, or sessions, will reach over 2 billion by the end of 2010 with annual hotspot connects anticipated to grow to over 11 billion by 2014.

- Asia/Pacific will have about one quarter of the worldwide hotspot venues over the forecast period.
- By 2012, handhelds are anticipated to account for half of hotspot connects.
- The total worldwide hotspot market size will swell to 319,200 venues by year-end.

Recent In-Stat research examines the worldwide market for public Wi-Fi access in hotspots (airports, cafés/restaurants/bars, convention centers, hotels, retail, marinas, outdoor hospitality, and public areas).

Dual-band Wireless LAN serial port adapter

connectBlue's suggests that its OWS451 Wireless LAN Serial Port Adapter is ideal when a serial cable is to be replaced with a Wireless LAN connection. Since the Serial Port Adapter has the TCP/IP and software drivers embedded, it also offers a seamless connection of a device to an existing 2.4GHz or 5GHz Wireless LAN network.

The OWS451 Wireless LAN Serial Port Adapter has dual-band support which makes it easier to identify interference free channels and connect to networks that utilize both the 2.4 and the 5GHz radio bands.

"Besides the benefits of dual-band functionality, we can offer the unique feature of Enhanced Enterprise Security which makes it possible to connect to existing Wireless LAN networks that utilize these security systems," commented Rolf Nilsson, CEO of connectBlue.

Thanks to the built-in TCP/IP and software drivers, there is no need for any additional driver to be installed in the host. The module interface is UART, and therefore, the OWS451 Serial Port Adapter will appear as a serial cable to the host.

Other popular features include low power consumption and full radio approvals for Europe, US and Canada (R&TTE, FCC, IC) as well as compliance with EMC standards.

Vera home control system cuts energy costs

Here's a nice idea for you - a single device with almost boundless possibilities: the Californian company, Mi Casa Verde (Spanish for My Green House, by the way), has introduced a new type of home control system to the European market. Marketed under the name Vera, this 'house maid' is an IP gateway based on the Z-Wave wireless standard. Using Z-wave modules with Vera, all the electrical devices in a house or apartment can be networked and controlled via the Internet, allowing users to remotely control and monitor their homes from any web browser installed on their PCs or smartphones.

The gateway consists of a base unit and a battery pack. According to Mi Casa Verde, Vera is distinguished by the fact it is simple to use and charges no monthly fee. The installation process is carried out using a conventional web interface. Once set up is complete, Vera can be operated from any PC or mobile device with internet access. Vera can also be unplugged and powered by the battery pack for portable installation, allowing Vera to detect other Z-Wave devices in the home; the user only has to press an installation button to establish a connection to the various Z-Wave products. As soon as Vera is plugged back into the Ethernet chord, all the devices are recognised and displayed on the web-based user interface.

Configure me up

Users can assign their devices to different rooms and define scenarios, such as 'I'm home' or 'I'm going to bed.' When activated, Vera will switch all devices in the network to the status specified for the respective scenario (e.g. lights off, blinds down, activate door locks). Different scenarios can be triggered on a time-dependent basis by the device, automatically by other Z-Wave devices such as motion sensors, or manually via remote control or wall-mounted switches.

For example, when your child gets home from school and unlocks the door, Vera can send you an email. You can view a still image or live footage from a security camera using your computer or smartphone to be certain that your kids are home safe and didn't bring home unwelcome guests.



While Vera can be controlled via a home computer, it can also be operated via the Internet from a user's office or web-enabled mobile phone. Typically, this level of secure remote access via the web involves a lot of installation and configuration effort in terms of services, routers and firewalls, but the company maintains that Vera is easy to set up, and automatically takes care of everything for the user. A web page enables all users to access their devices by entering their own logon name and password. This service is provided free of charge by Mi Casa Verde.

User security

In addition to controlling heating, lighting, windows and other installations in the network, IP security cameras can also be integrated with Vera. Once these have been installed in a home, the user enters the corresponding IP address into Vera and the rest is handled for them. Users can view live footage from the camera with a web enabled PC or smartphone.

Cutting energy consumption in the home

PC-based home control solutions often require users to leave their home

computers switched on permanently. On average, this consumes around 200 watts of power per hour. In contrast, Vera is claimed to use just three watts per hour and does not require users to install additional software or leave their home computers running. The system ensures that all sources of energy consumption in the home (lights, televisions, heating, security systems, etc.) are only switched on when necessary.

Me Casa Verde predicts that Vera will enable consumers to slash their energy bills by up to a third. One thing seems certain - if Vera does half of what is claimed, at only \$249, it does make high-end home control functionality affordable and should worry some of the established players peddling much more expensive systems.

They could have come up with a better name though for a high-tech system that embraces the green energy zeitgeist - I mean, Vera, it's just so 1940s.

low energy wireless news



EnOcean shows new series of energy-harvesting sensors

EnOcean GmbH will be showing off the latest developments in energy-harvesting wireless technology at electronica 2010 in Munich, 9-12 November. These include the new STM 310 series of unidirectional sensor modules. Also on show will be a number of additions to the EnOcean EDK 300 developer kit.

For those that haven't caught up with EnOcean yet, their wireless modules draw their energy from motion, light or changes in temperature, enabling completely energy-autonomous and service-free automation solutions. EnOcean systems have already been implemented in more than 100,000 buildings worldwide, addressing demands for increased flexibility and energy efficiency. See more at the [Incisor.TV movie here](#).

The latest products to emerge from EnOcean are the STM 310 series of sensor modules. Based on the Dolphin chip, the sensor modules feature an energy converter interface and can be supplied with a solar cell or a thermal converter. The plug&play devices incorporate a wireless transmitter plus antenna, internal sensors or an external sensor port, and an integrated charging circuit with its energy storage mechanism. This internal energy storage powers the modules when no ambient energy can be harvested.

Versions for both 868 MHz and 315 MHz enable worldwide application. Flexible programming enables a variety of self-powered applications with the new modules – window contacts, temperature and humidity sensors, or light, pressure and gas sensors to name a few.

"In this new series we're offering our OEM partners a versatile platform on which they can create a huge selection of batteryless sensor applications. The solar cell or the internal temperature sensor means a substantial reduction in the cost of producing room sensor



devices for instance", says Armin Anders, Marketing Vice-President and Co-founder of EnOcean. "So you can implement energy-efficient solutions for building automation much faster."

NXP introduces energy metering chip

NXP Semiconductors is getting to grips with smart metering with its EM773 energy metering IC – a 32-bit ARM-based solution designed specifically for non-billing electricity metering applications.

NXP told Incisor that the EM773 takes energy metering beyond a traditional billing context by making it easy for system designers to integrate energy metering functionality into almost any type of device, and make information on electricity consumption more accessible and intuitive for the end user. Consumers and industrial users can monitor energy consumption in real-time, in devices ranging from smart plugs, smart appliances and green consumer electronics, to building sub-meters, industrial sub-meters, and even clusters of rack-mounted servers in the data center.

Featuring a metrology engine with automatic single phase, power and energy measurement, the EM773 energy metering IC includes an API which simplifies the design of non-billing metering applications. The NXP EM773 is built on an ARM Cortex-M0 processor.

"Saving energy is high on the agenda for consumers and businesses, but with most electrical devices today, it's difficult to know how much energy you are actually using at any given point in time. Smart devices measuring and communicating how much energy is being used are potentially a powerful tool for managing energy consumption," said Rolf Hertel, director of smart metering, NXP Semiconductors.

The standard demonstration kit for the EM773 ships with a wireless plug meter transmitting data from the metrology engine via the wireless



m-bus to a USB-based dongle. The USB dongle uses the OL2381 wireless transceiver and LPC1343 microcontroller, both from NXP.

The NXP EM773 energy metering IC is now in volume production and is available immediately.

TI expands low energy options – BLE + ANT

Texas Instruments (TI) has introduced two ultra-low power, short-range wireless connectivity solutions for consumer medical, mobile accessories, and sports and wellness applications. TI claims that the CC2540 single-mode Bluetooth low energy system-on-chip and the CC257x ANT network processor can enable target applications to operate on a coin cell for more than a year.

"The CC2540 and CC257x, combined with our existing low-power RF, WiLink, BlueLink and MSP430 MCU portfolios, solidify TI's position as the industry leader in complete, highly integrated short-range wireless connectivity solutions that bridge the gap between the mobile and sensor worlds," said Volker Prueeller, marketing manager for TI's Low-Power RF products.

The CC2540 Bluetooth low energy system-on-chip features an integrated controller, host and application and comes in a 6 mm x 6 mm package. It is Bluetooth version 4.0 compliant with single-mode (CC2540) and dual-mode devices allowing full link testing and development.

TI describes the CC257x ANT network processor as a "turnkey sensor solution". On board is a 2.4-GHz CC257x network processor, MSP430 host microcontroller, software and application support and integration of ANT-FS function and AES encryption support. TI supports ANT with sensor and mobile devices for full system solutions.

The CC2540 Bluetooth low energy SoC is in volume production, while the CC2570 (single channel) and CC2571 (eight channel) ANT network processors are sampling.

LTE and the road to 4G

It's no secret that the data market is rocketing, and that the 3G networks are creaking at the seams – every Incisor trip proves this to be the case, based not only on trouble gaining network coverage, but also the phone bill at the end of each trip! Is there a solution, we cry? Well, Portio Research has been looking at the LTE/4G market. Its 82-page study covers the current state of LTE (Long Term Evolution) at worldwide and regional levels, discusses the drivers and inhibitors for LTE growth, reviews the LTE network infrastructure vendor landscape, and examines the future outlook for this 4G enabling technology. The report also includes analysis of the expected trends in technology adoption, the planned trials and deployments by MNOs worldwide and draws comparisons between LTE and WiMAX on several fronts.

Portio observes that with the soaring adoption of data services by mobile subscribers using handsets and laptops, data traffic has skyrocketed and 3G utilisation rates are fast-approaching threshold levels and threatening the user experience.

3G and 3.5G networks are increasingly proving incapable of handling data traffic, especially in urban areas and places with a high smartphone density. Facing a need for near constant enhancement of data transfer rates and mobile broadband network efficiency, MNOs are consequently planning to move to 4G technologies to accommodate the surge in data traffic and turn this challenge into an opportunity.

LTE (Long Term Evolution) and WiMAX (Worldwide Interoperability for Microwave Access) are the main pathways to 4G that MNOs have to pick between, and on which they can build their data handling capacities. While WiMAX has enjoyed a first mover advantage and a clear head-start, LTE's benefits – not least that LTE is a natural progression for MNOs operating on GSM/UMTS networks, and offers the ability to lower the cost of delivering data services – are expected to drive a surge in LTE network deployments in the coming years.

The period 2009-2010 has already seen the announcement of numerous LTE trials and deployments the world-over, and both this ever-growing number of contracts, and



the major MNOs involved who are favouring LTE over alternative technologies, strongly suggest that LTE deployment is gaining substantial momentum.

Based on Portio's forecasts, the worldwide LTE subscriber base is expected to grow at a CAGR (Compound Annual Growth Rate) of 187.7 percent between 2010 and 2015.

This growth will see the worldwide LTE subscriber base pass the 200 million-mark by end-2015 – within the first six years of its launch in late 2009; whereas the worldwide 3G subscriber base reached only the 100 million mark in the first six years after its launch.

Migrating to LTE technology is not just the preserve of the developed and saturated markets in North America and Western Europe, Portio reckons, with MNOs in developing markets also proactively doing the same; though, understandably, LTE's scale and use will markedly vary between markets.

Are our phone bills likely to drop in the near future? Not likely – the Net Ops have no interest in making less money. Will we be able to enjoy better mobile service? Not tomorrow, or perhaps even next year, but perhaps, a little way down the line.

Snippets

ST-Ericsson 3Q 2010 results

The transitional period continues for the merged ST-Ericsson business. Its third quarter results showed net sales of \$565 million, which is a 4% sequential increase, and an adjusted operating loss of \$85 million. The company says that its restructuring plans are fully on track, and that it has made \$19 million in savings in the quarter.

President and CEO, Gilles Delfassy, commented: "Although our transition will continue for some time, our progress is apparent in our daily interaction with customers, who are excited about the potential of our forthcoming products to help them provide consumers with innovative, high performance next-generation mobile devices."

Low energy wireless

Nordic USB-compliant 8-channel ANT solution

Ultra low power (ULP) RF specialist Nordic Semiconductor will display its full range of 2.4GHz ULP transceivers and wireless connectivity solutions at Electronica, which takes place in Munich from November 9 to 12, including the new nRF24AP2-USB – a single chip 8-channel ANT solution which integrates a proven 2.4GHz ULP transceiver core and 8-channel ANT protocol stack with Full-Speed USB 2.0 compliant interface in a 5x5mm QFN package that targets markets such as sports and wellness.

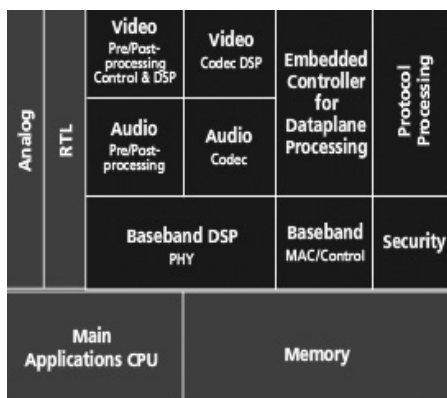
4G/LTE/WiMAX news

Shipments of PEDs with embedded 3G/4G to pass 100 Million

The number of portable entertainment devices (PEDs) now incorporating cellular connectivity provide a growing revenue opportunity for network operators, content owners, and manufacturers, says In-Stat, predicting that there will be significant growth across all categories of 3G/4G-enabled PEDs over the next five years. WCDMA will be the dominant enabling technology across the majority of shipments, with the exception of digital photo frames where GSM will be dominant.

"Standalone e-readers represent the brightest spot in 3G/4G-enabled PEDs with unit shipments expected to grow significantly across all regions over the next several years," says Stephanie Ethier, Senior Analyst. "North America will dominate compared to other regions capturing 64% of the worldwide 3G/4G e-reader market by 2014. Asia/Pacific will rank second in market share."

4G/LTE/WiMAX news



4M Wireless completes LTE protocol stack port

Tensilica and 4M Wireless have announced that 4M Wireless has completed its port of the PS100 LTE protocol stack to Tensilica's ConnX Atlas LTE reference architecture and has also officially joined Tensilica's Xtensions partner network. 4M Wireless has also ported its PS100 LTE protocol stack to the LTE system platform from Blue Wonder Communications, another Tensilica partner.

The 4M Wireless PS100 LTE protocol stack is a 3GPP Release 8 compliant implementation of the LTE protocol stack for User Equipment (UE) terminals. It consists of a fully optimized Layer 2, Layer 3, and NAS LTE protocol software enabling the highest uplink and downlink data rates.

Tensilica's Atlas LTE reference architecture implements the complete 3GPP LTE Layer 1 PHY at CAT4 data rates in a programmable solution based on its Dataplane Processor (DPU) and ConnX DSP IP cores. The Atlas reference architecture consists of application-specific ConnX DSPs and DPUs, tailored to meet the low-power requirements and high-computing power requirements of 4G mobile wireless handsets and base stations.

"The Tensilica Atlas reference architecture provides a total solution for LTE UE design," stated Atif Malik, CEO, 4M Wireless. "4M Wireless already works with a number of customers and partners that use the Tensilica architecture, thus the two companies provide a proven solution to the market. By using a series of optimized processors, Tensilica gets maximum efficiency while keeping the power budget as low as possible."

Cetecom USA installs LTE and W-CDMA test solutions

Cetecom has chosen Anritsu LTE and W-CDMA (HSPA+) test solutions as part of its Certification and Operator Interoperability Test (IOT) offering in San Diego. The selection of the ME7873F and ME7873L W-CDMA/LTE RF Conformance Test Systems, ME7832A 3G Protocol Conformance Test System, ME7832L LTE Protocol Conformance Test System, and ME7833L LTE Operator IOT System helps establish an independent test centre that provides wireless OEMs and ODMs with 3G/4G conformance and IOT testing in a single facility.

"Anritsu has helped us progress our San Diego laboratory for companies to conduct conformance and operator IOT tests on 3G and 4G user equipment and devices," said Lars Eriksson, COO of Cetecom Inc. "Anritsu test solutions are part of our turnkey system that can conduct all the necessary carrier interoperability tests so that wireless manufacturers can ensure compliance with 3GPP and operator standards."

The ME7873F and ME7873L are integrated TRX, performance, and RRM test solutions that provide PTCRB-approved test cases. They support testing in either a test call or no-call test mode. LTE bands currently supported include 1 to 14, and 17. Combined W-CDMA and LTE configurations are available, supporting W-CDMA testing from Rel. 99 to Rel. 7, as well as LTE with simultaneous testing of both technologies.

mimoOn 1st gen LTE femtocell air interface scheduler

mimoOn GmbH, which is a software defined radio (SDR) software company, has announced the 1st generation of its mi!Spectrum Femtocell LTE Air Interface Scheduler. The company told Incisor that this is compliant with the new Femto Forum APIs for air interface scheduling and network monitoring.

This new generation of QoS, CQI, and interference-aware air interface schedulers is predicted to significantly improve spectrum efficiency and minimize potential interference between macrocells and femtocells. Detailed specification of the new schedulers will be released in December 2010. The mi!Spectrum schedulers will run on mimoOn's own mi!Femto stack, as well as any other vendor's stack supporting the FemtoForum Scheduler / NMM APIs.

Thomas Kaiser, mimoOn CEO, said: "The new mimoOn mi!Spectrum Scheduler and mi!Femto Stack will enable operators to achieve significant gains in Femto and Macro network spectrum efficiency. mimoOn has chaired the Scheduler API and NMM API specification work in FemtoForum, which greatly helped us to be one of the first companies launching products compliant with the new APIs."

mi!Lord! – what a lot of silly spelling, punctuation and capitalisation in this anNounce!ment. !.

Snippets – High speed wireless

Boingo adds more WI-FI roaming in Madrid

Boingo Wireless, a Wi-Fi industry service provider, and GOWEX, a mobile internet specialist and creator of "WiFi Cities," have

signed a roaming agreement, giving Boingo customers on laptops and handhelds access to 120+ Wi-Fi newsstand kiosks in Madrid, as well as all 25 "Wi-Fi Cities" currently being deployed across Spain.

The news kiosks are located within the city and provide coverage of the main areas in Madrid. The Wi-Fi Cities will come online gradually through 2011, with Boingo customers gaining access as they go live.

events



DATE	EVENT	LOCATION	NOTES	LINK
Nov 8 - 10 2010	2010 mHealth Summit	The Walter E. Washington Convention Center, Washington, D.C., USA	-	www.mhealthsummit.org
Nov 9 - 12 2010	electronica	Munich, Germany	-	http://www.electronica.de/en
Nov 10 - 11 2010	Wireless Congress	Munich, Germany	-	http://www.wireless-congress.com/
Nov 10 - 12 2010	China Electronics Fair	Shanghai New International Expo Centre, China	-	http://www.icef.com.cn/fall_eng/index.shtm
Nov 17 - 20 2010	Medica 2010	-	-	http://www.medica-tradefair.com/
Jan 6 - 9 2011	International Consumer Electronics Show (CES)	Las Vegas, Nevada, USA	-	www.cesweb.org/

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