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NextGen   (UL)   NORDIC SEMICONDUCTOR   TRaC

the relentless march of ulp

It is hard not to focus on the ultra low power sector of the short-range wireless industry at this time. It is where all the development is happening.

With this massive swing to low power, it does make you wonder why it didn't happen this way at the outset? Perhaps Bluetooth should have been what Bluetooth SMART is from the beginning? It seems there's not a lot of focus on developing classic Bluetooth at the moment. Or completing the Bluetooth circle by developing a high-speed solution, filling the current gap for a viable wireless data streaming solution. Even the Wi-Fi/WiGig/60GHz people seem to have gone quiet on this, which is puzzling, as the explosion in the use of portable media-capable devices must surely make a video streaming solution not only desirable, but vital. Come back Ultra Wideband, all is forgiven!

Anyway, back to the current flavour of the moment – low power wireless. In this issue we set out to examine what is going on across the wireless ecosystem, and Incisor's main review looks at each of the well-known technologies – Bluetooth, Wi-Fi, ZigBee, EnOcean, DECT/ULE, NFC, RFiD etc and sets out to describe the status quo (note the lack of capital letters – we're not reviewing the ancient, cheesy, British rock band).

As usual, completing this review was a case of working with organisations that do understand PR, and we thank you very much, and those that do not. In some cases, pulling teeth would be easier.

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

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NextGen tackles the job of making in-car connectivity simpler.

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ABI: "Bluetooth will be an essential tool for building the Internet of Everything"

Fanning the fire that is the debate surrounding which wireless technology will succeed in the anticipatedly massive Internet of Things market, ABI Research estimates that the installed base of Bluetooth-enabled devices alone reached 3.5 billion in 2012 and is forecast to grow to almost 10 billion by 2018 - without taking into account many other technologies such as Wi-Fi, ZigBee, and cellular.

The emergence of standardized ultra-low power wireless technologies is one of the main enablers of the Internet of Everything (IoE), says ABI, with semiconductor vendors and standards bodies at the forefront of the market push, helping to bring the IoE into reality. 2013 is seen by many as the year of the IoE, but it will be many years until it reaches its full potential. The next 5 years will be pivotal in its growth and establishment as a tangible concept to the consumer.

"There has been (and still is) a lot of hype about IoE with some protagonists predicting 10s of billions of IoE devices populating the planet over the next 5 to 10 years," said Peter Cooney, practice director. "In reality the market is already huge, and Bluetooth will continue to be one of the key technologies that enable IoE market growth."

Bluetooth Smart Ready device shipments are growing rapidly and this is creating a large number of "hub" devices that Bluetooth Smart "node" devices can connect to. Initial growth has been strong in the health and fitness market, but the massive Bluetooth eco-system is also driving growth in many other markets including keyboards, remote controls, watches, toys, door locks, and many more.

"The smartphone will continue to be the primary market for Bluetooth and the catalyst for growth of the emerging Bluetooth v4.0 ecosystem, but strong adoption is also occurring in the PC, mobile consumer, and connected home segments," added Cooney. "Hub devices have driven the first growth phase for Bluetooth; the second growth phase will be driven by Bluetooth smart enabled nodes/sensors."

ETSI publishes draft standard for White Space spectrum

Incisor has been tracking developments in the use of TV White Space spectrum in the sub-1GHz band, and following the emerging Weightless standard. Now we learn that standards body ETSI has been working on a draft standard too. The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive.

The methods and principles used in ETSI's document for the operation of TV White Space devices in the band 470 MHz to 790 MHz are taken from the ECC Report 186 [i.5], which explains the regulatory principles under which it is envisaged such devices will be permitted to operate in Europe.

The present document applies to TV white space (TVWS) devices controlled by a white space database and which operate in the TV Broadcast Band 470 MHz to 790 MHz.

The present document applies to the following radio equipment types:
1) Master white space device
2) Slave white space device

The document applies to TVWS devices with integral, dedicated or external antennas, where TVWS devices using external

antennas are intended only for fixed use and is intended to cover the provisions of Directive 1999/5/EC [i.3] (R&TTE Directive), Article 3.2, which states that "..... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

The full ETSI document is available at this link.

Nordic sponsors best player in chess history

Ultra low power (ULP) RF specialist Nordic Semiconductor is sponsoring Magnus Carlsen, the youngest player to be ranked number one in world chess and the highest ranking points holder in the history of the game, in a three-year deal.

Norwegian Carlsen rose to the top of the world rankings in January 2010, just after his 19th birthday. In December 2012, Carlsen broke the 13-year ranking point record held by Gary Kasparov by gaining 2861 Elo rating system points against Kasparov's best of 2851. He has so far peaked at a record high of 2872, earning him the right to be called the best player in chess history. In 2013, Time magazine ranked Carlsen among the 100 most influential people in the world. Carlsen takes on the reigning world champion, Vishny Anand, in a 12-match playoff for the world championship title in Chennai, India, later this year.

Nordic's CEO, Svenn-Tore Larsen told Incisor, "We are delighted to have the opportunity to sponsor Magnus Carlsen. His presence will boost staff motivation and help us recruit the best people, but we will gain much more than that from this exciting association. The core value of this sponsorship is the ability of Magnus to act as a Nordic ambassador and open doors at the very highest level. He has access to people and events normally reserved for dignitaries such as Presidents."

news

Mobile wireless accessory shipments rocket

New findings from hi-tech analysts at Juniper Research have revealed the high growth surge expected in the emerging Smart Wireless Accessory sector.

Juniper believes that shipments of app-enabled smart wireless accessories will approach 170 million by the end of 2018, compared to over 18 million this year. At that time the market will be dominated by consumer electronics (CE) and fitness accessories, although in the longer run healthcare smart wireless accessories are expected to gain most traction.

Juniper's latest report, 'Smart Wireless Accessories: CE, Fitness, Health, Payments & Enterprise 2013-2018' noted that significant growth is expected across a very wide breadth of applications, comprising areas as diverse as video eyewear, baby monitoring, home security & monitoring and TV transmission equipment.

Report author Nitin Bhas told Incisor, "The actual take up of CE smart wireless accessories will depend on whether companies succeed in creating accessories that will capture the imagination of the consumer. Nevertheless, the multiplicity of potential use cases means that the consumer electronics category represents one of the most important areas in which smart wireless accessories will develop".

The app-enabled smart wearables market, a particularly hot niche within the wireless accessories sector, has already seen significant numbers of deployments particularly in the health and fitness area. Juniper's report forecasts an increased adoption of other wearables such as smart watches and to an extent smart glasses

towards the latter part of the forecast period, owing to recent developments within the wearable segment. Juniper believes that the market entry of players such as Apple and Google will further drive the adoption of premium wearable devices, and at the same time publicising and educating consumers.

Juniper also observed that the fitness and healthcare sector together will account for over 50% of the devices shipped this year and suggested that a multi-channel strategy is essential to gain traction in the race to secure a place in this new market.

Hybrid indoor location to dominate billion unit smartphone market

Apple's acquisition of WiFiSLAM has brought smartphone indoor location technologies to the fore, observes ABI Research. With over 1 billion new smartphones forecast to utilize indoor location technologies in 2018, the company believes that there are still significant opportunities for companies with the right technologies and strategies.

In ABI Research's latest Location Technology report, "Smartphone Indoor Location Technologies", it has forecast the adoption of different indoor location technologies, and the companies best placed to be successful. "We see a significant trend towards hybridization, with Wi-Fi, BLE and sensor fusion vita," senior analyst, Patrick Connolly told Incisor. "By 2014, hybrid solutions will have already surpassed standalone indoor location technologies on smartphones, with Wi-Fi and sensor fusion hybrid solutions reaching over 900 million units in 2018. Longer term, technologies around optical light, object recognition and LTE-direct are all forecast to offer differentiation."
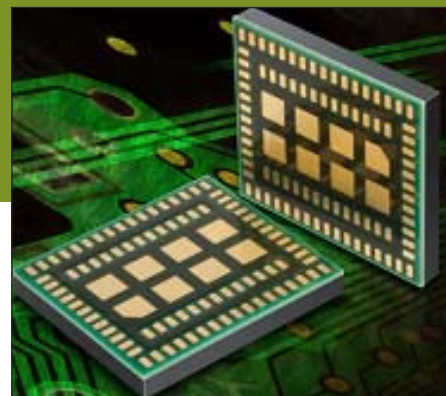
Practice director Dominique Bonte added, "We are already seeing start-ups pivot out of this space, but there is still huge opportunity for partnerships/acquisitions with major Android handset vendors, carriers and large application developers. Clearly Google is developing its own Wi-Fi indoor location solution; however, it may well open up its indoor location framework, enabling the market to expand much more rapidly. For IC vendors, with access to the hardware abstraction layer, indoor location innovation is vital for future socket wins."

Murata launches wireless LAN and Bluetooth transceiver modules

Murata has announced the LBEP series of wireless modules. These provide wireless LAN, Bluetooth and Bluetooth low energy (BLE) connectivity. Based around Texas Instruments' (TI) WiLink 8.0 solutions, the miniature modules measure 8.8 x 9.9 x 1.3 mm and offer a complete, highly integrated approach to providing wireless connectivity to a wide range of consumer, industrial and commercial applications. The modules include an integrated crystal and require no additional external components. Host connectivity, antenna and power are the only connections required. A slow clock input can be used to support a deep sleep mode.

The LBEP5CLWMC module provides both 2.4 GHz (IEEE802.11 g/b/n and Bluetooth 4.0) and 5 GHz (IEEE802.11a) connectivity. This module uses the TI WL1803/1833 combo connectivity solution. Host interfaces of SDIO are used for the wireless LAN and UART or PCM for Bluetooth.

The LBEP5CLWTC module provides 2.4GHz IEEE802.11b/g/n connectivity and uses the TI WL1831/1801 devices.

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25th – 26th September, London

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The massive potential of the M2M market and the 'internet of things' is being realised today and is about to transform the world of communications forever. It represents a once-in-a-generation opportunity for businesses and communities alike.

The huge scope of this emerging market requires multiple standards. One of these is Weightless; the newly ratified and emerging white space M2M standard for Low Power Wide Area (LPWA) solutions.

The use of white space provides a near perfect spectrum and free access. Weightless chips – already deployed worldwide – currently boast a 10km range, 10-year battery and cost less than $2; and this is just the beginning.

Momentum is gathering: Version 1.0 of the Weightless Standard was announced in April 2013; Ofcom have approved widespread trials and commercial usage; global giants including Google and Microsoft are supporting and participating in testing and research.

Weightless is rapidly becoming an established standard in the biggest new industry since the internet, and you can be a part of it from the start:

The first Weightless M2M Global Summit takes place on September 25 - 26 in London, UK.

"The rapid growth in membership of the Weightless SIG, now more than 900 international Members, is a clear indication of a vibrant and enthusiastic community of developers across the world engaging with the Weightless opportunity. This conference marks a major change in the life of Weightless from developing standards to developing businesses". Professor William Webb, CEO of the Weightless SIG.

- **Experience live demos and real-life case studies of the technology in action**
- **Meet all the major participants and supporters of Weightless technology**
- **Hear from ground-breaking and influential speakers including:**
  - William Webb, CEO, **Weightless SIG**
  - Cesar Gutierrez, Senior Policy Advisor, **Ofcom**
  - Jim Beveridge, Director, International Technology Policy, **Microsoft**
  - Stan Boland, CEO, **Neul**
  - Dr Erik Lenhard, Principal, **Boston Consulting Group**
  - Gary Atkinson, Director of Emerging Technologies, **ARM**
  - Adrian Scrase, CTO, **ETSI**
  - Kaivan Karimi, Executive Director, Global Strategy & Business Dev, **Freescale Semiconductor**
  - Jim Baker, Chair, Tech. Committee, **Joint Council on Transit Wireless Communications**, USA

- Jim Morrish, Director, **Machina Research**
- Robin Heydon, Global Standards Research & Innovation Group, **CSR**
- Andrew Yeoman, CEO, **Concirrus**
- Russell Haggar, Co-Founder, **Xsilon**
- Laurie Reynolds, Managing Director, **AquamatiX**
- Matthew Bailey, **Argon Design**
- David Crawford, **Centre for White Space Communications**
- Chris Rezendes, President, **INEX Advisors LLC**
- Ben Ward, Network Architect, **MLL Telecom**

The event schedule incorporates substantial opportunities for networking and interaction, with an exhibition zone running throughout both days, showcasing companies from across the white space and M2M ecosystem.

Book your place/s now to get your Earlybird Delegate rate and attend the two-day event for just £419 (plus VAT where applicable). This Earlybird rate is only available for a short time and is fantastic value, so register here before you miss out!

Not sure? Click on the movie screen here to hear what Warren East, CEO of Headline Sponsor ARM, thinks Weightless has to offer.

INCISOR.TV

VENUE
The Weightless M2M Summit will take place at 230 Bishopsgate, London EC2. The 'Bishopsgate Institute' has just undergone a £7.2m renovation and is perfectly located next to Liverpool St. Station, making it an ideal destination for international and domestic visitors alike.
www.230bishopsgate.com

news

No speaker Bluetooth headset

Hybra, a US company based in Traverse City MI, has recently launched a Kickstarter campaign for Sound Band, a Bluetooth-enabled headset that doesn't use speakers and leaves your ears open to the world around you.

Sound Band has been in development for four years, and is apparently ready to manufacture. The Kickstarter project passed its goal of $175k in just five days of a 45-day campaign, and a new target of $400k has been set. At the time of writing, Sound Band was just short of achieving this.

Hydra's pitch is that Sound Band is the long-awaited solution to ear buds. It is a wireless headset that uses surface sound technology (not speakers) to deliver sound to both ears, while leaving ears open to the ambient environment. With Sound Band there is no longer any need to remove your ear buds to have a conversation, order your third grande latte of the morning, or listen for your stop on the train. You can still hear the world around you, but the world around you can't hear your Sound Band.

Two multi-directional MEMS microphones are ported and tuned for maximum audio pick-up, and use noise reduction and echo cancellation technologies.

Sound Band connects to your smartphone via Bluetooth (certification pending, according to Hydra) in the standard "sync" fashion. Upon release, Sound Band will be compatible with Android and Apple operating systems. Hydra plans to pursue compatibility with RIM and Windows operating systems once it reaches its funding goal.

To learn more, have a look at the site at Kickstarter project site.

Bluetooth tooth – chew on that

Scientists at the National Taiwan University (NTU) in Taipei have developed a sensor that can be embedded in a tooth, and which could be used by doctors to monitor whether a patient has been sticking to medical advice, whether that be to eat less, or to quit smoking, for example.

Software developed at NTU recognises motion patterns of the jaw, and can work out what the person is doing – smoking, drinking, chewing or even coughing.

At this point in development the sensor can be fitted into a full set of dentures or a dental brace, but the longer term plan is to be able to contain the device in an individual cavity or crown.

The ability of the sensor to be able to work out what a person is doing sounds a bit far-fetched, but NTU's researchers claim that in tests using a prototype implant, the sensor got it right 94% of the time.

There's one restriction at this time – at the moment the sensor has had to be powered by an external source with a wire leading into the mouth. Not ideal when you are taking a girl on a first date. However, the aim is to be able to power the device with a micro battery. At that point the inventors plan to add a Bluetooth radio to provide a link to a smartphone, and from there to the doctor or dental practice.

Some way to go, then, but in these times, when sensors can be embedded in medicines and ingested by patients, not so far-fetched after all.

Bluetooth Module for Apple iOS Device

Laird has announced the release of its BTM46x Series Bluetooth modules. Based on CSR's BC04 chipset, the firmware on the BTM46x series allows OEMs to support Bluetooth data connectivity for PCs, smartphones and tablets including Apple iOS devices. The BTM46x firmware enables Apple licensees to add Bluetooth data connectivity, via the iAP protocol, into their MFI accessories products.

Application areas for the BTM46x Series include medical devices, ePOS terminals, barcode scanners, industrial cable replacement, and smartphone/tablet 'Appcessories'.

With a compact footprint of 12.5 x 22 mm, the modules are designed to support a separate power supply for I/O, in addition to including a complete Bluetooth v2.1 protocol stack for increased ease of integration. The BTM46x Series provides support for multi-point connections and includes the following Bluetooth profiles: Serial Port Profile (SPP), HID (Human Interface Device) and Apple's iAP protocol.

Car manufacturers becoming a driving force behind interoperability testing

By James O'Reilly, Bluetooth Qualification Expert, UL

Manufacturers of Bluetooth® devices can save themselves a huge amount of time, cost and protect brand reputation by testing for interoperability as well as compliance. The car industry is leading the way in incorporating interoperability testing into its manufacturing process – sometimes years in advance of release

Interoperability is basically about ensuring two products work together. For example, you buy a Bluetooth headset to make calls from your phone while driving, as well as answer incoming ones, listen to text messages, voice dial… there's potentially a whole host of functions available. So it's frustrating when it doesn't work, doubly so when you're not sure if the problem is with the headset or the phone. Which do you change? Most people will obviously return the accessory, so a poorly designed or untested product can result in a lot of returns.

The whole point of interoperability testing is to make sure one device can connect to another and do everything it's supposed to, saving manufacturers money and also protecting their reputations. The car industry in particular is proving one of its leading advocates, as it seeks to ensure ever more complex in-car entertainment systems work with mobile phones to read messages, download contacts, display numbers and essentially support smartphone functionality.

We have become incredibly wedded to our mobile phones. More than a phone, we buy into an entire operating ecosystem and once we're in we're generally very reluctant to change. Switching from Apple to Android or vice versa, for example, is a lot of hassle and can take up a lot of time, so it's more important than ever to ensure Bluetooth technology works with every device.

The power of people's attachment to their phone is something the car industry has learnt not to underestimate. The last thing a

manufacturer wants is customers choosing a different car because their phone doesn't work properly with the one you're selling. People won't change their phone to work with your technology – it must be the other way around, even for the sake of something as expensive as a new car. Nowadays, entertainment systems are getting tested years before they even go into a car, then continually after that. This is a principle that applies far beyond the automotive sector and something that all manufacturers of Bluetooth devices should consider.

But with an almost unlimited range of Bluetooth devices and accessories on the market how can you be certain that your device will not encounter any issues when released? The truth is…you can't, well not 100% anyway. Budget and manpower make it unrealistic to be able to do enough testing to iron out all potential issues, due to the vast number of possible different connections and applications between devices. There is a lot that can be done however. At UL we have years of experience creating bespoke test plans for manufacturers to provide the peace of mind that their product stands a good chance of working with the most amount of devices.

Here is an example of the different levels of testing that you may choose to subject your device to in order to improve the chance of market success.

Tier 1/Tier 2:

At UL, the first choice that we offer manufacturers is tier one testing. Testing at this level covers the very basic, but essential operations that a Bluetooth device will need to cover such as can your device simply connect and pair successfully, can it cover the fundamentals of a call and handle the basic functions of media playing? The number of devices to test against is limitless, but generally, manufacturers testing at this level benchmark against the most common devices on the market which are applicable pairings to their device.

Second tier interoperability considerations delve further into less common applications, but those that some users will still find important. These can differ depending on product type, but with the example of a car entertainment system, this could be uploading contacts to the car, further media usability such as shuffling, or viewing texts on the entertainment system. At UL, these are bespoke tests, based on the manufacturers' needs and the likely use of the device. With some car manufacturers that we have worked with we have gone as far as integrating the results into their public website for potential customers to see which devices will connect best to the infotainment system.

So, where should you start? At the end of the day, it doesn't cost anything to send us an email and ask for an opinion on a device. We can offer our thoughts and the reasons for our suggestions, the rest is then up to you. But why take the risk of shipping a product that may be Bluetooth compliant yet may not work as a consumer might demand? For more information please email me directly at james.oreilly@ul.com.

www.ul.com/wirelessandemc

The state of the Ultra Low Power wireless market

Setting out to review the Ultra Low Power wireless market, as Incisor has done this month, is a big task. We need to call upon experience built up over the years to allow us to cut through the daily flim-flam of press release quotes and statistics and then the highly self-serving statements made in the course of interviews, and to try to apply a bit of filtration.

We are also aided and abetted by the outlook of the various organisations we are reviewing. Some regard talking to the media as something they want to do, need to do, and enjoy doing. Others would rather poke needles in their own eyes. When you need to promote your products or evangelise your technology, the latter attitude is a bit of a hindrance. The wireless industry has its fair share of players in both camps.

The situation is complicated further in Incisor's case by the fact that our business model sees us earning our living from commercial deals with organisations in the industry – sponsored content, advertising, movies and events. We work this way so that we can be a free-subscription publication, which has encouraged thousands of wireless industry watchers all over the world to opt-in to receive Incisor since we first published in December 1998. Some companies/SIGs/Alliances/Forums have no problem with the concept of helping us share the cost of distributing their messages. Some others regard it as anathema, and not only refuse to partner with us, but are also reluctant to talk to us at all. Have a look at this special feature section and see if you can work out who is who! Answers on a post card please.....

But enough of the sales talk. The ULP wireless industry is in a state of frenzy at the moment as the mega-bonus that is the M2M/Internet of Things market emerges. Suddenly, connecting phones to headsets, wireless mice to PCs etc is old hat. Who cares about a few hundred million sales when, just around the corner, there is a market for billions or trillions of sensor devices?

How things play out over the next few years is a guessing game, whether for hacks such as us, for market researchers, venture capitalists – whoever. Things rarely go as expected. Technologies win and lose, and within given technologies

companies succeed or fail, and some simply disappear as they didn't stand out enough and became victims of industry consolidation. Survival of the fittest, and all that.

This, then, is our - essentially unscientific and somewhat personal – technology by technology review of the state of the Ultra Low Power wireless market in Q3 2013, combined with contributions from organisations within the industry

Bluetooth

Today, Bluetooth is all about low energy, or Bluetooth SMART as it calls it. Building on Bluetooth's 10-12 years of steady, considered, market-building work, the launch of Bluetooth SMART created a platform on which the Bluetooth SIG can and is sitting pretty. Bluetooth low energy might not tick every box, but, crucially, Bluetooth in one form or another is in pretty much every cellular handset in the market and in millions of other devices, and this is the crucial USP that means that Bluetooth low energy has a huge, if not to

say unassailable, head start over pretty much any competing technology. Why consider any other ULP solution if you want to address the biggest markets, with access to the Cloud, using familiar and widely available technology? Wi-Fi is in a lot of places, too, but Wi-Fi is harder to work with as a) it's ULP solution is less resolved/developed and b) Wi-Fi doesn't have Profiles (however, see below).

Bluetooth low energy as a wide-reaching conduit to the Internet of Things marketplace gives all solution providers the welcome warmth of a comfort blanket – they can just work with Bluetooth. Add in cross-platform, native operating system support – including most recently from Android with the release of version 4.3 – and it's hard to build a case NOT to use Bluetooth low energy. This despite the fact that Bluetooth isn't the lowest cost or simplest solution out there.

There is no question but that Bluetooth low energy will be a success. A big success. Possibly the biggest in the ULP market. However, not all Bluetooth members and supporters are completely happy. The feeling is that the broad appeal of Bluetooth low energy, and it's widespread market adoption have stalled development

in other areas for Bluetooth. Some cite a lack of focus on profile development – believing that profiles are what differentiates Bluetooth from most rival technologies. Others lament the day that the Bluetooth SIG gave up on developing a high-speed channel, and cite the current lack of a viable wireless video streaming technology as a big gap in Bluetooth's portfolio, and one that is not being met by other wireless technologies. The view is that Bluetooth could have completely owned the WPAN space, but has instead chosen to own only part of it. Great for some, not for all. As a result, solution providers are being forced to reconsider Wi-Fi, NFC, DLNA and – prepare for a shock – even cables!

ZigBee

The ZigBee Alliance (ZBA) has always been enigmatic. An engineering-lead organisation that has shied away from contact with the mucky media. It has therefore been hard to understand what is going on in the world of ZigBee, and therefore also hard to spread the ecosystem's messages. A recent change of top management seemed to provide new hope, but sadly, two top-level invitations to contribute to this feature that Incisor sent to the ZBA, and separately to one of its key member companies, all went unanswered.

Since 2002 the ZigBee Alliance has been pushing its technology into the mesh networking market. It achieved some early success, notably in Smart Grid, yet it seems to have failed to capitalise on its early lead. Although some market observers predict that ZigBee will secure a healthy share of the 802.15.4 market, this fails to take into account the fact that the market that ZigBee addresses is no longer served only by 802.15.4-based solutions. The ULP market is today much broader, and many other technologies see the potential of the M2M/Internet of Things market where everything is connected – not just smart meters – and are developing solutions that do address smart home/smart grid, but also address many other markets too, markets that ZigBee is much less well suited to. Then factor in that most of these other technologies are promoted by bigger, much more forward–leaning – ok, let's be honest – much more aggressive and PR-savvy promoters - and it is hard not to feel sympathy for ZigBee. It really seems that the ZBA and its key member companies – organisations such as Freescale, Texas Instruments etc - all share a publicity-shy

characteristic that inevitably leads to suspicions of a possible lack of conviction or confidence.

ZigBee still does have die-hard supporters. And the ZBA continues to develop its proposition. During July the ZBA announced that Version 1.2 of its Home Automation Standard had been ratified. The highlight features of 1.2 improve the battery life for security sensors to over seven years, standardize pairing of devices and simplify installation and maintenance for consumers and custom installers. The ZBA stated that these features have a significant impact on operational and device costs to service providers and quality of service to consumers.

Well, good luck, guys. We continue to offer a platform to tell the world what you are doing. When you are ready.

Wi-Fi

It still seems strange to be including Wi-Fi in an ULP wireless feature, but, despite Wi-Fi's propensity to suck power, various companies are now promoting ULP Wi-Fi solutions. One of these companies, Gainspan, which span out of Intel, is featured elsewhere in this issue. Small trailblazers such as Econais are also promoting ULP Wi-Fi, but any question marks over Wi-Fi's long-term viability as an ULP solution might be addressed by the fact that some of the big-boys are looking at this market too. Qualcomm has identified the 802.11ah version of Wi-Fi as a key enabler for the Internet of Things. And it seems that that other wireless semicon giant Broadcom is also ➔

A broad market with room for many

"The Internet of Things or whatever moniker we give the connected world is growing and the exact shape of it is uncertain. There are many areas to this as well and one part is ULP which has a number of different parameters, by that I mean technologies.

We hear that they are all vying for the same space and so that creates competition and from competition grows innovation. Every exponent of a particular technology will claim that their technology is the best; and quite rightly so, they are, and should be, proud of what they have achieved.

However, from the point of view of a compliance professional who sees all these technologies in development and in action and who talks with all of the stakeholders I believe that the there is room for them all. No one technology fits all. They are all brilliantly constructed technologies, each one has its own advantages over the others and there is clearly room for them all. Although the world strives for compatibility and interoperability through standards I think that the (technology) world would be a be a lot less interesting without such diversity. So, to the question of how is it shaping up? It's shaping up nicely, it is becoming clearer where everybody can sit and it really could be a case of the more the merrier!"

Joe Lomako
WiSE Business Development, M2M, UL

looking at low-power Wi-Fi, with a recently launched combo chip combining low-power integrated Wi-Fi and Bluetooth. Broadcom's BCM 4390 is apparently aimed at M2M applications and the sports and fitness, health and wellness and automation markets, and for embedded use in products such as weight scales, thermostats and security cameras.

Further details on Broadcom's thinking and its low-power Wi-Fi strategy are sparse at the moment, though Brian Bedrosian, Broadcom's Senior Director, Embedded Wireless, Wireless Connectivity Combo Group did tell us, "Powering the 'Internet of Things' requires exceptionally advanced technology delivered in an exceptionally simple way. By offering the industry's most integrated embedded Wi-Fi solution that uses dramatically less power, Broadcom enables our customers to bring connectivity to more products in more market categories, both established and emerging."

It is still hard not to be a little ready to believe that Wi-Fi's entry into the ULP market has not been driven by FOMO (Fear Of Missing Out), but if there is one technology that has the clout to rival Bluetooth, and which traditionally has been a more aggressive and assertive predator than Bluetooth, it is Wi-Fi, the Wi-Fi Alliance and its member companies. Read Gainspan's contribution to learn more.

ANT

Incisor ran a 5 page special focus on ANT/ANT+ last month, and so that is the first place we would direct you to learn about the current state of the ANT market. If you didn't see that issue, you can access if from our web site using this link.

With its roots in the Canadian Rockies, ANT+ sets out to be the wireless technology that allows monitoring devices to talk to each other. Historically it has done very well in sports and fitness, where an ANT+ heart rate strap will send heart rate data to a watch, phone, bike computer, tablet and/or and other device that reads ANT+ data. The ANT+ Alliance includes major sports and sports equipment companies such as Adidas, Garmin, Suunto, Timex and Trek Bicycles amongst its members, as well as tech industry traditionalists such as Microsoft and Motorola. Perhaps ANT's most pro-active partner has been Nordic Semiconductor, the primary supplier of ANT silicon. Nordic does have a foot in two (three actually) camps, also supplying Bluetooth SMART chips (and proprietary solutions – that's the third foot).

While ANT's roots may be in the sports and fitness and health and wellness markets, the technology is looking to broaden its outlook, including into home automation. As the feature 'ANT's practical mesh network solution simplifies home automation' in last month's issue (see link above) points out, the ANT+ Controls profile uses an addressed multidrop channel option called a shared channel supporting multi level addressing of up to 250 devices in up to 16 zone levels (ANT can expand this number of devices to 65,000+). By setting the zone and individual device addresses in the application someone can turn on, dim or turn off and group or individual light in the facility from any room, all from a smartphone. ANT claims multiple years of battery life from a coin cell for a typical sensor application.

So, while ANT will continue to be the ultra low power connectivity solution of choice for many sports and fitness enthusiasts, it can and does intend to compete with other ULP technologies in the broader market. Taking on and beating Bluetooth SMART, ZigBee and other technologies is a big ask, but in recent years ANT has shown no signs of being cowed by such a challenge.

6LoWPAN

So, who knows much about 6LoWPAN then? It is an acronym of IPv6 over Low power Wireless Personal Area Networks. 6LoWPAN is the name of a working group in the Internet area of the Internet Engineering Task Force (IETF).

The 6LoWPAN concept originated from the idea that "the Internet Protocol could and should be applied even to the smallest devices," and that low-power devices with limited processing capabilities should be able to participate in the Internet of Things. The 6LoWPAN group has defined encapsulation and header compression mechanisms that allow IPv6 packets to be sent to and received from 802.15.4 based networks, so 6LoWPAN is often mentioned in the same breath as ZigBee.

The 6LoWPAN Working Group apparently has a complete set of specifications for 6LoWPAN, and says that its work is formally complete. It has also submitted a specification for applying 6LoWPAN technology to Bluetooth Low-Energy/Bluetooth Smart), but at the last time of checking this hadn't passed the Internet Engineering Steering Group (IESG) yet. IESG, is, by the way, a body composed of the Internet Engineering Task Force chair and its area directors.

Is 6LoWPAN a player in the ULP market? It's hard to tell, but at the moment this

seems more a concept than real-world, here and now technology.

EnOcean

EnOcean has featured regularly in Incisor, and that's for two main reasons. The first of these is that we are enthusiastic, as EnOcean offers something the other wireless technologies don't have, and so we like writing about it. EnOcean's low power, wireless building control technology hinges around energy-harvesting - control systems that never require battery changes and do not have to have wiring throughout a building. Installation and maintenance are massively simpler and cheaper as a result – what's not to like? And the second reason is that the EnOcean Alliance is one of those forward-leaning organisations that understands that it is a good idea to let the world know what it is doing, and that talking to the media is something good, not something that warrants the brandishing of a crucifix or waving of a string of garlic.

EnOcean-based self-powered wireless monitoring and control systems are not just PowerPoint technology either. According to the EnOcean Alliance, there are now more than 250,000 EnOcean-enabled buildings around the world. At an EnOcean event back in 2010, Incisor.tv talked with one happy EnOcean customer, Barclays Bank, one of the UK's largest High Street banks – see the movie we made with EnOcean here. At that point, which was more than three years ago now, Barclays had already installed EnOcean-based environmental control systems in more than 500 of its retail branches, with a clause in the contract that no branch could close to the public while the work was being carried out. The unique, non-invasive/easy-fit nature of EnOcean's systems made this possible.

We're astonished that energy-harvesting hasn't been more widely adopted. The ZigBee Alliance made an announcement at the end of 2012 that it, too, was to use energy-harvesting technology. The EnOcean Alliance immediately made noises about IP and patent infringements, and we haven't heard anything about energy harvesting from the ZigBee Alliance since that time.

Because of its unique qualities, the strength of backers such as Siemens and the professional way it is going about promoting its technology, we can't see how EnOcean will not continue to grow.

Ultra Low Energy technology and the ULE Alliance

Sprung out of the DECT industry and the DECT Forum at the beginning of 2013, the ULE Alliance is promoting ULE for control network ecosystems in the home and in commercial buildings.

ULE is based on DECT (Digital Enhanced Cordless Telecommunications), which is the technology we have all used for many, many years as it is what enables our cordless phone to talk to its basestation. DECT first grew beyond this original application with the roll-out of CAT-iq, which connected the phone with the world of IP. Now the growth is expanding further, with ULE majoring on low power consumption, low latency, long range, moderate data rate and value-added voice capabilities, and aiming to be the next evolution in home networking.

Launching and positioning itself alongside the ULP wireless industry's other major players, the ULE Alliance participated in Incisor.tv's Wireless Roundtable event which took place alongside CES in January this year. The movie can be viewed here.

Elsewhere in this issue, the ULE Alliance's Director of Business Development Avi Barel sets out ULE's goals and identifies the technologies strengths. With DECT's global foothold as the de-facto standard for residential and business cordless communications, it is hard to see how ULE could not grow a business in the ULP sector.

NFC and RFiD

Yes, these two are low power wireless solutions, but they don't really play in the same markets as the technologies discussed above.

NFC is about two main things – making it simpler to make transactions – i.e. contactless payments - and then exchanging digital content, and connecting electronic devices with a touch. The latter known commonly as Secure, Simple Pairing (SSP). NFC has courted the world's financial monoliths for a decade, and yet until now has barely scratched the surface of deploying global, NFC-based payment solutions. Localised trials exist here and there. That's all. For a fuller overview, see Frontline Test Equipment's article 'A cup "full" of potential - NFC Contactless Payments' on p12 of the June issue of

Incisor. And despite being part of the Bluetooth specification for about 10 years, Secure Simple Pairing has yet to become known or used by the world population of Bluetooth (or Wi-Fi – NFC is in the Wi-Fi spec too) users. For some reason best known to itself, the Bluetooth SIG has done almost nothing to promote SSP. This is crazy really, as SSP is great, and substantially simplifies the task of pairing devices. Only now is NFC pairing starting to be used. A recent announcement from high-end audio/TV company Loewe of a portable Bluetooth speaker – Speaker 2go - that can be paired by NFC is an example. This NFC adoption seems to be being driven by the CE companies rather than the evangelists, and almost seems to have been stumbled upon by accident.

Perhaps again due to FOMO, the great and good of the NFC world have started to make some noise about taking NFC into the wider world. Koichi Tagawa, who works for Sony and is at the same time chairman of the NFC Forum has recently been quoted as saying that NFC may be applied to applications like wine tracking and device pairing. Tagawa referenced Japanese airlines' use of NFC to allow the boarding of a 450-person plane in just 15 minutes - a process that apparently takes 40 minutes without NFC. NFC is, we should note, starting to appear in more smartphones. Samsung is a fan, though Apple isn't. NFC could grow, but has yet to succeed in its key target markets, after many years of trying.

RFiD, meanwhile is exclusively about asset tracking and identification. RFID tags are used in many industries. An RFID tag attached to an automobile during production can be used to track its progress through the assembly line. Pharmaceuticals can be tracked through warehouses. Livestock and pets may have tags injected, allowing positive identification of the animal. On off-shore oil and gas platforms, RFID tags are worn by personnel as a safety measure, allowing them to be located 24 hours a day and to be quickly found in emergencies. RFiD tags are simple, cheap and just do what they set out to do. The technology has no SIG, Alliance Forum or whatever, and is what it is.

The others

So that leaves us with technologies such as Z-Wave, Wavenis, WirelessHART, ISA-100 and proprietary solutions. Of these, only Z-Wave can claim to have gained a foothold. Well, more of a toehold really. Z-Wave is the dream of a Danish start-up called Zen-Sys, which was subsequently acquired by Sigma Designs in 1998 and is a wireless communications protocol designed for home automation, specifically to remotely control applications in

> ## "Both Z-Wave and ZigBee are doomed"

residential and light commercial environments. The technology uses a low-power RF radio embedded or retrofitted into home electronics devices and systems, such as lighting, residential access control, entertainment systems and household appliances. Although the Z-Wave Alliance claims the support of 160 manufacturers worldwide and a presence in the US, Europe and Asia, and while some Z-Wave products are on sale today, the reality is that this is really a US-based technology, with little awareness or penetration outside of American shores. This statement is, we know, likely to stimulate an outcry from the Z-Wave community, but as they are 5,000 miles away we may not hear them. The Z-Wave case would be better made if there was more of an effort to evangelise and promote the solution. Incisor isn't alone in being a little sceptical, others go further. In a recent Gigaom podcast, Qualcomm's Interactive Platforms Division President Rob Chandhok said that both Z-Wave and ZigBee are doomed due to their too tight coupling of the radio and protocol. The Internet of Things, will demand loose coupling, said Chandhok, and the post-AOL/Compuserve evolution of the Internet exemplified how this decoupling had to happen. Incompatibility will not survive market consolidation. Strong words, from Qualcomm, and they apply equally across the other small players in the ULP connectivity market.

Summary

At this point in time, proponents of many low power wireless technologies are scrabbling to grow beyond their original remits and to ensure their place in the M2M/Internet of Things market. Yes, people are interested in sports sensors, remote controls and such like, but what everyone really wants is not to miss out on The Next Big Thing. With the desire to connect all devices, everywhere, all the time comes a need for at least billions if not trillions of wirelessly connected sensor devices. This is a market of such monumental size that it is no surprise that the battle for supremacy is, at times, a little unseemly.

In this market we have established players such as Wi-Fi, Bluetooth, ZigBee, ANT, EnOcean etc, and aspiring players whose hands have yet to be dealt. Here we are thinking about technologies such a Weightless, which will deliver very low cost sensors with long range,

Allianz Digital Accelerator new partner for WT Innovation World Cup

The worldwide award for wearable technologies, the WT Innovation World Cup, has a new partner: Allianz Digital Accelerator, an Allianz company. Allianz is an international financial service provider that offers products and solutions in insurance and asset management to approximately 78 million customers worldwide. The Allianz Digital Accelerator develops new digital business models and accelerates their execution and implementation within Allianz. The Allianz Digital Accelerator is behind the new "Evolve Insurance Award" within the WT Innovation World Cup programme, which fosters the development of smart wearable technology that will have an impact on safe living.

EnOcean Alliance at the Energy Event 2013

At the Energy Event 2013 (NEC, Birmingham, UK 10-11 September) the EnOcean Alliance will show how energy harvesting wireless technology enables building automation systems that work without cables and batteries, bringing the cleantech aspect to energy efficiency technologies. At the joint stand (#E41), Alliance members Pressac, Distech Controls and WAGO will present new batteryless wireless solutions, based on the EnOcean standard ISO/IEC 14543-3-10. This ranges from a smart energy meter solution to an integrated room control solution and a complete intelligent automation system.

Pressac becomes a Promoter of the EnOcean Alliance

The EnOcean Alliance also tells us that Pressac Communications Ltd has become a promoter member. By doing so, the company, which supplies the automotive and telecom industry, enters the building automation market. Promoter status means that the UK-based company is now a key player in the Alliance, supporting the development of EnOcean energy harvesting wireless standard for energy-efficient building solutions. Pressac is contributing expertise in the field of mechanical and electronic design as well as network cabling solutions.

excellent in-building propagation and very long (up to 10 year) battery life. Unlike the other technologies, which have been conceived for some other job – wireless networking in Wi-Fi's case, wireless personal area connectivity in Bluetooth's case – Weightless and other M2M-specific technologies have been designed specifically to address the Internet of Things market rather than being manipulated and crow-barred in.

If any of the market forecasts are close to correct, there is going to be demand for at least a few billion sensors within the next few years – certainly before 2020. Trying to decide which wireless technologies will maintain a foothold and grow their presence isn't easy, but we believe it will look something like this:

- The primary market for industrial, large-scale, utility driven applications will be addressed by dedicated networks and application-specific sensors devices such as those planned for M2M networks such as Weightless or SigFox. Business currently enjoyed by ZigBee, Z-Wave, Wavenis etc will diminish due to the smaller footprint established by these technologies and their ring-fenced nature.

- The energy-harvesting technology harnessed by EnOcean will be recognised as a key, highly valuable differentiator for building control systems. EnOcean will continue to grow and other technologies will fall in line, adopting energy-harvesting techniques.

- The secondary market for devices that connect with consumer/ICT-based products and technologies will be dominated by both Bluetooth SMART and Wi-Fi, with Wi-Fi's share growing as time passes. It is really too early to say how ULE will fair at this stage, so we will have to review this further down the line.

- While it may struggle to grow outside of its native territory, ANT's loyal and enthusiastic member network and established and specialised ecosystem will ensure its ongoing place in the sports, fitness and wellness markets.

- NFC and RFiD will continue to do what they do, with NFC hopefully not being the perpetual 'might have been big' wallflower.

All of this could be completely wrong, of course. Let's check back in 2020 and see what is going on.

Energy Harvesting Wireless Automation

By: Andreas Schneider, Chief Marketing Officer, EnOcean GmbH

Room Controller/ Gateway/ BMS

Batteryless wireless **light sensors** automatically match lighting to daylight.

Batteryless wireless **Occupancy sensor** adjusts temperature and turns off lights when a room is not in use.

Batteryless wireless **Position sensors** setback HVAC when windows are opened.

Batteryless wireless **Room temperature sensor** for minimal energy consumption and maximum comfort.

Heating valve for self-powered and energy-efficient room temperature control.

Batteryless wireless **switches** control lighting and shading.

→ YOUR PAYBACK/ROI

- 15% cost savings in new construction
- 70% cost savings in retrofits
- 40% energy savings
- Unlimited Flexibility

The need for energy management in buildings is becoming more critical as electricity prices inevitably rise. In addition, with an increasing amount of energy coming from renewable sources this means there is a need for more efficient methods of energy usage. Buildings play a key role as they consume high levels of energy and therefore demand the integration of innovative technologies that can be installed easily and at a fast ROI, providing significant energy savings.

Such a technology is the EnOcean energy harvesting wireless technology, which has established itself as the standard for sustainable buildings over the past ten years. Due to the energy harvesting principle the wireless modules gain their power from the surrounding environment and therefore work without batteries. In the process, an electro-dynamic energy converter uses mechanical motion, or a miniaturised solar module generates energy from light. Combining a thermoelectric converter with a DC/DC converter taps heat as an energy source. These small amounts of harvested energy are sufficient to transmit a wireless signal and enable operation of numerous maintenance-free sensor solutions. This includes batteryless switches, intelligent window handles, temperature, moisture and light sensors, as well as presence sensors, relay receivers and control centres.

Seamless communication

The EnOcean protocol is internationally standardised as ISO/IEC 14543-3-10. It is the only standard specifically designed to support very low power devices and energy harvesting applications. For optimal RF effectiveness, the radio protocol uses sub 1 GHz frequency bands. RF reliability is assured because wireless signals are just 0.7 milliseconds in duration and are transmitted multiple times for redundancy. The range of energy harvesting wireless sensors is about 300 metres in an open field and up to 30 metres inside buildings.

Each module comes with a unique 32-bit identification number to exclude any possibility of overlap with other wireless sensors. For additional security requirements, such as access control systems and other critical applications, data encryption for secure wireless communication can be included as well. →

Application

Network

Data Link

Physical

enocean alliance
No Wires. No Batteries. No Limits.

EnOcean Equipment
Profiles (EEP)

ISO IEC

ISO/IEC 14543-3-10

On top of the open standard, the EnOcean Alliance has developed standardised application profiles (EnOcean Equipment Profiles, EEP) which ensure that devices from different vendors can work together seamlessly in a system. In addition, the technology can also be easily connected to all systems that communicate over Wi-Fi, as well as over Ethernet/IP, KNX, BACnet or LON via gateways. The EnOcean Alliance is a consortium of more than 300 member companies which develop and promote products and solutions integrating the batteryless technology. These wireless products are ideal for new buildings as well as for retrofitting existing spaces and with no batteries, plus there is virtually no maintenance.

High energy savings and fast ROI

Based on EnOcean technology, an intelligent automated system can be realized by interconnecting automated thermostats, wireless heating valves, window contacts, humidity sensors, occupancy sensors and CO2 sensors. These are just a few examples of the products in place to regulate climate control in a building automatically. In an intelligent automation system, for example, a room controller receives information related to temperature, humidity, window position or CO2 from the respective sensors and controls the opening and closing of valve actuators for radiators. At the same time the room controller sends information to an energy controller. This automation calculates the demand as a function of outdoor temperature and flow temperature to control energy generation.

Buildings in which occupants do not pay for the energy bill directly – hotels, hospitals, schools, offices, government, industrial and retail – waste the most energy and therefore provide the highest

savings potential and lowest ROI timeframes. That said, occupancy-based HVAC and lighting control, and monitoring systems integrating energy harvesting wireless technology can save installation costs of more than 30 percent in new constructions and up to 70 percent in retrofits, as well as help reduce energy consumption by 20 to 50 percent in facilities, often with an ROI of three years or less.

Smart solution for modern design

A good example of an effective energy harvesting wireless automation system is the Indian branch of South African FirstRand Bank. It occupies 6000 m², spread over three floors in the TCG financial administrative building in the centre of Mumbai. For the modern office design, the biggest challenge was achieving optimum energy savings, whilst remaining cost effective and flexible to accommodate future alterations to the office layout.

The investors decided to implement modern building automation featuring energy efficient EnOcean-based technology from Thermokon, a promoter of the EnOcean Alliance. The wireless transmitters and receivers of the EasySens product line, which operate without batteries, wires or an external power supply, enable smart control of heating, cooling, ventilation, lighting and CO2 levels. Thanos, the design-oriented multi-functional room operating panel, acts as a control centre and detects the current room temperature and humidity, as well as enabling light and blind control. Wireless temperature sensors, model SR04, with an integrated solar cell, are installed in the offices for room temperature set point adjustment. Occupancy detection for energy efficient lighting control is achieved using the wireless motion sensor SR-SDS.

Conventional light switches have been replaced by the energy harvesting wireless EasySens switches. To achieve an optimal network for all manufacturers, a wireless EnOcean-based Thermokon gateway is used to convert the RF telegrams into a RS485 signal. The SAIA controller provides centralised control and completely transmits the system's intelligence onto a special KNX and S-Bus communication bus.

Reduced installation costs and the ability to position the sensors and gateways flexibly provides for an attractive interior design and freedom for future changes. At a low investment, this environmental-friendly infrastructure enables considerable energy cost savings of approximately 40 percent.

www.enocean.com

Introducing ULE: The new, yet the most experienced, kid on the block

By: Avi Barel, Director Business Development, ULE Alliance

ULE (Ultra Low Energy) is the most recent addition to the family of existing wireless technologies targeting the market for home and building automation. Since ULE is based on the mature DECT technology, one of the earliest and most mature digital wireless technologies, the roots of ULE go back to the early 90's.

ULE Origin:

Introduced in 1991, the DECT technology (Digital Enhanced Cordless Communications) is designed to support both voice and data communications. For many years the DECT technology has been almost exclusively used for the cordless telephony – among the largest consumer electronics market segments, shipping 10s of millions of sets annually (over 200M nodes), and with an installed base of over 600M households worldwide. Recent advancements in the high level of connectivity at home, in buildings and on the go, drove the evolution of DECT to support large numbers of data oriented devices and consume very low power. ULE is the result of this evolution. ETSI announced the release of the DECT ULE standard in May 2013.

The ULE Technology emerged from DECT by improving two key performance parameters: Ultra Low Energy consumption and improved security. Wireless technologies are characterized and compared to each other by several basic factors:

• The network topology
• Frequency band
• Range
• Data bandwidth
• Power consumption

Beyond the pure technical factors, there are important factors which reflect on the technology, such as: additional capabilities, maturity, interoperability, ease of installation and cost of ownership. These factors should be taken into account when evaluating technologies.

ULE network uses star topology

A base is the center of the ULE network. A single base may control a large number of nodes in the network (several thousand nodes per base). Thanks to ULE's long range, one base is usually sufficient to cover an entire building. In rare cases of very large areas repeaters and multiple bases, connected to each other, are supported. The experience with DECT shows that the use of repeaters and multi-base installations is rare (less than 1% of the total installed base). This makes installation of a ULE network as simple as installing a cordless telephone at home, ideal for do-it-yourself by a consumer.
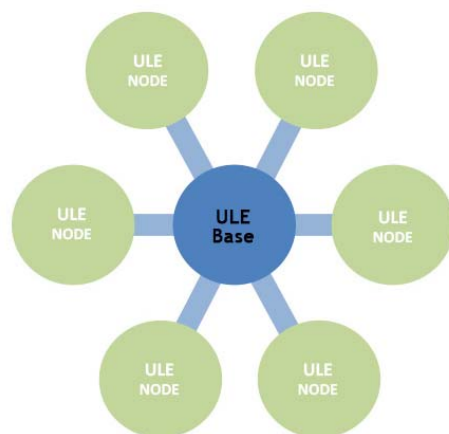
ULE uses a dedicated, licensed and royalty free frequency band

The 20MHz bandwidth and each ULE device being capable of dynamic channel allocation and collision avoidance enables practically interference free operation even in densely populated networks. This is a unique feature of ULE that makes it stand out when compared to other wireless technologies based on the ISM band; these are prone to interference from other wireless activities caused by multiple technologies operating in the same frequency spectrum.

ULE communication range

This is the longest among all short range wireless technologies. In a building it can reach over 60m (and up to 100m depending on building construction); in open areas it can be 300m. These numbers are based on experience of DECT. Since the data communication of ULE is less demanding than traditional voice communication, the range of ULE may extend even further. Although ULE definition accommodates range extenders, the experience shows that the use of the extenders is not common.

ULE data rate

ULE can support up to 1Mbit/s. This enables transmission of voice and limited video (up to 8 frames/second). This means that a user, monitoring the house remotely, may not only receive an indication about an event at home, but can also open the communication channel to listen-in or see what's happening at home. This capability opens up vast potential for new devices and applications for remote home monitoring. In fact, DECT-based devices using such features already exist in the market. Some examples include audio/video baby monitors and audio/video door phones.

Ultra Low power consumption

This is one of the key advantages of ULE vs. traditional DECT. The ULE communication scheme enables years

of operation without replacing batteries. For example, a device which operates on two AA batteries, and communicates with the base every 2.5 minutes, will require battery replacement in 5 years.

ULE supports Software Upgrade Over The Air (SUOTA)

This means that devices can be remotely upgraded, making them future proof by enabling software upgrades after installation of a device (ULE node).

ULE Standardization and certification

DECT ULE is an official ETSI Standard: ETSI TS 102 939-1. This standard covers the physical layer (which is exactly the same as DECT) and the Transport Layer, which implements updates for ULE. Using the same physical layer as DECT enables software upgrade of millions of existing home gateways, which support DECT, to also support ULE. The application layer protocol HAN FUN (Home Area Network FUNctional) is defined by the ULE Alliance. The definition of protocol is flexible, meaning that any application layer (including 6LoWPAN) may run on top of the ULE Transport layer; this makes the coexistence of ULE with the IP networks straightforward.

The ULE Certification program built on top of the DECT Certification has been developed based on many years of experience. This will deliver high levels of interoperability, as has been delivered by the DECT industry.

Summary:

The ULE Technology delivers new capabilities and performance most suitable to the modern wireless communication era of smartphones and tablets; on the other hand it enjoys the maturity and experience of DECT. ULE surpasses any other wireless technology almost in any performance parameter. This makes ULE extremely attractive for Home Automation, Security, Climate Control and many more applications.

The ULE Alliance, which was founded in January 2013 and promotes the ULE Technology, has over 30 members, including world famous operators and manufacturers. The number of members grows steadily.

For more information about ULE Technology and ULE Alliance please visit www.ulealliance.org

Email Avi Barel:
a.barel@ulealliance.org

Standardized by ULE Alliance — HAN FUN Application Layer

Standardized by ETSI (ETSI TS 102 939-1) — ULE Transport Layer — Physical Layer ULE = DECT
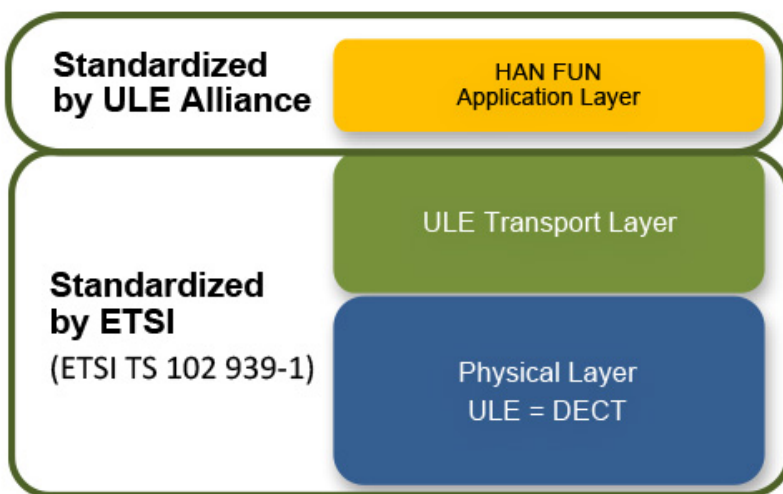
IN NEXT MONTH'S INCISOR:

The Home Gateway – building links between home systems and home networks, the Internet and utilities.

There will be opportunities to contribute editorial and advertising for this feature.

Next month's issue will also preview the 2014 Incisor.tv Wireless Roundtable event, which will take place alongside 2014 CES in Las Vegas.

If you would like to participate in the review section or would like further information regarding the Wireless Roundtable, please contact Vince Holton: vholton@incisor.tv

DSP Group Introduces –
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Leading the ULE evolution, DSP Group delivers in-house, one-stop-shop ULE solutions – full hardware and software reference design including IC's for all endpoint devices, concentrators, Linux OTT and more.

ULE Benefits

✓ Interference free band
✓ Video and audio support

✓ Superior secure range
✓ Lower cost of ownership

✓ Global ETSI standard

HEALTHCARE

MONITORING

ENERGY MANAGEMENT

SECURITY

WHITE APPLIANCES

HOME AUTOMATION

CLIMATE CONTROL

IP

CLOUD

DHX91, our advanced IC for ULE, was designed for longer battery life and low BOM with audio and video support, and is optimized for sensor connectivity.

Visit us at the European Utility week, October 15-17 and at the Broadband World Forum, October 22-24, RAI Convention Center, Amsterdam

Low power Wi-Fi: the ultimate paradigm change?

Wi-Fi has not normally been associated with ultra low power. When considering which technology to adopt to provide wireless connectivity in an application requiring long battery life, many might consider it OK to overlook Wi-Fi and consider the more familiar contenders. GainSpan, on the other hand, thinks otherwise. Incisor spoke to the company, and, we must admit, came with feeling newly enlightened.

Wi-Fi has traditionally been thought of as a power-hungry technology. GainSpan seems to have turned that on its head. How have you managed to do that?

GainSpan's innovation is a combination of patented technologies for ultra-low power states and power consumption optimization which were a result of years of accumulated experience in working with hundreds of customers who were designing devices that needed long battery life. Fundamentally, our chips and modules "sleep" better than any other Wi-Fi chips, with standby current as low as 260 nA in certain conditions; "wake up" faster from these low power states than other Wi-Fi chips (a few ms); and have accurate timing circuitry and algorithms optimized for numerous use cases to leave the receiver on as little as possible.

How low is GainSpan ULP? How does it stack up against alternative ULP technologies such as Bluetooth LE, ZigBee, Z-Wave, DECT ULE and proprietary solutions?

Wi-Fi will always be slightly more power hungry than other low bandwidth technologies such as Z-Wave, ZigBee, ANT or BLE or sub GHz RF solutions, as Wi-Fi operates over 20 MHz channels while these other technologies use much narrower channels , from 10's of KHz to 2-3 MHz. While the transmit and receive currents are higher with Wi-Fi, the standby/deep sleep current of GainSpan's chip - 260 nA to few microamps in standby - is comparable, if not better, than other technologies. Although Wi-Fi can't generally operate from a coin cell battery due to these batteries' peak power limitation, several applications that we address run for multiple years on AA or AAA batteries.

Are there characteristics of Wi-Fi that make it more suitable for some low power applications?

Wi-Fi's data throughput and bandwidth are the primary characteristics that none of the technologies mentioned above can deliver. Streaming high-quality audio and video can only be achieved in wireless LAN/ PAN applications over Wi-Fi, hence the interest we've seen for our technology by manufacturers of all kind of cameras, video surveillance cameras, speakers and other audio equipment. Low-power Wi-Fi has two other characteristics which explain the demand for it in Internet of Things and sensors applications: Wi-Fi is the only one of the technologies based on the Internet Protocol (IP), and, Wi-Fi is the only one, except Bluetooth, that is in almost every smartphone.

Has GainSpan created a complete silicon solution - a true, low power Wi-Fi chip, or is the company applying software techniques to reduce power consumption for traditional Wi-Fi silicon?

We've developed our own low-power system-on-chip, and offer chips, modules and software as part of its solution. The low power is the result of patented technology and a properly architected chip in combination with software techniques and algorithms to optimize power consumption and wake up time.

Is this a viable solution on which to base Internet of Things (IOT) development?

Absolutely. Low power Wi-Fi will be a significant enabler to the IOT for some of the reasons mentioned above: IP based protocol, smartphone connectivity, low power consumption and long battery life for battery powered devices. GainSpan's Wi-Fi and Wi-Fi/ZigBee IP chips are of particular interest for IOT devices as they are truly "systems-on- chip" combining baseband, RF, memory and two processors: a WLAN processor running the Wi-Fi MAC and a network service/ application processor. The networking stack and services are hosted on the second processor, offloading the host

microcontroller (MCU) used in the device. This makes the GainSpan chip extremely flexible. It can be paired with very small, low cost 8-16 bit MCUs with limited capability, with larger 32-bit MCUs/ MPUs if required by the application, or with no MCU at all, when used, for example, in simple sensor applications.

Is the primary goal for GainSpan silicon to be embedded into sensors, or does it have applications across a broader range of products, perhaps including computing or consumer electronics devices?

GainSpan targets devices and appliances covering the connected home, healthcare and fitness, smart energy, metering, audio and video consumer products, and commercial and industrial applications. We are not going after the PC, tablet or smartphone markets. Generically, the applications can be classified as Access Point mode, such as when a smartphone directly controls a device that has an embedded GainSpan Chip; Station mode, where the device or sensor gets connected to the cloud through an access point; or Concurrent mode, when the device acts both as an access point and a station concurrently.

You have recently launched an ULP Wi-Fi and ZigBee IP combo product. These would seem to be two competing rather than complementary technologies. What is the thinking?

The thinking behind this was to integrate ZigBee-IP as a complementary technology--at no extra cost over that of a Wi-Fi chip. Thus, a customer can use it as a Wi-Fi chip if ZigBee is of no interest, or as a Wi-Fi/ZigBee IP chip if the dual mode has value. Since RF and memory are all shared between Wi-Fi and ZigBee IP there's no cost penalty to a customer looking at a Wi-Fi only chip. ZigBee brings two key attributes that are often mentioned as advantages of ZigBee over Wi-Fi: 1) smaller RF channelization hence lower power consumption when transmitting to cover the same distance, or alternatively better receiver sensitivity for low data applications, and 2) meshing. Although IEEE 802.11s has been standardized for meshing, the Wi-Fi Alliance has never adopted meshing and hence interoperability between Wi-Fi vendors is almost nonexistent. In ZigBee, meshing is more mature.

Why ZigBee IP and not ZigBee?

A large part of the success of the Internet is related to the maturity of the Internet protocol and methods. By implementing the recently standardized ZigBee IP protocol in our chips, we further extend the

IP network all the way to the sensor and the device. Customers interested in using ZigBee or a form of IEEE 802.15.4 protocol in conjunction with Wi-Fi, still have the flexibility to use the GainSpan GS2000 chip, as the IEEE802.15.4 code is implemented in the chip.

What has been the market reaction to this radical, ULP Wi-Fi approach?

Market adoption has accelerated significantly over the last year or so and now with the launch of our GS2000 solution, we expect to see the pace quicken even more. Take a look at door locks, for example. Initially door lock manufacturers were concerned by Wi-Fi's power consumption and considered other wireless technologies for remote controlled door locks. Today, several of them are adopting ULP Wi-Fi. These manufacturers appreciate the convenience of Wi-Fi in connecting to smartphones and existing Wi-Fi routers in the home, the extended battery life provided by the GainSpan solution and the embedded networking stack running on the chip.

At what stage is GainSpan's development? Are you shipping finished product to market?

We've been shipping Wi-Fi chips and modules for several years. And now, we are sampling the new Wi-Fi (IEEE802.11/b/g/n) and ZigBee IP (IEEE 802.15.4) combo chips and modules and will be in volume production before the end of the year.

Does GainSpan intend to standardize its technology, or to license it to other companies, and is this necessary to achieve global success?

GainSpan's chips and modules are Wi-Fi Alliance® certified and, as such, are already "standard." The new GS2000 chips and modules will also be Wi-Fi Alliance and ZigBee Alliance certified.

www.gainspan.com

2013 USA Wearable Technologies Conference

As most Incisor readers will know, we teamed up with the organisers of the 2013 USA Wearable Technologies Conference, which took place at the end of July. We were to help promote the conference to Incisor's global subscribers prior to the event taking place, and then we would attend and film the conference to create a video record. This would be used to help extend the reach of the conference and the messages of its contributors to the much larger audience that wasn't able to attend.

We aren't attempting to claim the glory for this, but the reality was that the event was a complete sell-out several weeks before it took place. About 300 people attended the event, including visitors who had travelled from far and wide.

And the conference was well supported by sponsors and exhibitors, too. Flextronics took the main sponsor position and had a strong presence throughout the event.

Much attention was given to bringing delegates and sponsors together, with multiple networking sessions throughout each of the two days. This seemed to be appreciated by all who attended.

From our own perspective it was a real eye-opener to see just how much development was going in the wearable technology market. Long-term Incisor readers, and wireless industry watchers will be aware that companies started making noise about wearable technology during the early days of Bluetooth – we're talking 5,6,7 years ago. We remember testing a Bluetooth-enabled ski jacket that resulted from a co-operation project between Motorola and Burton way back in 2006. At that time, though, most of the wearable technology that was on offer was hardware-based, somewhat clunky, with not much thought given to real world applications.

Now we live in a different world. Not only are more hardware options available (and cheaper, and less power-consuming, and they work better), but they are nearly all connected to real-world applications, whether market-specific – e.g. medical, health and fitness, fashion etc., and they virtually all have some 'Internet of Things' element to them, adding to the vast, Big Data cloud that now orbits the planet.

Click on the movie screen above to watch the video.

Wearable technology is obviously good. Wearable technology that links into planet-wide connected ecosystem is better.

Some of the demonstrations that we saw were mind-boggling. How about the world's smallest ingestible sensor – a tiny, grain of sand sized sensor that is made of dietary minerals and designed to be embedded directly in a patient's medicine? This was from Proteus Digital Health. An augmented reality contact lens. Tech-embedded underwear and a smartphone app to help you pleasure your partner while you are away on a trip (honestly!). Wear all day cameras. Pain treatment products that are as easy to apply as a sticking plaster. Textile based sensors. Wearable diagnostics patches. The list was long, and extremely impressive.

Rather than try to tell you more about the conference in the written word, we would like to invite you to watch what Incisor.tv went to San Francisco to create – the main review above and the series of movies that can be viewed on the following page. And you know, they say that a picture is worth a thousand words. In which case our videos are a veritable War and Peace-style overview of the Wearable Technologies Conference.

These events take place around the world and through the year. The next one takes place in Taipei, Taiwan during October. You can find details at this link. If you want to see some of the latest implementations of leading-edge wearable technology, we can't think of a better place for you to go.

> "I would like to congratulate you on the excellent conference that was well attended by great caliber people and the organization was excellent."

Richard Stokvis, CEO at Seconbeat and speaker at the Wearable Technologies Conference

USA 2013 Wearable Technologies Conference video archive

Over the course of the two day Wearable Technologies Conference, the Incisor.TV team created a number of individual movies in addition to the main review streamed from the previous page. Here is a selection of those movies.

Click on the screens to watch your chosen movie.
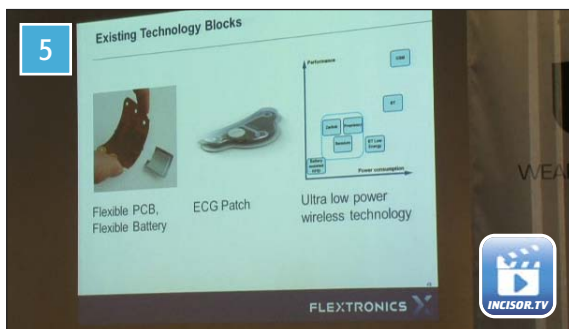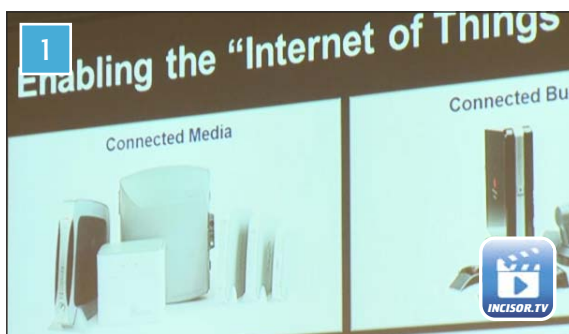
VIDEO SYNOPSIS

1. *John Dwyer presents on behalf of Flextronics.*
2. *Billie Whitehouse, Wearable experiments talks about Fundawear!*
3. *Beecham Research reveals its Wearable Technologies market findings.*
4. *Cindy Soo, Flextronics, talks Experience Design.*
5. *Wearable Technology in the medical space – Lior Shtram, Flextronics.*
6. *Conference summary from Christian Stammel, John Dwyer and Vince Holton.*

Incisor.tv events

2014 INCISOR.TV WIRELESS ROUNDTABLE OPENS NEXT MONTH

THE OCTOBER ISSUE OF INCISOR WILL INCLUDE A FULL PREVIEW OF THE THIRD ANNUAL INCISOR.TV WIRELESS ROUNDTABLE INDUSTRY EVENT, WHICH WILL TAKE PLACE ONCE AGAIN ALONGSIDE THE CONSUMER ELECTRONICS SHOW IN LAS VEGAS.

WE WILL BE INVITING ALL KEY PLAYERS IN THE WIRELESS SECTOR TO PARTICIPATE. IF YOU WANT TO BE A PLAYER, YOU HAVE TO BE IN THE GAME!

CLICK THE VIDEO SCREEN BELOW TO WATCH THE 2013 WIRELESS ROUNDTABLE REVIEW

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Chuck Sabin, Director of Product Management & Planning, **Bluetooth SIG**

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Frans Campfens, Senior Innovation Manager, **Liander**

William Webb, CEO, **Weightless SIG**

Bruno Basquin, Chair of M2M and eUICC Working Group, **SIMalliance**

Renaud Di Francesco, Director, European Technology Standards, **Sony**

Duncan Bees, CTO & CBO, **Home Gateway Initiative**

www.iotconnectevent.com

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low energy wireless news

ZigBee's 2012 lead in Home Automation to be surpassed by Bluetooth in 2015

A lot of press releases that arrive at Incisor's in-box have no relevance to us whatsoever, and you wonder whether the client shouldn't be questioning the competence of its PR agency. But sometimes, the right press release arrives, and at the right time. Like this one, just in time for our ULP focus, and in which we learn that ABI research expects annual home automation device shipments to exceed 351 million by 2018, growing at a CAGR of 78%. ABI suggests that ZigBee dominated the IEEE 802.15.4 part of the market and claimed the top share of node shipments at 4.5 million, narrowly beating out proprietary protocol offerings.

Senior analyst Adarsh Krishnan, commented, "ZigBee is enjoying success in the home automation market because, as an open standard technology, multiple IC vendors are creating ZigBee chipsets. Quite simply, open standard technologies are considered less risky and highly scalable when compared to the closed ecosystems of proprietary RF technologies."

ABI also suggests that another wireless communication protocol that has gained traction in the home automation market is Z-Wave. ABI Research is a US-centric business, by the way, so see our Z-Wave related comments in our main ULP review.

ABI does suggest that smart devices that use the Bluetooth Low Energy (BLE) protocol part of Bluetooth v4.0 single-mode specification will experience the highest growth in the category, reaching over 133 million units by 2018. Practice director Dan Shey explained, "Consumer electronics (CE), including smartphones, tablets, and laptops equipped with Bluetooth are a major contributor to Bluetooth growth in home automation. Not only do these devices drive production

economy of scale advantages but CE's are also growing a role as a tool for managing and interacting with home automation systems."

ZigBee implemented in Set-Top Boxes

The ZigBee RF4CE standard is gaining acceptance in the set-top box (STB) market, says research company IHS, where it currently serves mainly as a replacement for infrared (IR) technology in remote controls. However, due to the development of multi-protocol ICs, ZigBee technology is also set to allow STBs to become the centrepiece of automated homes.

IHS forecasts that a total of 30 percent of STBs shipped globally in 2018 will integrate support for ZigBee RF4CE, up from just 3 percent in 2011, and under 7 percent last year. The remaining STBs will use either IR technology or will include support for other RF technologies (such as Bluetooth) within remote controls.

"The latest generation of ZigBee chipsets support more than one separate profile, enabling STBs to communicate not only with ZigBee RF4CE remote controls, but also with ZigBee Home Automation-enabled devices," Lisa Arrowsmith, associate director for Connectivity at IHS told Incisor. "This can allow the STB to act as a central gateway to enable cloud-based remote home-control services, as operators seek to reduce customer churn and to increase average revenue per user."

Comcast has already announced its Xfinity Home Control platform, in which both ZigBee RF4CE and ZigBee Home Automation are supported, allowing the STB to communicate with devices using either protocol.

IHS observes that, like Comcast, many other key service providers are looking for ways to create new revenue streams and differentiate themselves from their competition. Adding home automation services is viewed as one way to achieve this goal.

RFID wristband for festival market helps event promoters protect revenue

Identification solution developer PDC has released its new SecurLock wristband closure at one of southern California's largest annual music festivals. SecurLock is a one-way sliding closure with a dual-thread design and gripping teeth, that if twisted, engages the woven wristband fabric to prevent transferring among festival goers.

PDC provided more than 350,000 RFID-enabled wristbands at the event. More than 25 types of PDC's Smart Woven RFID Wristbands were used to grant access to certain areas for different tiers of attendees including general admission, VIP, staff, artists, production, etc. The wristbands were also used for social media integration, allowing fans to "check-in" on Facebook at their favourite stage throughout the duration of the event.

Talking to Incisor post-event, Robin Barber, vice president of leisure and entertainment for PDC said, "PDC has been delighted to design the high-security wristbands for such a well-acclaimed music event. SecurLock is an aggressive, tamper-proof closure that helped this massive festival be another success story for PDC's RFID Solutions Group."

Barber added that since its launch in 2001, PDC's Smart Band RFID Wristband System has been used by leading music festivals and venues to deliver unique and convenient applications that help redefine the guest experience, while reaping bottom line benefits to the festivals that use them. Applications include: cashless point-of-sale; cashless arcade and vending; social media integration; keyless hotel and locker access; electronic access control; photo management systems; and customer loyalty programs.

low energy wireless news

GainSpan samples GS2000 Wi-Fi/ZigBee IP chips and modules

Ultra-low power Wi-Fi company GainSpan, which is featured elsewhere in this issue's ULP review, is sampling its new family of GS2000 chips and modules. The company claims that the GS2000 is the industry's first single chip solution bringing together both Wi-Fi (802.11b/g/n) and ZigBee IP (802.15.4). The new Wi-Fi/ZigBee IP chip is intended for battery and line-powered connected devices for the Connected Home, Smart Energy, metering, healthcare and high-speed audio, video and security applications.

GainSpan suggests that by incorporating Wi-Fi and ZigBee, which support both IPv4 and IPv6 devices, the GS2000 extends IP connectivity. Wi-Fi brings local connectivity to smartphones and remote connectivity through the Internet. It leverages the installed base of Wi-Fi access points and hotspots. ZigBee IP extends the reach of IP to more battery operated devices, through the use of smaller channelization and meshing.

"Only Wi-Fi and ZigBee IP provide for and support IP addressing and methods, extending these Internet protocols directly to a device or sensor," Greg Winner, president and CEO, GainSpan told Incisor. "To deliver on the vision of the Internet of Things, range, power consumption, ease of deployment and network management are often more critical than other factors. The GS2000 addresses line powered as well as battery operated applications cost effectively, both necessary to achieve that vision."

The GS2000 System-on-a-Chip (SoC), contains multi-standard RF as well as both 802.11b/g/n and 802.15.4 PHY/MAC functionality, dual ARM Cortex -M3 processors, networking stack and services, and memory to support various application profiles. It supports Wi-Fi WLAN software, ZigBee IP-- which is based upon 6LoWPAN--

and IP based addressing and methods over both 802.11 and 802.15.4 wireless standards.

Samples of the GS2000 Wi-Fi/ ZigBee IP combo SOC and modules as well as evaluation and development kits are currently shipping, said Winner, with volume shipments expected later this year.

Oberthur, Gemalto, and G&D top ABI Research's NFC Smart Card ranking

Oberthur was the highest-ranked vendor in ABI's Competitive Assessment. In terms of market presence, it is second only to Gemalto, but its Implementation score was boosted by it becoming the first smart card vendor to achieve significant wins for eSEs. Oberthur was judged to have a broad portfolio with high-level partnerships allowing it to serve a wide cross-section of applications by enabling a set of end users to utilize NFC. The combination of its level of technical development and product features resulted in it achieving a high score across the Innovation criteria.

Gemalto was ranked second overall by a single point. It has the largest market presence with a portfolio that is very much focused on mass market solutions. This can be detected in its strategy to focus primarily on payments and mobile financial services, with less emphasis on establishing a broader network of partners and products that may be able to better serve other applications. However, ABI recognized that Gemalto has led from the front with strong innovation and a well thought-out strategy for its existing NFC portfolio.

G&D was ranked in third position overall, scoring in both major groups of criteria. It has been an early innovator and proponent of NFC, establishing products to serve its partners and customers as the market has evolved.

Is Apple about to boost NFC?

Apple has filed a patent application for the ability to "gift" digital content via Near Field Communication (NFC).

The application titled "Media Gifting Devices and Methods" describes ways in which one user can bring their NFC-enabled iDevice – an iPhone, for example – within range of a second user's, and pass the offer of a gift of a media file to that second person.

Should the "giftee" accept the offer from the "gifter" and if the gifter's device has an online connection, the gifter's account would be charged for the media file, which would then be downloaded to the giftee's device from the online provider, which in Apple's case would be the iTunes Store, along with any appropriate DRM keys

If an online connection isn't available, the giftee device would obtain from the gifter a locked version of the gifted file from the gifter's device, along with a gift license. The media file could then not be played until the giftee went online, at which point the content provider would charge the gifter for the content and unlock the media file on the giftee's device.

Could this be the breakthrough that NFC has needed? The lack of NFC in the iPhone 5 was not only a surprise but also a major disappointment to the NFC community. With NFC penetration of the (non-Apple) smartphone market starting to happen, could Apple's seeming gravitation to NFC support mean that 2013 (2014, really) will be NFC's year? Like 2012? And 2011? And 2010? Repeat... Repeat....

Over 45% of Wi-Fi Chipsets in CE Devices in 2017 to support 802.11ac

Researchers at IHS have been examining the Wi-Fi market, and suggest that the increasing demand for bandwidth from mobile devices will spur the rapid adoption of next-generation Wi-Fi technology, with shipments of chipsets supporting the new 802.11ac standard set to account for nearly one-half of all Wi-Fi chipsets shipped for use in the consumer electronic device market in 2017.

Shipments of 802.11ac chipsets will make up 47 percent of all Wi-Fi chipset shipments in 2017, up from just 1.3 percent in 2013, according to the IHS Connected Devices Database. This will amount to a compound annual growth rate (CAGR) of more than 430 percent from 2012 to 2017.

However, another IHS study entitled "802.11 – New Markets and New Technologies – 2013 Edition", which examines the broader range of device segments which contribute to the wider Internet of Things, found that the transition to 802.11ac in device segments other than consumer electronics—such as fleet management and consumer health monitoring—will occur far slower, if at all. This is because many of these applications do not require the higher data rates offered by 802.11ac to perform basic connectivity functions, such as low bit-rate data transfer.

The 802.11ac standard provides up to three times the speeds possible with the incumbent 802.11n technology. The higher speeds are attained through advances such as support for wider frequency bands and more complex antenna configurations.

Lisa Arrowsmith, associate director of connectivity research at IHS told Incisor, "Bandwidth requirements continue to increase, both in residential and enterprise networks. Consumers continue to stream higher levels of video content to mobile devices. Meanwhile, the bring-your-own-device trend is straining enterprise network bandwidth. Longer term, the trend toward cloud-based computing is likely to exacerbate these problems. All these developments are spurring demand for the faster Wi-Fi speeds delivered by 802.11ac."

Mobile devices lead the charge to 802.11ac

ABI believes that smartphones, networking equipment and laptop PCs are spearheading the adoption of 802.11ac, with strong uptake occurring in the first half of this year.

Among smartphones, for instance, the HTC One and Samsung Galaxy S4 included support for 802.11ac earlier this year. It's also widely believed that the next iteration of Apple's iPhone will include the faster Wi-Fi standard. Earlier in June, during its Worldwide Developers Conference, Apple had announced the inclusion of 802.11ac in its Airport Extreme and Time Capsule products as well as in the revised MacBook Air, signifying Apple's support for the technology.

On the enterprise side, in April Cisco Systems released an 802.11ac module for its Aironet 3600 series of access points. For its part, Aruba Networks included 802.11ac in its 220 series of access points.

Traffic bypass

ABI finished up by adding that the arrival of 802.11ac technology will make Wi-Fi more attractive to operators looking to offload cellular data traffic.

Liam Quirke, senior analyst for connectivity at IHS observed, "The move by 802.11ac toward the 5-gigahertz band, along with its increasingly complicated multiple-input and multiple-output (MIMO) configurations, will help to further improve the robustness of Wi-Fi technology, making it more attractive to operators looking to offload cellular data traffic while maintaining the same level of experience and reliability."
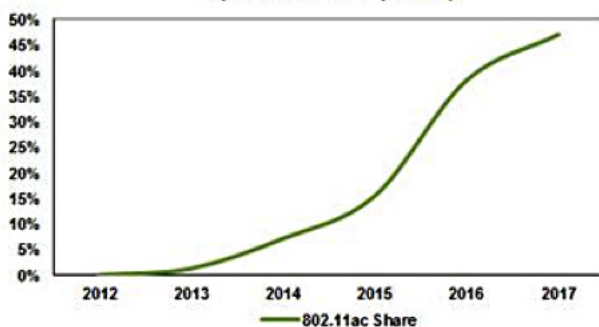
The chart shown here presents the penetration of 802.11ac among shipments of Wi-Fi chipsets.

Snippets

802.11ac Wi-Fi finds biting point in consumer AP market-place

Worldwide consumer Wi-Fi customer premises equipment (CPE) shipments surpassed 43.3 million at the end of 1Q-2013; a 16.8% increase from 4Q-2012. "802.11n device shipments still dominate the market, accounting for more than two thirds of total device shipments; however, 802.11ac access point adoption is starting to gain traction," said Jake Saunders, VP and practice director of forecasting at ABI Research.

Devices with the very latest Wi-Fi standard, 802.11ac, started to enter the market in late 2012. According to ABI Research's "Wi-Fi Equipment" Market Data, a total of 0.2 million consumer 802.11ac Wi-Fi APs shipped in 1Q 2013. 802.11ac protocol enables speeds up to 1.3 Gbps as well as better coverage than 802.11n. ABI Research expects that 1 million of 802.11ac consumer access points will be shipped by the end of 2013.

high-speed wireless news

connectBlue adds WLAN channels for full dual-band coverage

connectBlue's embedded Wireless LAN (WLAN) modules have had their frequency channel range expanded to fully cover both the 2.4GHz and the 5GHz ISM bands. The company told Incisor that the extended channel range makes it easier for customers to use the modules according to local market preferences in order to plan for a robust and interference-free wireless connection.

Most WLAN devices have traditionally used the unlicensed 2.4GHz industrial, scientific and medical (ISM) radio band. However, several more wireless technologies – such as Bluetooth, ZigBee, Wireless HART – also use the 2.4GHz band, so the unlicensed 5GHz band offers a less crowded radio space for WLAN. The greatest strength of the 5GHz band is the availability of 23 non-overlapping frequency channels – 20 more than is available in the 2.4GHz band.

Rolf Nilsson, CEO of connectBlue commented, "Our customers need such robust functionality as their factories or hospitals require faultless wireless connectivity 24/7. They tend to use 2.4GHz for their wireless office communication and 5GHz for their wireless M2M communication. Dual-band functionality is thus one of our strongest features in our WLAN product offering."

The WLAN IEEE 802.11b/g/n radios utilize the 2.4GHz band and the IEEE 802.11a/n radio utilizes the 5GHz band. The 5GHz band is divided up into sub-bands called U-NII bands (Unlicensed National Information Infrastructure). These U-NII bands have varying local market acceptance and Nilsson suggested that access to the full 5GHz channel coverage makes it easier for connectBlue customers to market their end products according to local requirements.

Snippets

Weightless SIG passes 1,000 member milestone

The Weightless SIG has announced that NextG-Com, a protocol stack and wireless embedded system component developer, has joined the Weightless SIG as its one thousandth Member. NextG-Com joined the Weightless community earlier this year as an SIG Associate member as a first step in understanding the opportunity for Weightless technology. Since this time the company told Incisor that it has been developing a series of M2M terminal protocol stack solutions and related components. NextG-Com has now migrated to Core membership of the SIG to take a more active and participative role in the working groups helping to define future developments of the standard.

Commenting at the time of the announcement, Professor William Webb, CEO of the Weightless SIG told us, "We are delighted to have reached this significant milestone in our membership so early in the evolution of the Weightless ecosystem. As we enter the next phase in our growth contributions from companies such as NextG-Com will be invaluable to our strategy".

Weightless is a wireless technology targeting machine communications (M2M) applications. Built on a cellular architecture Weightless claims to be the only data pipe of its kind that has been specifically optimised for global, long range, infrequent transmission of small data packets generated by M2M applications.

The Tech Success Awards are an initiative of **TechWeekEurope**, a leading technology news and advice website. Presented for the first time in 2012 Tech Success Awards celebrate successful IT projects in the UK across seven major categories.

Click on the graphics above to be taken to the Tech Success Awards web site.

"The arrival of cloud and mobile technologies is ushering in a new era, where IT departments can become more responsive to user needs. We are recognising this with a set of awards that recognise the way organisations are capitalising on this change."

Peter Judge
TechWeekEurope UK Editor

events

DATE	EVENT	LOCATION	NOTES	LINK
Sept 22 - 23 2013	Weightless M2M Summit	London, UK	Contact TOM HARRISON ON +44 (0)1494 445074	http://www.weightless.org/weightless-m2m-summit/
Sept 10 - 11 2013	Energy Event 2013	National Exhibition Centre, Birmingham, UK	EnOcean Alliance will exhibit	
Sept 10 - 17 2013	Bluetooth SIG Working Group Summit	Montreal, Canada	-	www.bluetooth.org
October 1 - 4 2013	ANT+ Member Symposium	Kananaskis, Alberta, Canada	For more information: symposium@thisisant.com	http://www.thisisant.com/business/ant-membership/symposium-info/
October 9 2013	Wearable Technologies Conference Asia	Taipei, Taiwan	-	http://www.wearable-technologies.com/events/wearable-technologies-conference-i-asia
Nov 5 - 8 2013	WTshow@A+A	Dusseldorf, Germany	-	http://www.wearable-technologies.com/events/a-a-2013
Nov 12 2013	Intelligent Sensor Networks	Eindhoven, The Netherlands	-	http://www.isnconference.com/
Nov 20 - 23 2013	WTshow@Medica	Dusseldorf, Germany	-	http://www.wearable-technologies.com/events/medica-2013
Jan 7 - 10 2014	International CES	Las Vegas, Nevada	-	www.cesweb.org
Jan 8 2014	2014 Incisor.tv Wireless Roundtable	Las Vegas, Nevada, USA	Contact vholton@incisor.tv for more information	

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