



EMERGING TECHNOLOGY TRENDS FOR WIRELESS DEVICES

THIS ISSUE

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THE INS AND OUTS OF BLUETOOTH INTEROPERABILITY TESTING

STUFF WE REALLY LIKE: SENNHEISER PXC 360 BT

the bluetooth steamroller

Last month's issue of *Incisor* included a feature 'Bluetooth bites', which gave an insight into how the Bluetooth SIG intends to consolidate the technology's lead in the short-range wireless sector. Put simply, the SIG is replicating the structure that has successfully overseen Bluetooth's growth over the last 12 years, but now across individual application areas rather than one team covering the whole market.

The initial focus is on the automotive, consumer electronics/PC, health & fitness, mobile phone and smart energy markets, though the plan is to create new focus groups as applications emerge. Based on the success to date, this is a compelling proposition. Watch the movie on this page to hear the plan explained by Mike Foley of the Bluetooth SIG.

One of the cornerstones of Bluetooth's forward-looking proposition is Bluetooth low energy (BLE). As a route into the low power, sensor-based sector, which so far has been dominated by proprietary solutions, but which ZigBee, Wavenis, Z-Wave, ANT and a few others have been trying to corral and call their own, BLE must have sent shivers down the spines of the incumbents. No other technology has the reach, profiles, levels of adoption and awareness that Bluetooth has. Crucially, none of them enjoys the default option position in the cellular handset, which is a shoe-in (vital, actually) element of many applications.

Unsurprisingly, given this threat to the sensor market status quo, there have been accusations that BLE isn't as LE as the promoters suggest it is. This was totally predictable. Whenever a paradigm change like this occurs, the opposing PR teams go into overdrive to try to undermine the perceived threat.

Here at Incisor, we set out to un-earth the definitive answer – how low is LE? We set our own bloodhound, Dean Gratton, on the trail. And he came up trumps. If you are a Bluetooth supporter, we think you will be pretty happy. If paying off your mortgage depends on the success of one of those other technologies? Well

Oh, and before I go, very best Christmas greetings to all our readers and friends. Thanks for your support in 2010.

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

INCISORTV FOCUS THIS MONTH:



As the Bluetooth SIG looks to advance from 2 billion units shipped per year, to 5 or 10 billion, Mike Foley tells Incisor about changes to the SIG that will accelerate the process.

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EMERGING TECHNOLOGY TRENDS FOR WIRELESS DEVICES

The medical world is increasingly looking for innovation, and medical devices is one sector that is showing signs of progress. Tim Phipps, Medical Wireless Lead at Cambridge Consultants, looks at some of the latest developments in the rapidly growing market of wireless medical devices.

BLUETOOTH: YOU'RE AMAZING JUST THE WAY YOU ARE?

Dean Gratton tackles a serious question: is Bluetooth low energy as low as it is claimed to be? Prepare yourselves for the answer!

THE INS AND OUTS OF BLUETOOTH INTER-OPERABILITY TESTING

So, you think that interoperability testing can be glossed over, eh? Not if you want your product to be sold, and to stay sold, says Frontline Test Equipment.

STUFF WE REALLY LIKE: SENNHEISER PXC 360 BT

Look out Bose – here's a high-quality, noise-cancelling headset – with no wires!!!

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Mobile health device links patients and healthcare professionals

Cambridge Consultants has announced a new product concept based on its Continua-compliant Vena platform. The Minder, powered by Vena, enables continuous, real-time medical data collection and transmission via cellular networks.

Doubling as a pocket-sized digital patient checklist, Minder is a gateway that captures wireless medical data and transmits it to a patient's online health record, creating higher volume and higher quality data for Electronic Medical Records (EMR). Minder can also receive real time updates to the checklist, allowing two-way communications with healthcare professionals or caregivers, enabling more meaningful use of e-health records.

Usually, a hospital visit is required in order to record data, such as ECG or blood pressure readings, into a patient's EMR. However, as wireless-enabled medical devices continue to grow in number, the Minder device showcases a viable pathway for such readings to be acquired and transmitted remotely. For physicians and hospitals, this would provide access to more accurate data to work with, while increasing efficiency and decreasing unnecessary and expensive hospital visits. For patients, the Minder takes the stress out of the often complex daily medication and monitoring regimen.

With the goal of increasing compliance via user engagement, the Minder displays an interactive timed to-do list that can be customised for individual patients. For instance, a recovering heart attack victim can now transmit their blood pressure readings from home to their EMR in real-time. If the reading is high, the Minder could instantly alert a care provider, who

could then have the patient carry out necessary steps by sending tasks back to the Minder. If the reading is on target, it could prevent an unnecessary hospital visit.

"The rollout of ubiquitous health monitoring is gaining traction; the question is not 'if' but 'which' technologies will take hold. Between the proliferation of countless health apps for smart phones and even the first Continua Certified smart phone, we are seeing an opportunity to drive a new market and lower health care costs via connected health solutions," said Vaishali Kamat, Group Manager, Medical Technology, Cambridge Consultants. "The other big question going forward will be: 'How do I design a product in a smart way so that I can get it to market without regulatory hiccups?' We believe the answer lies in standards-based technology such as Vena, which can provide reliable platforms for dedicated health devices. In the end, the companies that clear regulatory hurdles first will most likely dominate the market."

The Vena technology used in Minder combines Cambridge Consultants' know-how with CSR's BlueCore and Qualcomm's Wearable Mobile Device (WMD) hardware (this supports a variety of 3G networks and provides integrated GPS, and accelerometer and Bluetooth technologies), while Vena implements Continua Health Alliance standards for Personal Area Network (PAN) and Wide Area Network (WAN) interfaces. Devices based on Vena can receive data via Bluetooth or USB from any Continua Certified devices and transmit this data via HL7 over cellular networks. The Vena wireless healthcare software stack embeds the Bluetooth Health Device Profile (HDP), which is optimised for the secure transport of medical data and the IEEE 11073 standards for compatible exchange of information between devices.

Cambridge Consultants' Vena family of devices includes an inhaler, the VenaHub USB gateway, and core technology for A&D Medical's wireless blood pressure cuff and weight scale.

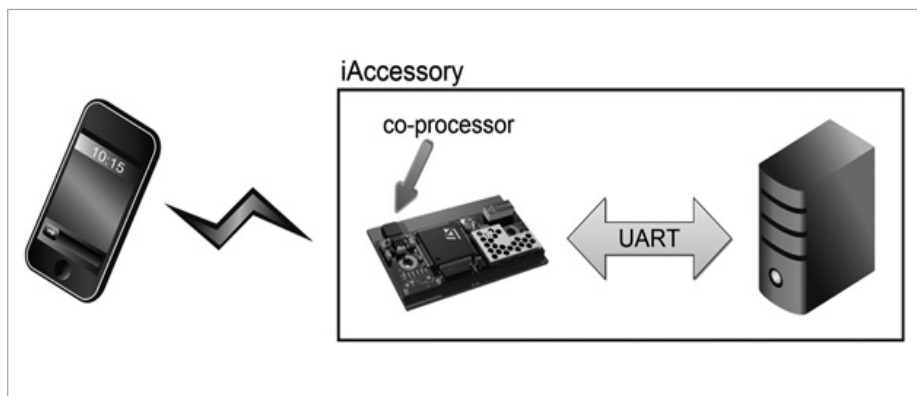
Connectivity ICs critical for growth in handset semiconductor markets

The total revenue delivered by handset semiconductor shipments is forecast to increase approximately 5.5% this year, says ABI Research, and the trend is expected to continue through the next three years, resulting in a total estimated revenue growth of 12% in 2013.

Qualcomm, MediaTek, and TI are the top players in the overall handset chipset market, accounting for approximately 80% of all shipments. Qualcomm maintains a leading market position, especially in the high-end smartphone segment. ABI suggests that with its powerful IP library and an almost full range of technologies, the firm looks likely to maintain its position at the top of the market for years to come.

The majority of MediaTek's shipments are 2.5G and 2.75G chipsets for the company's low-cost solution. MediaTek is set to continue gaining a greater share of the low- to mid-priced chipset market. TI has been gradually stepping out of the 2.5G and 2.75G chipset market since the end of 2008, with shipments expected to decline in 2010 and virtually cease in 2012.

Bluetooth has the highest attach rate compared to other connectivity chips: its average penetration rate is expected to be 55% in 2010. The penetration rate of GPS is expected to be 23% this year, and will keep increasing in the next five years to reach 45% in 2015. The revenue increase from Wi-Fi chips will be the highest among the three connectivity chips over the next five years, estimated to reach US\$1.4 billion in 2015, a 14% CAGR between 2010 and 2015.



connectBlue's Bluetooth bites Apple

connectBlue is setting out to provide Bluetooth capabilities for the Apple iPhone, iPod touch or iPad in industrial and medical applications. The Swedish company told Incisor that although highly sought-after in these applications, wireless connectivity between an iPhone/iPad and a device/vehicle/instrument has been cumbersome to implement. Until now, that is, as (trumpet fanfare!) connectBlue has implemented its industrial wireless experience in ready-to-go software and modules.

connectBlue had seen that initially, an operator may have looked at implementing connectivity between a device and Apple iPhone/ iPod touch / iPad through a Wireless LAN TCP/IP based network. However, an iPhone can only be connected to one network at a time while an iPhone application wants to simultaneously interact with several devices as well as the Internet. Therefore, the operator found itself looking at the alternative of connecting the device (wired or wirelessly) as an accessory directly to the Apple product.

For the Bluetooth wireless connection, the iPhone demands a specific Apple Accessory Protocol in order to communicate between the device (accessory) and the iPhone. It also requires an Apple specific authentication co-processor in the accessory.

"We have solved this in a ready-to-go Bluetooth connectivity solution. connectBlue has developed a unique software that takes care of the Apple Accessory protocol," explained Rolf Nilsson, CEO of connectBlue. "Also, we have solved the need for the specific Apple authentication co-processor by connecting the device host CPU directly to the connectBlue Bluetooth module. Now,

the interaction between the iPhone/iPad and the industrial/medical device can be seamless."

connectBlue has two solutions: the OBS414 is an all-in-one Bluetooth module that has an added chip with integrated Apple authentication co-processor as well as the Apple Accessory Protocol firmware, so there's no need for the customer specific Apple authentication co-processor in the host device/accessory or the Apple Accessory protocol. Then there is the OBS411, which is a small form factor module for customers that already use this module or for those customers that already have an Apple authentication co-processor integrated. In the software there is support for an integrated Apple authentication co-processor as well as the Apple Accessory Protocol firmware.

This is an interesting development. It has seemed up until now that most apps for 'serious' use – e.g. industrial and medical, have been based around non-Apple smartphones, whereas Apple's back yard has been home to entertainment/media/ consumer apps. What will take-up be? Time will tell.

2010 mHealth Summit a success

Hmmm ... Have you ever looked back and thought - maybe we should have been at this event? As Incisor went to press, the 2010 mHealth Summit was coming to a close in Washington, D.C., and had been attended by more than 2,400 attendees from 50 countries. This meant that the mHealth Summit, which also attracted big hitters such as Bill Gates and Ted Turner to provide keynotes, had nearly tripled in attendance in its second year. The event's mission statement was to learn, share and discuss the power and potential of mobile technology to improve global health.

Organized by the Foundation for the National Institutes of Health in partnership with the mHealth Alliance and the National Institutes of Health (NIH), the three-day gathering featured more than 125 exhibiting companies showcasing the next generation of products, services and solutions for mHealth.

"The people, ideas and innovations at this year's mHealth Summit are a testament to the fact that the mHealth moment has arrived, and is moving full-speed ahead," said David Aylward, Executive Director of the mHealth Alliance. "The mHealth Alliance was very pleased to announce a series of major grants and new partnerships during the Summit. It is these connections and commitments that make events like the mHealth Summit so important in helping to drive forward the field of mHealth."

The event drew more than 150 speakers from around the world, including additional keynote addresses from: Francis S. Collins, Director, National Institutes of Health; Todd Park, Chief Technology Officer, U.S. Department of Health and Human Services (HHS); Aneesh Chopra, U.S. Chief Technology Officer; Dr. Judith Rodin, President, The Rockefeller Foundation; and Dr. Julio Frenk, Dean of Faculty, Harvard School of Public Health and former Minister of Health, Mexico.

It seems the event worked well for people a little closer to Incisor's orbit, too. "The quality of the attendees was excellent. Everyone I needed to meet was at the 2010 mHealth Summit. I've never experienced anything like this," said Clint McClelland, Senior Director of Market Development, Qualcomm.

Based on the success of the 2010 mHealth Summit, plans are apparently underway for the 2011 mHealth Summit, to be held Dec 5-7 at the Gaylord Convention Center and Hotel in the Washington, D.C.

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On Thursday the 6th and Friday the 7th of January – the first two days of CES 2011 – Incisor TV will compile a news and feature show that will be broadcast via the Incisor TV web site. The show will include news bulletins, interviews with senior executives of companies that are attending the show, company profiles, product overviews and a general flavour of trends and developments at this, the most important consumer electronics show of the year.

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new products

STUFF WE LIKE: SENNHEISER PXC 360 BT

Should Bose be looking over its shoulder?

Noise-cancelling, SRS/HD surround sound AND no wires!

Anybody that flies on airplanes a lot knows that those people who like to think of themselves as savvy travellers are almost always to be seen in possession of a set of noise-cancelling headphones, and that they're usually Bose-branded. Just as it has won the competition to 'buy the back/inside back page advertising space in every magazine that has ever been published and advertise a Wave radio on it' competition, Bose has won the hearts and minds – and bucks – of the chinchlad frequent flyer.

Dude, lose the cable!

I guess it has something to do with my job, but these days, each time I see these smug dudes unpacking their Bose gear, with the Big Whopper-size earpieces, I am puzzled by the willingness of the owners to live with the fact that by using these behemoths they are, in fact, demonstrating that they are not only way behind the curve, but also seriously un-cool. I mean, they have cables, for heaven's sake! Come on.

No, to go with the zeitgeist, you have to lose the wires. There are enough good stereo Bluetooth headsets out there now for there to be no need to be tied to seat 24H.

(Let's skirt over, for now, the fact that some airlines try to ban the use of Bluetooth devices in the cabin. Apart from anything else, the cabin crew don't know the difference!)

I see the future, and it's blue

For some time now I've been travelling with Sennheiser's PX210 BT. This is a great set of headphones, and came to me courtesy of - now CSR-owned - Audio Processing Technology Ltd's (APT-X) tie-in with Sennheiser, and Sennheiser's adoption of apt-x audio compression.

Now, I've been very impressed by the 210s.



Great sound, and with only occasional re-charging, they've never died on me. However Chuck McDockersman still had the opportunity to look down on me because his Bose gear was a) bigger (not good) and b) had noise-cancelling, which is a handy feature.

Prepare, Chuck, to experience the feeling of indignation you would suffer if you were downgraded from Business to Coach. Yes, you're going to be seeing people around you who are getting their high-quality, noise-cancelled headset experience without a wire!

Yup, the PXC 360 BT from Sennheiser is a noise-cancelling Bluetooth stereo headset, and is a step up from the 210s. The headset uses apt-x compression again. This technology is at the heart of the high-

quality Bluetooth audio experience in a growing collection of consumer audio devices.

The earpieces, while managing to avoid burger-bun proportions, do sit over rather than on the ear. I found that the 360 offered at least the same, though probably a better quality audio experience than I had been enjoying with the PX210 BT, but that the over-ear style headset enhanced the audio experience on a number of levels. The very nature of the earpiece keeps more of the sound that you want, kept in, and less of the sound that you don't want, kept out. Then switch on the noise-cancelling and the experience gets better again. I'll confess that I haven't tried the headset on an airplane yet (they arrived just as I arrived back from my latest trip), but I'm off to see Rococo in Ireland next week, and I'll have



the opportunity to do so then*. However, in a normal environment, the noise-cancelling effect can be perceived and definitely reduces extraneous noise. Sennheiser calls the technology NoiseGard 2.0, and explains that it electronically identifies and reduces unwanted ambient noise

HD sound?

The PXC 360 BT is also Sennheiser's first travel headset with a feature called SRS surround sound mode, and the documentation adds the epithet WOW HD, which we could have probably lived without. This feature provides what Sennheiser calls an 'immersive virtual surround soundscape'. What does this mean in practice? Well, it's true that when you press the SRS button, the soundscape does appear to broaden. However, I'm not completely convinced. At the same time as enhancing the spatial effect, SRS does seem to 'thin' the sound a little. I tried switching SRS on and off through a variety of tracks. It suited some more than others. I believe that some users might overall prefer not to use SRS – the sound quality is great without it. I guess this will be a personal taste thing.

One other feature is a TalkThrough function. Press another button while you are listening to your music and you can tell the ~~trolly~~ flight attendant that you

would prefer the rubber chicken curry to the rubber beef stew and can you have another bottle of red wine please, without removing the headphones.

Day to day stuff

I've now used this headset for some time without having to re-charge it. That's not very scientific, is it? Sennheiser quotes a playtime sliding scale of 20/10/8 hours, depending on how many of the features you are using (NoiseGard /Bluetooth/ NoiseGard + Bluetooth). I can say that I've spent large chunks of my regular UK to West Coast USA trips using my PX 210 BT headset without ever being left in silence, and if the 360s are any different, I'll let you know.

Design-wise, the PXC 360 BT comes with rotatable/fold-in ear cups and a metal-reinforced headband. The Bluetooth, SRS, TalkThrough, track and volume controls are



integrated on the right ear cup and work fine after a few minutes' orientation. The headset comes in a travel pack that is considerably smaller and therefore more convenient than the Bose FatBoy, and you also get a set of accessories – an audio cable for the Troglodytes, an in-flight adapter, multi-country charger and of course the rechargeable lithium polymer battery.

A great product, then, and one which could prompt a sea-change, paradigm shift – call it what you will – amongst business travellers. It won't be birds that airport operators will be trying to keep out of jet engines, it will be cast-off Bose QuietComfort headsets.

** From the Dynamic Updates Department: I can now report that Sennheiser's noise cancellation does work! On the flight to Dublin, background aircraft noise was definitely reduced. In another – very unscientific – observation, I have a suspicion that switching in the noise cancellation did also affect (that means reduce the quality of) the overall audio experience a little, but not enough that I would choose not to use this option.*

How to turn your iPad into a proper laptop



Now, iPad users (well, anybody that buys Apple products, really) are somewhat sensitive to the apparent design superiority of their phones, computers, tablets, etc, etc. So, isn't the best idea in the world, then, to make the uber-gadget that is the iPad look just like, well, a conventional laptop?

Genius at work, surely?

Hypercel thinks this is so, and has introduced an iPad case with an integrated Bluetooth keyboard. Now, we're all for anything Bluetooth, but the basic premise of this product is a bit askew, isn't it? Or is it just us? Apparently not. When we showed this product to one of our iPad-toting dude

friends, his exact words were "Silly me for not realising that I needed a GIANT keyboard to turn my beautiful mobile device into any other clunk box".

However, for the sake of the record, let us at least give you the basic stats: The case has a framed pocket allowing full screen access with book-style closure and a magnetic wrap-around to secure the iPad. The keyboard is accessible as soon as you open the case, which can be folded to keep your iPad in an upright position in landscape mode – perfect for document writing applications, says Hypercel. Just like a laptop, says us. The keyboard itself is similar in size to netbook keyboards with

full QWERTY layout and a function button that opens up additional features including playback and volume controls. Hypercel claims a working time of up to 25 days and a standby time of up to 100 days.

So, there you have it. If you're embarrassed to be seen with your iPad, then buy Hypercel's case and bask in the knowledge that you need feel the shame no more.



Tim Phipps,
Cambridge
Consultants

Emerging technology trends for wireless medical devices

By Tim Phipps, Medical Wireless Lead,
Cambridge Consultants

The medical market has traditionally looked to drug development to provide innovation and new solutions: an approach that has led to spiralling costs and improvements in outcomes which are now only incremental. So the medical world is increasingly looking for innovation elsewhere and medical devices is one sector that is showing signs of progress.

With one of the largest independent wireless development teams in the world, Cambridge Consultants has a pedigree of creating 'world firsts' in wireless communications, including satellite communications, broadband communications, as well as medical areas such as drug delivery and surgery. In this edition of Incisor, we look at some of the latest developments in the rapidly growing market of medical devices which include wireless.

The relatively new sector of wireless medical devices has emerged over the last few years: and since it is not yet completely formed, it offers opportunities for companies to "leap-frog" their competitors and establish a leadership position in a fast growing market sector. In this article I will look at some of the technology trends in this market and try to draw some conclusions about the likely outcomes.

1. "The Big Picture" - video

Living rooms around the world have seen a dramatic increase in the size of screens used for watching television and for experiencing home-cinema. Just the same trend has been seen in operating rooms as well, with lots of High Definition displays being used to give bright, clear images to aid surgeons in their work. This is great, but there is a problem to be solved in adding wiring to a sterile environment and



keeping the environment clutter-free and the electronics clean without a rapid degrading of the equipment. So, leading companies are turning to wireless to offer freedom of movement and simpler sterilisation procedures.

There are some interesting problems to be solved for wireless video in the operating room. The most obvious is the need for high quality images, which means that there is a need to transfer a large amount of image information within a short period of time, with no compromise on quality. There are a number of technologies that offer high data rates, and the first products in this sector have each made different technology choices. The candidate

technologies include the following options:

- Communications in the 60GHz band; which offers lots of bandwidth but only a low transmit power and raises concerns over range in cluttered environments and hence reliability.
- Ultra-Wide-Band; again this can offer a high data rate with only a low transmit power.
- IEEE802.11n; a new contender that may be useful as the standard matures, though the spectrum is shared with WiFi users.
- Proprietary solutions; expensive to develop, but may offer a good match to the requirements, if a suitable technology can be brought in from other market sectors.





It can be argued that the low transmit power technologies will be a risk for some applications where non-line-of-sight communications may become unreliable. Another opinion is that intensive computing power will need to be applied to the video encoding to offer the really interactive feeling that comes with low transfer latencies.

Today, the early entrants are looking at simple applications, such as adding a second display, or adding a movable display. If we can properly solve the technology problems in a small form factor, then it would be possible to embed a wireless solution in any medical device which creates moving images. At this point the whole operating room could go wireless.

2. Medical telemetry

For some time now, we have been able to make wireless measurements of critical patient information whilst patients move within the hospital. Cambridge Consultants worked with Philips Medical to develop their IntelliVue™ Telemetry System, which led the way in this field. Today the challenge is to stay in touch with patients when they leave hospital to go back home. Accurate and timely information can allow medical practitioners to offer real reassurance and advice without the need for a face-to-face appointment.

As with all emerging market sectors, the area of wireless medical telemetry is taking some time to settle on the best technology to fit these new applications. Some of the early implementations include a cellular communication module using a technology such as GPRS: this will work well for low volume, high value applications but is likely to be too

expensive for mass market products, plus it has the inconvenience of needing to be recharged at regular intervals. Other products have chosen to use WiFi for communicating: this is fine, so long as the user has broadband installed at home, with good coverage from their wireless router. Our expectation for this market is that it will use a pair of devices which are the sensor plus a hub. The sensor will be a cheap, battery powered device with a medical sensor: it's communications being via a short range technology like Bluetooth Low Energy. The sensor links to the hub, which will be powered by mains electricity and will connect back to the network via a wireless cellular technology. We are not far from the emergence of a mass market device in this sector. Efforts to create an open standard through the Continua Alliance should pay off by creating a market for common technology platforms.

3. Implantable Devices

A new range of devices is establishing itself, with devices that are implanted in the body for long-term usage. Applications include pacemakers, defibrillators, nerve stimulators and swallowable imaging systems for diagnostics.

The key to any communications with these devices is a product design process that is optimised for ultra-low power design. Obviously, it is extremely difficult to replace the batteries, if the product runs out of power. Established radio chipsets are maturing in this sector, like the offering from Zarlink. System design and efficient antenna design are still important to ensure a successful product development.

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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 Pordage
Marketing Communications Director
Cambridge Consultants.

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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/

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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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Frontline *Bluetooth*[®] Interoperability Testing Services Product Testing Made Easy – Improving Your Customer's Experience

Let's paint a picture here. You are a manufacturer of technology products that communicate with other technology products. Like most of the rest of the world, you've realized that *Bluetooth* wireless technology is the best way of making those short-range connections wirelessly, and so your product is *Bluetooth* enabled.

You've spent a lot of time and money working to get your *Bluetooth* enabled product out the door, and the last thing you want to happen is for your customer to have a bad "out of box" experience. Just one bad out of box experience can be very expensive for any company.

How do you prevent this? You've got just two options:

1. **Become a *Bluetooth* wireless technology interoperability testing expert** – read articles like this, study on your own, look through books, attend training, learn it yourself and experiment with multiple devices. Then come up with your own test strategy, buy all the "current" phones and devices and test your products yourself,

-or-

2. **Use a *Bluetooth* Interoperability Testing Service** – Frontline Test Equipment is a company that knows *Bluetooth* specifications, profiles, and protocols "in and out" and has already developed the test plans and has a comprehensive device library to test against your devices.

I recommend option number two.

Where to start – Know your customer

You're going to need to look at the use cases of your product and test it according to the way your customer would use it. Let's pick a good example: you are about to release a new *Bluetooth* hands free unit and you want to make sure that it is easy to use and "just works" with all of the major cell phones on the



market. Just assuming that it will should not be an option! You've got to test it the way your customer would use it, with actual phones. Unfortunately *Bluetooth* device manufacturers have not all implemented the *Bluetooth* technology the same way. What seems simple may be a BIG challenge. This is because the *Bluetooth* specification is complex and consistently being amended and updated.

The *Bluetooth* specification has evolved for more than ten years. It's comprehensive and contains highly detailed information about how to design a successful *Bluetooth* enabled product. Even though a *Bluetooth* device may have been built to this specification, there is no way to guarantee that your *Bluetooth* hands free kit will work with a specific cell phone or any other cell phone on the market without testing against that cell phone. And if the cell phone vendor happens to have some mistakes in its code, therefore not letting your device talk to it correctly, the chances are slim that you will be able to get the phone vendor to change their product after it is shipped. What you really need is a *Bluetooth* expert that can help you understand the work-around that you can create on your device, thereby

ensuring that your *Bluetooth* solution will work with the cell phones already on the market.

Who you gonna call?

Frontline Interoperability Testing Services will help you make your products better and your customers happier. With 10 years of experience in the *Bluetooth* technology arena, Frontline is a great resource for you to use to help understand the problems that might exist in your *Bluetooth* implementation. Working with Frontline is like adding 10 years knowledge, expertise and experience to your organization overnight. As a seasoned extension to your QA department, Frontline already has in place the infrastructure you need for fast and cost-effective *Bluetooth* protocol analysis. They have already seen the type of problems that you could encounter, and we will make it possible to solve new problems faster, and at a lower cost.

Bluetooth Interoperability testing is a critical component in the development process. It ensures your product is as robust and reliable as possible and that it will work with other devices on the market.





Staying with the hands free kit example, you are going to need to test your product against all of the right devices. It's more than a mild understatement to say that there are a lot of different cell phones on the market. If not virtually impossible, it would certainly be very costly to test your hands free kit against every cell phone. Frontline has one of the largest device libraries anywhere in the world, and is able to help you determine what specific cell phones you need to test against, and for each geographic market. You have been considering global needs, haven't you?

And they use the very best *Bluetooth* testing equipment available today. Frontline's industry leading analyzers have been developed in-house at Frontline and are in use at all major OEM manufacturers around the world. Alongside our analyzers, the test plans are already written and refined, and will be used by highly trained and knowledgeable staff with strong subject matter expertise. All of this takes place in their secure, dedicated facilities.

Customized test routines

The cost of *Bluetooth* interoperability testing has sometimes been seen as a barrier. Frontline understands that. Because every device is different, and because the *Bluetooth* specifications are broad, Frontline's test plans start out efficient, lean, and customized for your product. Then frequent triggers are added to identify early problems. When errors do occur, Frontline *Bluetooth* interoperability testing doesn't just tell you about them, they partner with you to solve them, providing sniffer traces and working with you to get your product back on track.

You'll never have to worry that your devices are being subjected to unnecessary testing cycles or inefficient schedules.

It doesn't stop at testing. Another thing to test to ensure a good out of box experience for

your customer is usability issues. Your developers did a good job developing the hands free kit, but while they are familiar with *Bluetooth* wireless technology, it's quite possible that they don't have the same level of know-how needed to develop a user interface – one that gives the best out of box experience.

Frontline can help you as they run the test. They will identify inconsistencies, oversights, user challenges they experience as they test your device. If you've been working through a comprehensive test program, you will understand whether it is going to be easy for your customers to understand your user interface. And if it's not exactly working out to plan, you will be able to save more time and money by correcting shortcomings before the hands free kit is on the customer's sun visor.

Your goals should be to keep the product in your customer's hands and not have them deal with your technical support team or return your products. You want each of your devices to work correctly the first time and every time. You want to provide a fantastic customer experience. Using **Frontline Bluetooth Interoperability Testing Services** will help you make this happen.

So, there you have it. *Bluetooth* interoperability testing is vital if any product is going to make it out of the retail sales environment, and then to stay in the hands of a satisfied customer, rather than coming back to you via the returns system, or maybe suffering an ignominious end at the rubbish dump.

Frontline's expertise means that not only can you make the right connection for and with your customers, but that you will be doing it with the best product possible, and at a cost that makes **Frontline Bluetooth Interoperability Testing Service** the obvious choice.

Click on the movie screen here to see Frontline in action



www.fte.com

Snippets

Low energy

Murata partners with Kathrein on UHF RFID solution

Murata has formed a partnership with antenna manufacturer Kathrein to offer a solution that simplifies the implementation of RFID in electronics production. The offering from Murata and Kathrein incorporates Murata's Magicstrap RFID module technology and Kathrein's customised UHF antenna technology.

With the new electronics production solution, Magicstrap RFID tags can be glued to the PCB at the first stage of the process, so that traceability is available from the first step onwards. Process parameters can be written to and read from the user memory in Magicstrap at any point in the production cycle.

4G/LTE/WiMAX

Mobile ops to write billion dollar cheques for LTE

As mobile data traffic exceeds 3.67 exabytes, operators are gearing up to prepare for 4G services as a means to manage that growth, reduce OPEX, and stimulate new revenue opportunities.

According to ABI Research vice president for forecasting Jake Saunders, "We estimate that mobile operators could well be writing out cheques for \$1 billion in 2011. But as vendors offer their fountain pens, there is still uncertainty. There has been some slippage in LTE deployments. In early 2010, there were indications that 20 or more operators were planning to launch commercial services before year's end."

mimoOn announces LTE PHY and software stack

mimoOn has announced availability of its LTE PHY and stack software for macro and small cell basestations for Texas Instruments' (TI) new C66x digital signal processors. mimoOn's Layer 1 SW has been integrated onto TI's C66x-based, flexible, scalable processor targeting LTE wireless infrastructure. mimoOn's LTE software meets the latest version of the 3GPP standard. Written in ANSI-C language, it delivers algorithms such as high-performance channel estimators and MIMO detectors. TI's C66x DSPs offer design and code reuse, since the processors can be scaled to meet the processing demands of macro basestations.

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Bluetooth: You're amazing just the way you are?

by Dean Anthony Gratton

I have been listening to the new album from Bruno Mars, 'Doo-Wops & Hooligans' – it's playing in the background whilst I tackle this month's column, along with my trusty glass of red, of course, to hone my focus! One track, in particular, caught my attention: track two, titled 'Just the way you are'. It has already been covered by a contestant in this year's British X-Factor competition and has successfully made the number one spot in the UK singles chart. The track made me start thinking about Bluetooth. Okay, I know, I know. Ordinarily, most men would be thinking of their spouses, but I started to think about Bluetooth (honestly, I did!). I was wondering how to approach the subject of Bluetooth low energy, along with the several stories that had been surfacing over the last few months. It's a valid proposition, I thought, but regrettably, the wife will never forgive me! I'm going to put that hesitantly aside for now and address that minefield later.

The new Bluetooth testament

Anyway, for now, there are some important questions that need addressing. I have recently read numerous rumours surrounding the technology – none of which have been altogether negative. Far from it in fact! The occasional headline news and rumourmongering seems to suggest that Bluetooth has been rewritten into, if you like, the new Bluetooth testament. Yes, I know there's a new specification, but I'm suggesting that observers across the industry are seeing Bluetooth in a whole new light and I just wanted to better understand and explore what's being said and what has exactly provided Bluetooth wireless technology with its long-awaited revival?

I'm also reminiscing back to the early days of Bluetooth, where eager PR chaps were delivering empty promises. This time though, it seems so different! The chitter-chatter and whispering seems to be void

of such folly and is instead filled with justifiable positivity.

Yes, Bluetooth is amazing – isn't it?

I'll first offer an explanation as to this month's column title. It isn't merely a witty blanket statement and it's far from conclusive. Indeed, I'm not suggesting that Bluetooth's perfect. I hope the subtle question mark stapled to the end of the title will steer you to my audacious supposition – something which I will explain and further explore as we go on. To begin answering this question, I thought I'd put it to the Bluetooth Special Interest Group (SIG). I dropped an email to Starr Million Baker (I just love that name!), Ink-PR and Mike Foley, Executive Director, Bluetooth SIG. I was hoping these guys would have time to respond, as it was rapidly approaching Thanksgiving and I'm always late with my copy! Mike's opening gambit was simply, "Yes, Bluetooth is amazing". Yep, I used the same analogy when asking Mike the question and was pleasantly taken aback. Foley continued, "unlike the subject of Bruno's song, it isn't amazing just because of what it is, it's amazing because of what it is becoming."

The new Bluetooth v4.0 specification now encompasses all three flavours; namely classic Bluetooth, Bluetooth low energy and high-speed Bluetooth. But it's Bluetooth low energy (BLE) that has received a lot of attention and much of the press I've seen surrounds the question: "does Bluetooth low energy operate as low as advertised?" With this in mind, I couldn't leave Mike Foley's resounding statement open – I had a few other cards up my sleeve just to ensure that all areas were covered. Anyhow, I'll return to more of Mike's insight in my final thoughts (does that sound like Jerry Springer to you?).

How low can you go?

I caught up with Tim Whittaker, System Architect at Cambridge Consultants



(cambridgeconsultants.com). I had already fired the question across to them and was pleased to hear that Tim was already working with his team to better understand just how low Bluetooth low energy could go! I dare say, the guys at Cambridge Consultants were also keen to dispel the 'how low' rumourmongering and Tim didn't waste any time either! Baring all, and void of inhibition, he delved into the intricacies of the technology and confirmed, "we decided to seek out some real measurements rather than rely on rumours, so we measured the actual charge drawn from the battery for some example events in a simple BLE device."



Tim recognised that, with any new technology, there's inevitable hype in the initial introduction with, perhaps, unavoidable disappointment when the first generation of technology products appear. I couldn't agree more and assumed at this point that Tim was priming me for "well, the rumours are true!" Nevertheless, Tim added "in the case of Bluetooth low energy, we have been pleasantly surprised."

Here comes the science

Whittaker used a medical device (a glucometer and dosing pump device reporting a diabetic's condition) to illustrate the positive results obtained during his testing. During the lab conditions and assuming worse case scenarios where the device would have to advertise "100 times on average before its manager would respond" along with "five data transfers per day" which would translate to 18.5mC (or 215nA per day on average). With deep sleep still possible, the current consumed represents 1.21µA, which would support a battery life of 21 years (based on a CR2032 cell). Tim confirmed this "is much greater than its shelf life!" Overall, Tim summarised "The evidence that we have seen in recent weeks gives us good cause to expect BLE to perform as advertised."

This is amazing – some wonderful news, but I'm not happy to let it rest there. Admittedly, there are other silicon manufacturers out there, so I decided to speak with Thomas Embla Bonnerud, <TITLE> at Nordic Semiconductors (nordicsemi.no) and Karl Torvmark, Strategic Marketing Consumer at Texas Instruments (ti.com). I asked the same question to both representatives regarding the rumours surrounding the 'how low?' energy issue. Thomas was first to confirm Cambridge Consultants' findings. He suggested, "running on a chip designed for BLE and power optimized, it [BLE] will deliver on the promises" where, he continues "some solutions will deliver better battery lifetime than even the SIG projected." Someone please pinch me; this is going extremely well. Okay, my attention is now turned to Texas Instruments. Karl in his exuberance offered me a dissertation, which I'm confident, could be submitted to Cambridge University, where he would inevitably be awarded a PhD! Unfortunately, I'm unable to reproduce his dissertation in its entirety

here, but I'll do my best in extracting and paraphrasing the highlights (I mean the best bits as there was nothing overtly negative!).

BLE compares favourably with its competitors

Karl opened up with "some of the earlier current estimates for BLE were unrealistically low," whilst acknowledging that there are numerous processing and management activities, which are all required to enable a BLE system to become energy effective. Incidentally, TI currently has a single-mode system, which has successfully completed v4.0 certification in September. Karl acknowledges, if you compare current TI BLE-enabled systems with previous generations of TI Basic Rate (BR) / Enhanced Data Rate (EDR) devices there are obvious power savings. What's more, Karl argues against focusing on one particular aspect of radio functionality, namely radio peak current. He suggests that all parameters such as radio-on time, sleep currents, start-up times and so on are equally as significant and that any analysis needs to ensure that these factors are all taken into account.

Texas Instruments have indeed undertaken such an analysis for a BLE slave in an application context and, as shown in Figure 1, they afford us a realistic perspective of the power breakdown. Karl confirms, "For a BLE slave communicating once a second, we are consuming 30µA on average. This is the total system, including the entire BLE software stack, running on our CC2540, and is based on actual, measured data. To put this in perspective, 30µA corresponds to 330 days of battery life using a CR2032 coin cell." Leaving no stone unturned, Karl also considers the

low energy competition. He suggests "I don't think Bluetooth low energy has anything to be ashamed of", confirming that Bluetooth low energy measurements add up and are favourable when compared with ZigBee, low power Wi-Fi and ANT Wireless, for example.

So, is Bluetooth amazing after all?

In essence, the measurements and testing have provided sufficient evidence to suggest that Bluetooth low energy does deliver on its low energy promise - and then some! So, returning to my supposition or question, "is Bluetooth amazing?" I have to admit, Foley wasn't aware at the time of what kind of feedback Cambridge Consultants were going to provide and he wasn't aware that I had approached Nordic and TI for comparable answers, commenting: "I trust any evaluation you perform will look into multiple suppliers to give an honest overview of what the technology is capable of." He can rest assured that it was as he foresaw. Only three examples in this feature, but ultimately they all demonstrate that the technology does what it says on the box!

It seems that the New Year may prove to be a prosperous year for Bluetooth, as shipments for the technology are forecast in their billions. As Mike proudly confirms, "Every analysts' forecast I have seen confirms this opinion" and he finally adds "the Bluetooth SIG expects billions of single-mode low energy products to be created and deployed."

So, maybe, just maybe, Bluetooth is amazing after all...?

Until next month ...

That's it for another month and next time I'll see you in 2011 – honestly, where does the time go? So, this is where Dr G signs off this year and I wish you all a great Christmas and a spectacular New Year. Take care.

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.

You can contact Dean at incisor@deangratton.com and follow him on Twitter @grattonboy, but you can read more about his work at www.deangratton.com.

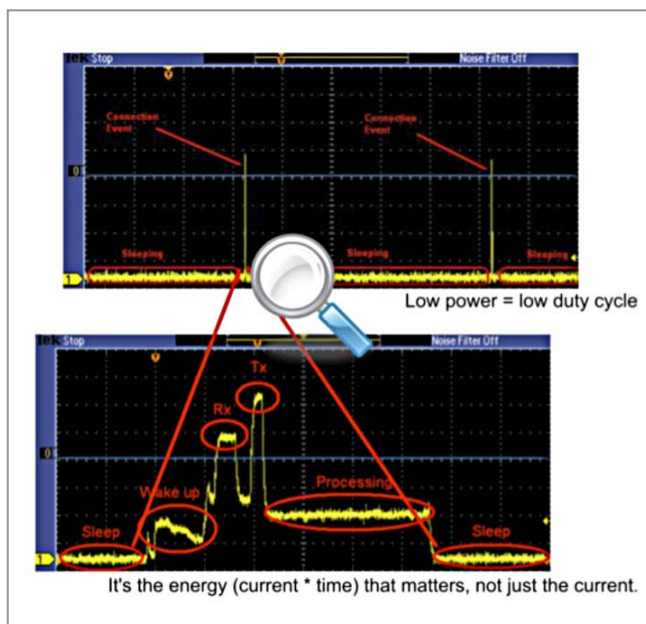
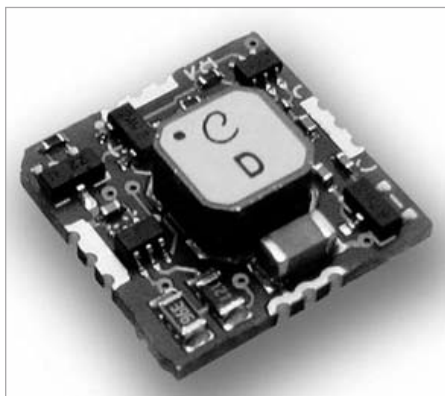


Figure 1: BLE power consumption (courtesy of Texas Instruments).

low energy wireless news



EnOcean taps heat as energy source for energy harvesting modules

EnOcean's ECT 310 DC/DC converter enables batteryless wireless modules to use heat as their power source. Electricity is produced from heat emitted from machinery parts, radiators or even the human body.

This is the third energy source exploited by EnOcean for its service-free wireless modules, the other two being motion and light. The ECT 310 works as an interface between thermoelectric converters and EnOcean modules such as the bidirectional STM 300 sensor and the plug&play STM 312.

The ECT 310 is an ultra-low-voltage DC/DC converter, which converts low input voltage upwards of 20mV into conventional electronic output voltage of 3 to 4V. The energy obtained in this way powers EnOcean wireless modules. With its plug&play capability, the ECT 310 can be combined with a thermoelectric converter and the STM 300 or STM 312 energy harvesting wireless modules for the implementation of batteryless sensors or actuators powered solely by heat. The bidirectional STM 300 is part of EnOcean's Dolphin platform and is able to both transmit and receive wireless signals.

EnOcean told Incisor that using heat to produce power opens doors to new applications for energy harvesting wireless technology, in building and industrial automation as well as in medicine. For example, it enables the use of heating cost allocators and temperature sensors, control engineering or sensors for preventive diagnostics wherever heat is available.

"You find differences of temperature in diverse environments: in manufacturing, in heated or air-conditioned premises, through solar radiation, on motors and engines or even on humans themselves. That makes heat an ideal extra energy source for our self-powered wireless modules," says Armin Anders, VP

product management and co-founder of EnOcean. "Supported by the ECT 310 you can implement our wireless solutions wherever there's a temperature difference, at least in part, of 2 degrees or more. So we're anticipating an even faster pace in the development of applications for energy-efficient automation and energy harvesting wireless sensor technology."

Texas Instruments upgrades its commitment to EnOcean Alliance

TI has become a promoter of the EnOcean Alliance, of which it has been a member since 2008. TI told Incisor that by upgrading to promoter status it is reinforcing its commitment to EnOcean's energy-harvesting wireless technology and will provide its expertise in energy-efficient integrated circuits (ICs). The EnOcean Alliance has more than 160 members worldwide, including leading companies from the building technology and electronics sectors.

"With Texas Instruments as a new promoter in the Alliance, we can boast a high profile, global partner to spread the benefits of energy harvesting technology," commented Graham Martin, chairman of the EnOcean Alliance. "This in-depth cooperation will contribute to defining the energy harvesting wireless technology and setting it up as a standard for energy-efficient buildings."

TI has collaborated with EnOcean since 2005 and TI ICs are used in a number of EnOcean modules. In June 2010 the two companies announced their intention to expand collaboration in the area of energy harvesting technology.

"EnOcean's batteryless and wireless technology opens new opportunities for energy-efficient buildings," said Volker Prueeller, marketing manager for TI's Low-Power RF products. "In our promoter role, TI can work closely with other members of the alliance to

increase development of energy harvesting technology."

[Click this link](#) to watch IncisorTV's EnOcean movie.

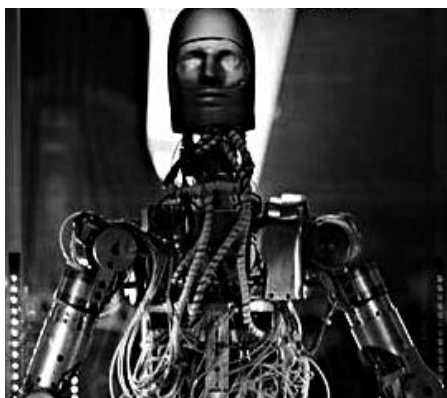
PassivSystems goes with Ember, needs spellcheck...

British company PassivSystems (*sigh.... - 'guess that spelling must have seemed like a good idea to somebody*) has integrated Ember's ZigBee chips and ZigBee PRO networking protocol software into its PassivEnergy (oh, no!) home energy management product, giving users 'unprecedented control over their household's heating and hot water'.

PassivEnergy apparently manages homeowners' energy usage based on the way they live. Once it learns a homeowner's living environment preferences, the system regulates automatically, turning up and down the heat and hot water based on occupancy. It also integrates with other alternative energy sources, such as solar panels, so that a homeowner can manage and monitor energy generated from renewables as well as from their regular supplier. The system is controlled using the PassivController (*no further comments necessary*), a wall-mounted or free-standing touch screen that provides wireless management of heating and hot water, as well as insight into how other energy sources are performing.

An Ember-enabled PassivHub provides the central intelligence for the system and coordinates wireless communication with all of the sensors, switches, actuators and displays in the home, as well as providing an Internet broadband gateway for remote communications away from the home. PassivSystems chose Ember's EM200 Series chips – EM250 system-on-chip (SoC) and EM260 network co-processor (NCP) – with the EmberZNet PRO ZigBee software stack running the ZigBee Home Automation Profile.

low energy wireless news



Wireless mind gaming with brain control headset

Puzzled by that headline? So were we! To explain..... ultra low power (ULP) RF specialist Nordic Semiconductor has paired up with wireless mind-control specialist, Emotiv, which is employing Nordic 2.4GHz proprietary transceivers in the off-the-shelf EPOC Neuroheadset platform that Emotiv is now actively targeting at the mainstream consumer gaming industry.

The Emotiv EPOC headset is essentially a wireless, real-time brain wave (EEG) acquisition device optimized for consumer use. It uses 14 non-invasive sensors to measure unique brain wave signatures produced when a wearer simply 'thinks' of up to 13 gaming-applicable cognitive actions: left/right, push/pull, lift/drop, rotate in six dimensions, and vanish. (What this means, for instance, is that if the wearer thinks 'push' a gaming object will be propelled away from them, and if they think 'pull', it will be drawn towards them.)

But wait – as if that's not wacky enough, the headset – which additionally incorporates a gyroscope to detect movement – is more than just a brain-powered joystick: It can also detect facial expressions and even emotional states (e.g. excitement, calmness, tension, frustration, engagement) and so 'knows' how the gamer is feeling or responding, which means on-screen characters or games could be designed to respond 'empathetically'.

In operation, Nordic told Incisor that the EPOC headset requires no specialist training or equipment (such as a trained technician or conductive gels) to use beyond a simple on-screen guided initial setup and learn procedure (that can be designed as part of a game) to ensure all 14 sensors (located on self-adjusting arms) are

correctly positioned and making adequate electrical contact with the user's head. Uniquely in the case of the EPOC headset, this includes being able to operate through human hair – a natural electrical insulator.

"What each of the 14 EPOC sensors is doing is taking 128, 16-bit sample 'snapshots' – every second – of the electrical fluctuations [EEG brain wave signals] resulting from the chemical activity of billions of active neurons in the brain measured on the μV scale," explained Geoff Mackellar, Research Manager and CTO at Emotiv.

This data is then transmitted using a proprietary Nordic 2.4GHz transceiver to a twin transceiver located in a USB wireless dongle plugged into a computer USB port. The ultra low power operational characteristics of the Nordic transceivers helps the EPOC's rechargeable lithium-polymer battery to run for up to 14 hours of continuous operation between charges – enough to satisfy even the most hard-core gamers.

"What all this means is that gamers can now interact with the virtual world by the power of thought alone," Mackellar continued. "And this will enrich the gaming experience beyond all recognition as it will allow gamers to interact with gaming content in entirely new and seemingly magic ways that can include accurate emotional responses from virtual characters. In fact it could be just what the gaming market needs to take it to the next 'must have' product level."

"But even this could be just the tip of the iceberg," adds Tan Le, co-founder and president of Emotiv. "I believe that our wireless mind-control technology has begun a trend that means that one day, gamers may not need an input device like a joystick or gamepad at all to play a game, instead they will interact directly with the virtual gaming world by using the power of thought alone. And although the initial

target for our product is the global consumer gaming industry, the potential is there to transform the way that we interact with all machines in the future."

This sounds pretty amazing, to us Incisorites. OK, so the wireless bit is not that revolutionary, but what it is being used for sure is!

Can't wait to try this one.

Smart Energy to be largest growth for 802.15.4 and ZigBee

In-Stat believes that ZigBee has been languishing as a technology for nearly 10 years, unable to find an application that would provide a launching pad for its mass adoption. That search may be over. With government stimulus and mandates forcing utilities to better manage electricity usage, In-Stat notes that smart energy is gaining traction as the largest volume growth opportunity for 802.15.4 and ZigBee, helping to push forecasts of chip and module shipments to exceed three quarters of a billion units by 2014.

"Energy management organizations as well as IT companies like Google, are also taking an interest in helping drive ZigBee to the forefront of network adoption," says Brian O'Rourke, Principal Analyst. "Proprietary solutions still have a large share of the market, but because government measures require standards-based solutions, ZigBee stands to benefit significantly in the long run."

O'Rourke told Incisor that In-Stat expects to see early growth in numerous market segments throughout the forecast period. However, aggressive growth is not expected until 2015 and beyond, and industrial process control will be the second largest application by volume.

RF remote control nears tipping point, says Nordic CEO

Age-related failings in traditional infrared (IR) remote control technology are preventing end users from navigating modern digital media services and content libraries with ease and simplicity, which isn't helping their success. These problems are solved by modern RF technology that delivers the performance and features consumers require at a mass-market price point

Svenn-Tore Larsen, CEO of Ultra low power (ULP) RF specialist Nordic Semiconductor, told Incisor that the adoption of RF remote control technology in place of traditional IR is approaching a tipping point, because RF now offers the performance and features demanded by consumers at pricing levels acceptable to the mass market.

"While nobody's claiming that an RF remote control is ever going to be lower cost than an IR unit any time soon," explained Larsen, "one-button-one-operation, line-of-sight-access-only IR will simply become so frustrating that end users will be happy to pay the small premium necessary to access the enhanced navigation and control features supported by two-way (bi-directional) RF technology." This includes the use of touchpads, scroll wheels, touchscreens, and LCD displays that can display, for example, 'live' playing status info and album artwork, as well as non-directional – often through-wall – operation.

"These ease-of-use advantages are driving RF remote control technology into the mainstream by raising consumer awareness of what's possible and making IR remote controls look increasingly dated and unappealing in comparison," continued Larsen. "In addition, the price of RF remote controls continues to fall and is approaching a point whereby RF controllers are becoming attractive to consumer electronics manufacturers for routine bundling with their products."

Several research studies have also independently arrived at the same conclusion. Strategy Analytics, for instance, says that early adopters of advanced Internet TV services (such as Apple TV, Hulu, PlayStation Network



video, Netflix on Xbox Live, and AT&T U-Verse) are demanding improved controllers, and that when questioned consumers expressed a preference for simple, pointing 'wand' controllers for navigating their way around Internet-connected TVs.

In addition, major consumer electronics (CE) giants such as Philips are now offering RF remote control platforms to OEM manufacturers of digital media devices such as music players, TVs, and PCs (e.g. the Philips Bellagio RF remote control platform from Philips Home Control), and a growing number of universal RF and IR remotes are being launched.

And the Apple iPhone, iPod touch and/or iPad are now being used by a number of

CE manufacturers as a remote control using (typically free) downloadable apps to provide the user interface (e.g. Meridian in its award-winning Sooloos digital media system).

"The RF remote control market will be served by a combination of proprietary and standards-based solutions dependent on the needs of the end application," concluded Larsen. "Nordic Semiconductor is well positioned to provide both types of remote control with its proprietary products and forthcoming Bluetooth low energy wireless technology solutions. Furthermore, the proven 2.4GHz wireless connectivity technology Nordic pioneered for PC peripherals (e.g. wireless mice, keyboards and joysticks) is exactly the same technology required for next generation RF remote controls

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Bluetooth SIG re-structures as part of push to 15 billion device shipments.



Here comes Bluetooth high speed wireless technology!



Frontline Test Equipment – the importance of interoperability testing.



Rococo talks Bluetooth LocalSocial – combining proximity with location.

Your company can be featured on Incisor.TV. Contact us now to discuss opportunities, including at the 2011 Consumer Electronics Show

high speed wireless news



Bluetooth trailblazer supports Wi-Fi Direct

We probably shouldn't read too much into this, but CSR – for many years the leading Bluetooth semiconductor company – tells us that its latest connectivity platform CSR9100 is ready for Wi-Fi Direct. The CSR9100 connectivity platform is designed to meet the requirements of the Wi-Fi Alliance's Wi-Fi Direct certification as well as support for the latest Bluetooth standards.

The Wi-Fi Direct standard allows for two modes of operation. The first allows a device to act as an access point (AP), also commonly known as a hotspot, allowing a number of Wi-Fi stations and devices to connect to it and share services. This functionality also enables the "mobile warrior" use case in which users can share 3G or 4G data pipes with a number of stations connected to it via Wi-Fi. The second mode of operation is based on point-to-point where Wi-Fi devices will be able to make direct connection groups to do things like print, sync, and share content, even when an access point or router is unavailable.

So, CSR would seem to be promoting a solution that is destined to fight with Bluetooth in the WPAN sector.

Not everyone is convinced of Wi-Fi Direct's proposition, and various commentators have suggested that Wi-Fi Direct is an attempt to shoe-horn Wi-Fi into WPAN applications, when it just doesn't really fit. Mike Foley, executive director of the Bluetooth Special Interest Group commented: "If the new Wi-Fi Direct product is a dongle added to a laptop and one drives the experience from the laptop, scenarios such as printing could be workable (assuming of course the laptop already has the print driver loaded). But it breaks down quickly

when attempting to connect that laptop with a mobile phone or other device." Read Foley's full piece at [his blog 'Wi-Fi Direct \(Again\)?'](#) dated 26th October.

Incisor is preparing a feature on Wi-Fi Direct. Should anyone out there, from CSR or otherwise, want to give us comments on the Wi-Fi Direct versus Bluetooth debate, please contact Vince Holton. We will do our best to provide a balanced view!

We got a bit side-tracked there. Back to CSR

Wi-Fi Direct will also be supported through CSR's new standalone Wi-Fi products, CSR6030 and CSR6031. Both the CSR9100 connectivity platform and the CSR6030 and CSR6031 products are apparently already in design-in stage with a number of CSR's customers, and end-products are expected to be on the market in 2011.

Demand for 802.11n spurs Wi-Fi market

Since wireless network infrastructure adoption is increasing around the world, demand for Wi-Fi equipment is growing rapidly. According to recent ABI Research's Wi-Fi equipment market data, worldwide Wi-Fi access point shipments exceeded 18 million in the second quarter 2010. These shipments include wireless routers, access points and gateways in both consumer and enterprise markets.

Worldwide Wi-Fi access point shipments in the second quarter of 2010 grew 6% compared to the first quarter. Total shipment volumes were strong in both enterprise and consumer market segments.

"In both consumer and enterprise sectors, demand for 802.11n product is

growing rapidly. In the second quarter, 802.11n products were the key drivers of Wi-Fi equipment market growth," says research director Philip Solis.

A total of 5.9 million of 802.11n devices were shipped in the second quarter. This represents a 15% increase over the first quarter. Due to increase interest in upgrading from 802.11a/g to 802.11n technology, the deployment of 802.11n products is expected to accelerate even further in coming years.

At present, D-Link leads in the consumer access point market with a 19% share. After D-Link, Netgear and Linksys are positioned second and third for access points in SOHO/Consumer markets. In the enterprise market segment, Cisco maintains the largest market share and Aruba networks is the second-largest player, with market shares of 54% and 13% respectively.

Revenue increased 5% in the second quarter, while the average selling prices of Wi-Fi access points dropped approximately 1%. Research associate Khin Sandi Lynn notes, "Due to increasing competition between manufacturers aiming to provide better and more cost-effective solutions, the average selling price of these devices is expected to fall still further."

high speed wireless news



WiGig Alliance and VESA to collaborate

The Wireless Gigabit Alliance (WiGig Alliance), which, as Incisor has previously reported, is pushing for the worldwide adoption and use of 60 GHz wireless technology, and the Video Electronics Standards Association (VESA), which looks after global display standards, have signed a cooperative agreement to define (their version of) the next generation standard wireless display technology. VESA and the WiGig Alliance say they will share technology expertise and specifications to develop multi-gigabit wireless DisplayPort capabilities. A certification program for wireless DisplayPort products will be developed in parallel.

The WiGig-VESA collaboration boasts that it will deliver a wireless display capability with image quality and I/O experience equal to that of wired interfaces.

"WiGig technology is a perfect match for DisplayPort since it provides the multi-gigabit bandwidth, packet architecture and bi-directional I/O capabilities needed to support the DisplayPort v1.2 feature set and beyond," said Bruce Montag, VESA chairman. "Wireless DisplayPort will enable new connectivity options in a wide range of devices, from lower-power handhelds to tablets, notebooks, monitors, projectors and HDTVs. We are thrilled to begin defining the specification and certification program for wireless DisplayPort products."

Dr. Ali Sadri, WiGig Alliance president and chairman added: "With many proprietary wireless A/V technologies on the market, our vision is to standardize a wireless display interface, and we are excited to partner with VESA to extend multi-gigabit wireless functionality to DisplayPort technology."

Meanwhile, the WiGig Alliance has announced the feature completion of the WiGig version 1.0 A/V and I/O protocol adaptation layer (PAL) specifications. The organization is planning to publish its specifications in early 2011. The application specifications have been developed to support specific system interfaces, including extensions for PC peripherals and display interfaces for HDTVs, monitors and projectors.

There have been various adjustments to the WiGig membership. AMD has elevated its WiGig membership level from Contributor to Board of Directors, and CSR and Nitero have joined WiGig as Contributors.

Motor City meets Silicon Valley

Overall, the market for Wi-Fi chips is very diverse and encompasses many different areas, says market research company In-Stat. Traditionally, the automobile industry was one market where Wi-Fi chips hadn't been adopted, but In-Stat believes that is rapidly changing. Taking their cue from OnStar, automotive companies have discovered that in addition to selling the device, there are profits to be made from selling services as well. In-Stat is predicting that more manufacturers will incorporate mobile hotspot features into cars whether users opt for them at purchase time or not, driving automotive application Wi-Fi chipset revenues to eclipse \$100 million by 2015.

"The cost of adding mobile hotspot ability to a broadband-capable system, such as OnStar, is only roughly \$25 per car or less," says Allen Noguee, Principal Analyst. "In fact, Ford has announced it is doing just that, adding Wi-Fi to all SYNC-2-equipped vehicles starting this year. Ford

even made headlines recently when it announced that it was using a car's built-in Wi-Fi to configure and customize each vehicle in the factory where it is being built."

Based on its mainstream Wi-Fi research, In-Stat is suggesting:

- Wi-Fi chipsets shipped will exceed one billion units per year by 2012.
- Devices with the largest revenue growth rate over the next five years will include mobile Internet devices, automotive applications, E-readers, and DVD/Blu-Ray players.
- Wi-Fi chipsets for notebook computers and mobile handsets are each expected to have revenue of over \$1B in 2015.
- While the notebook PC once "was" the market for most Wi-Fi chipsets, handsets have now passed notebook PCs.

Somewhat undermining its own 'Wi-Fi revolution in the car' forecasts, In-Stat concedes that over the next five years, the largest drivers of Wi-Fi semiconductor revenue will be notebook computers, cellular handsets, personal media players, and digital televisions.

4G/LTE/WiMAX news



ST-Ericsson and Nokia push TD-LTE in China

ST-Ericsson and Nokia are developing TD-LTE demonstration devices for China Mobile.

At the recent Shanghai Expo, Nokia and ST-Ericsson demonstrated video streaming and other multimedia services on a TD-LTE Nokia Booklet containing ST-Ericsson's M700 TD-LTE modem. ST-Ericsson's told Incisor that it's LTE modems, which can download data at speeds of up to 100 Mbps, enable mobile subscribers to enjoy high-definition video streaming, video conferencing, online gaming, rapid file transfers and other demanding multimedia services.

China Mobile is trialling TD-LTE. Globally the technology is referred to as LTE TDD, which has a wide interest from operators around the world.

"Although LTE is still in its infancy, this sophisticated technology has the potential to bring a raft of compelling high-speed multimedia services to hundreds of millions of consumers all over the world," said Heikki Koivu, Vice President, TD-SCDMA Business Team, Nokia. "Our co-operation with ST-Ericsson will enable us to demonstrate LTE capable devices and experiences as TD-LTE is developing towards commercial maturity"

"After driving development of both LTE and TD-based mobile technology for several years we are now ready to supply market-leading TD-LTE solutions," said Pascal Langlois, Senior Vice President, Chief Sales and Marketing Officer of ST-Ericsson. "Our co-operation with Nokia, the world's number one mobile phone supplier, will strengthen our ability to support mobile operators deploying LTE."

Maravedis predicts LTE deployments to exceed 300 operators in 2016

Research company Maravedis predicts that there will be over 350 million LTE subscribers by 2016, while the number of WiMAX subscribers should reach 50 million.

"Market forecasts have been revised to reflect the economic slowdown and the progress made by the LTE ecosystem," said Maravedis Research Director Adlane Fellah.

With over 600 WiMAX deployments, 185 devices and 62 base stations certified, the worldwide WIMAX industry accounted for over 13 million subscribers projected at the end of 2010. The WiMAX subscriber market share breakdown by standard was 57% mobile, 25% fixed and 17% proprietary in Q2 2010.

Maravedis also anticipates that 14 LTE networks will be operational worldwide by the end of 2010. "The list of operators committed to LTE has grown to 127 members as of the end of Q3 2010," said report co-author Esteban Monturus. "As several 4G spectrum auctions take place before the end of the year (notably in Europe), more operators will feel the need to solidify their plans regarding LTE," he added.

"WiMAX remains a viable alternative for broadband connectivity, particularly where migration to full mobility is not expected," said Cintia Garza, Senior Analyst. "While the issue of migration to LTE/TD-LTE equipment is being met, operators must still consider how the subscriber device base can be converted. The use of multiple-mode WiMAX/LTE is an option now worth considering."

Anritsu approves GCF test platform

Anritsu's ME7873L RF Conformance Test System (RFCT) has become the first test system to achieve GCF test case approvals for 80% of LTE terminal RF test cases required for terminal certification.

Long Term Evolution (LTE) offers data speeds 5 to 10 times faster than current 3G mobile communications. With some of global operators close to rolling out LTE services before the year end, leading LTE terminal makers can utilize these test cases in preparation for future GCF Terminal certification. As a condition for starting terminal certification, GCF requires that 80% of each group of test cases used for examining conformance with LTE specifications must have been validated and approved on a single Test Platform.

Anritsu's ME7873L RFCT received this GCF validation milestone for the initial group of RF test cases at the recent GCF meeting held in October, and Anritsu told Incisor that this makes the ME7873L the world's first test platform for RF Conformance Tests to offer all of the test cases included in this GCF milestone and approved by GCF. Additionally, these GCF validated test cases include covering the RRM test-marking another world first.

In addition to its RF conformance test solution, Anritsu offers LTE protocol conformance test solutions to satisfy the requirements for GCF certification testing. Anritsu expects its protocol solutions to meet this milestone before the end of 2010.

4G/LTE/WiMAX news



SK Telecom launches Data Femto service

picoChip technology has been selected by South Korean wireless equipment vendor Contela to supply SK Telecom (SKT) for a data-only femtocell deployment called Data Femto. The service is optimized to offload traffic and solve congestion issues. Contela has been selected by SKT as the sole vendor for the service which is to be launched this year. The SKT Data Femto service will be South Korea's first commercial 3G femtocell deployment. It is also the world's first commercial service to use the 3GPP luh interface between the access point and gateway.

Contela is supplying SKT with an end-to-end solution, including not only the FAP (Femtocell Access Point) but also the FMS (Femtocell Management System) and FGW (Femto Gateway).

"Operators around the world are facing the challenge of rising network traffic and are turning to femtocells to solve the problems of capacity and offload," said Rupert Baines, VP of Marketing at picoChip. "Given the importance of data and given the sophistication of the wireless market it is no surprise that Korean operators are taking advantage of the technology, and developing innovative approaches. Based around the latest standards from 3GPP and the Femto Forum, Contela has developed an end-to-end solution which dramatically improves network capacity, solving the 'data deluge' that operators are now facing."

Dell'Oro recently forecast that revenues from worldwide femtocell deployments will be \$4 billion by 2014, ushered in by a significant increase of shipments next year, and an inflection point in 2012.



Shipments should reach 62 million in 2014, the firm said. Seventeen carriers have already launched commercial femtocell deployments worldwide, with commitments from three other carriers, one of which is SKT, to launch a commercial

mimoOn announces LTE PHY and software stack for TI C66x DSPs

mimoOn, which builds LTE software implementations for programmable radio platforms, has announced the availability of its LTE PHY and stack software for macro and small cell basestations for Texas Instruments' (TI) new C66x digital signal processors (DSPs).

mimoOn's Layer 1 SW has been integrated onto TI's C66x-based, flexible, scalable processor targeting LTE wireless infrastructure. mimoOn's LTE software meets the latest version of the 3GPP standard. Written in ANSI-C language, it provides algorithms such as high-performance channel estimators and MIMO detectors. TI's C66x DSPs offer equipment manufacturers the advantages of design and code reuse, since the processors can be scaled to meet the intensive processing demands of macro basestations.

According to Brian Robertson, VP Sales & Marketing of mimoOn, "Going into 2011, the market is now demanding a fully integrated SoC with LTE software that enables faster time to market, in combination with efficient reuse of SW. Our continuing partnership with Texas Instrument demonstrates the commitment and leadership that both companies bring to the wireless infrastructure market."

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events



DATE	EVENT	LOCATION	NOTES	LINK
Jan 6 - 9 2011	International Consumer Electronics Show (CES)	Las Vegas, Nevada, USA	-	www.cesweb.org/
Jan 26 - 27 2011	DECT World & CAT-iq 2011	NH Barbizon Palace, Amsterdam, The Netherlands	-	http://www.dectconference.com/
Feb 6 - 9 2011	ISPO – the International Sports Business Network	New Munich Trade Fair Centre, Munich, Germany	Bluetooth SIG participating at Wearable Technologies Pavilion	http://www.ispo.com/en/Home/cn/vi/vicn/dates_facts
March 15 - 19 2011	ISH 2011	Messefrankfurt, Frankfurt, Germany	Trade fair: Building, Energy, Air-conditioning Technology, Renewable Energies	http://www.ish.messefrankfurt.com/
April 11 - 14 2011	Bluetooth SIG All Hands Meeting	Intercontinental Hotel, Budapest, Hungary	Annual meeting for all Bluetooth SIG members	http://www.bluetooth.org (requires member logi-in)

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