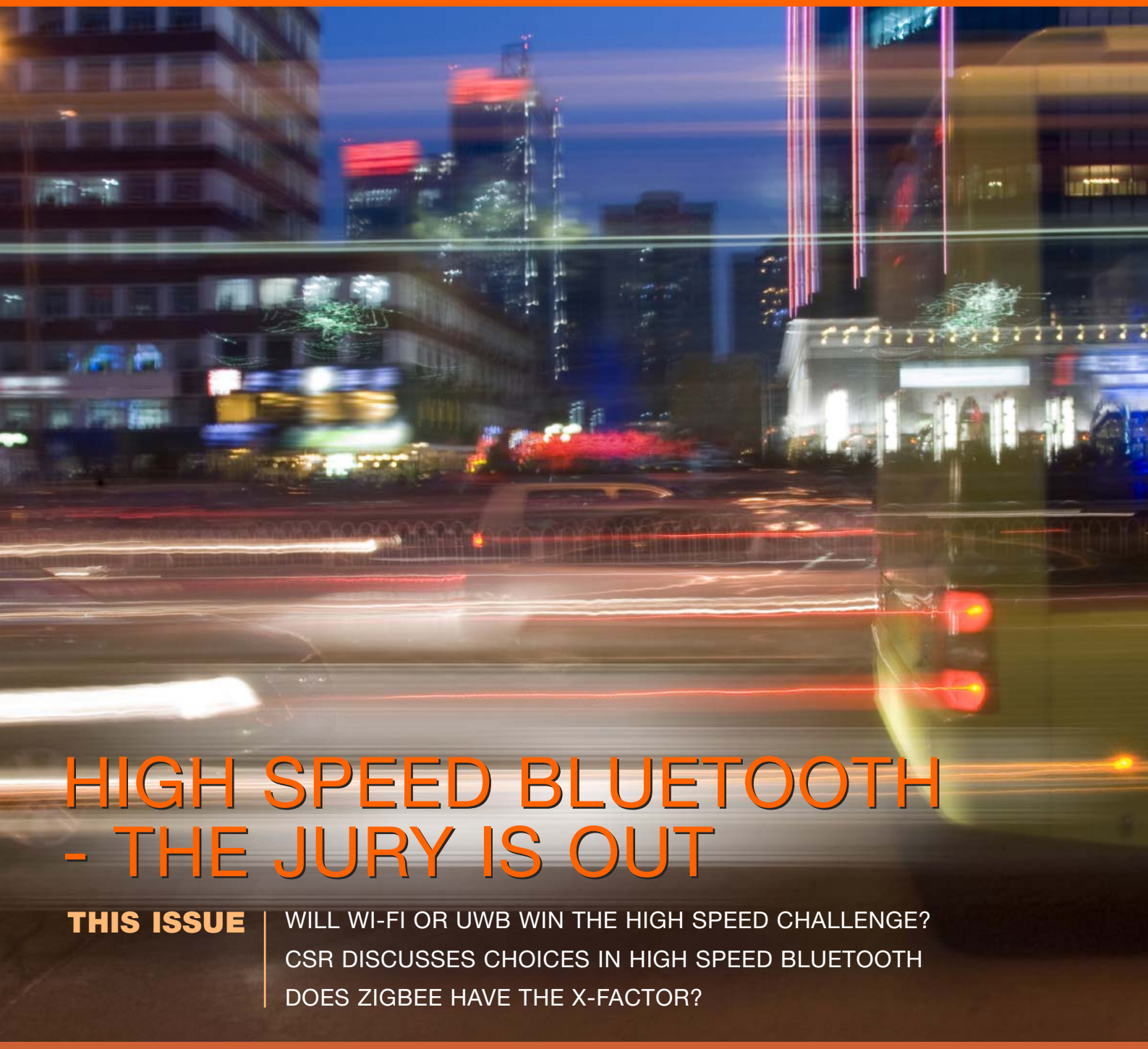
INCISOR™

for the short range connectivity environment

Video enabled Issue 126 September 2008



HIGH SPEED BLUETOOTH - THE JURY IS OUT

THIS ISSUE

WILL WI-FI OR UWB WIN THE HIGH SPEED CHALLENGE?

CSR DISCUSSES CHOICES IN HIGH SPEED BLUETOOTH

DOES ZIGBEE HAVE THE X-FACTOR?

www.incisor.tv

sponsored by csr STACCATO COMMUNICATIONS IMS RESEARCH

challenges at spectrum extremes

OK, in this instance I am talking about the extremes of the WPAN performance spectrum – both high and low.

It has been public knowledge for some time now that an intense debate has been going on within the Bluetooth community to resolve which high speed data transport will be aligned with Bluetooth for the forthcoming Seattle release of the spec – Bluetooth 3.0 to the outside world, or – formally – high speed Bluetooth.

At one stage it seemed that UWB was the sure-fire certainty, and yet Wi-Fi's proponents were not willing to give in so easily. Paul Rasmussen has been talking to key players within the Bluetooth SIG, and those at some of the most significant companies in the industry. Paul comes to a conclusion that I'm not sure I agree with – feel free to let me know what you think yourselves. Email me at **vholton@incisor.tv**.

Meanwhile, Dean Gratton re-visits ZigBee. It is 12 months since we last reviewed ZigBee, and Dean assesses where the technology is today. You would think that the ZigBee Alliance would be happy to bring us up to speed, but the best we were able to get was the views of someone from its PR agency. ZigBee is getting a lot of negative feedback – in the industry and in the media. Incisor has no axe to grind and would welcome input form the Alliance and/or its members. At this stage we are not getting it, and I apologise for that. This is the only WPAN industry organisation that operates in this reclusive way.

If they don't want to talk to the world, you've got to ask - why?

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

CONTENTS

EDITORIAL CONTACTS

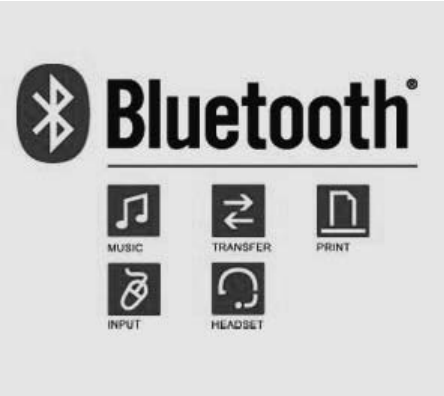
INCISOR IS PRODUCED/DISTRIBUTED BY :
Click I.T. Limited
www.incisor.tv
Hampshire Gate, Langley, Rake
Hampshire GU33 7JR, England
Tel: +44 (0)1730 895614

CONTACT DETAILS:
Publisher/Editor-in-chief:
Vince Holton · vholton@incisor.tv
Telephone: +44 (0)1730 895614

Contributing writers:
Rebecca Russell, Manek Dubash,
Dean Anthony Gratton
Paul Rasmussen, Mads Oelholm.

Views expressed within are those of the Incisor editorial and management representatives, and of the representatives of sponsor companies. Incisor is distributed on a monthly basis to companies and individuals with an interest in short range wireless technology.
Subscribe to Incisor free of charge at:
http://www.incisor.tv/subscribe.php
Should you wish to stop receiving Incisor, please send a message titled 'UNSUBSCRIBE' to:
mailto:incisor@incisor.tv

news



Bluetooth SIG enhances testing program

The Bluetooth Special Interest Group (BSIG) has launched an enhanced version of its Bluetooth Profile Tuning Suite (PTS). For those who haven't stumbled across this so far, the PTS simulates multiple Bluetooth devices and profiles for interoperability testing and lets companies test in-house.

In preparation for what the BSIG describes as 'an explosion of development' around the upcoming Bluetooth high speed and low energy specifications, the PTS Version 3 adds test suites for seven profiles that will address new applications like health devices and streaming video, support for Windows Vista and an improved user interface.

From talking to BSIG members, Incisor knows that the PTS has had a fairly profound effect on the test market, and the BSIG is itself in no doubt. "The PTS has saved Bluetooth SIG member companies millions of dollars in time and expense associated with device qualification and contributed to greater interoperability between the two billion Bluetooth devices in existence today," said BSIG exec director Mike Foley. "With so much new development and demand, our organization has a growing challenge of making sure all possible combinations of Bluetooth devices work well together. PTS Version 3 makes that possible."

Many of the profiles supported in PTS Version 3 address new and future application arenas - particularly streaming video, remote control, and health and fitness monitoring - which will be made possible with the release of high speed Bluetooth and Bluetooth low energy in 2009. The new or updated profiles include:

- Audio/video remote control profile (AVRCP 1.3)
- Video distribution profile (VDP)
- Health device profile (HDP)
- Dial-up networking (DUN)
- Phone book access profile (PBAP)
- Basic printing profile (BPP)
- SIM access profile(SAP)

PTS Version 3 is available for download now.

CSR and Intel save laptop energy

CSR has collaborated with Intel to redesign how its integrated Bluetooth device interacts with a laptop PC, and suggests that laptops employing the new technology from CSR and Intel will save up to 1 Watt. This new technology, which is called Bluetooth Advanced Power Management (APM), could provide next-generation Intel-based laptops with up to an extra 30 minutes of battery life.

As part of the collaboration, CSR developed new Bluetooth firmware and complementary Windows software which implements an Intel-developed power-saving technique called USB Sideband Deferring. The objective is to eliminate the power drain caused by frequent polling of the Bluetooth chip by the USB subsystem.

Unsurprisingly, Intel mobile processors implement many techniques to save power. One of the most important is switching to low power sleep states when idle. An important sleep state is called C3. Apparently, an integrated USB Bluetooth device can prevent the processor from entering the C3 state because it needs to be constantly polled to check whether it has any data to send to the system. This constant polling prevents entry into C3. Bluetooth APM lowers power consumption by making sure that the Bluetooth device is only polled when it has data to pass to the system. The rest of the time the processor can enter C3.

"Laptop PCs are increasingly becoming an integral part of contemporary mobile lifestyle. Bluetooth technology further advances the paradigm of unwired computing. CSR's implementation of Intel's USB Sideband Deferring technology makes this possible while saving system power," said Kamal Shah, manager, Mobility Enabling Initiative, Mobile Platforms Group, Intel Corporation.

Bluetooth Advanced Power Management is available now using firmware for CSR's Flash memory-based BlueCore4-External, and Incisor was told that equivalent ROM-based silicon will be sampling to lead customers in September 2008.

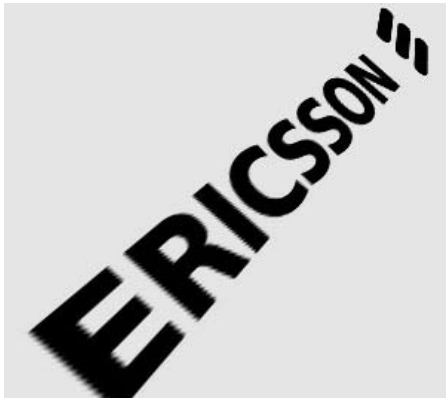
Bluetooth V2.1+EDR tester validated

Test solutions company AT4 wireless' BITE Protocol tester T1212 has recently obtained validation from the Bluetooth SIG for the Bluetooth 2.1+ EDR specification. AT4 wireless claims that this makes the T1212 the only validated test tool today for the 2.1 + EDR spec.

Secure Simple Pairing, Extended Inquiry Response or Erroneous Data Reporting are among the features available in the new Core Specification, and now that a validated test system is commercially available, the Conformance Test Cases for these new features have been passed to Category A. This means that Bluetooth device manufacturers are able to qualify their products against the latest spec at any of the Bluetooth SIG recognised Test Laboratories.

"Our existing customers, and new ones too, now have access to qualified and recognised cutting-edge wireless solutions to test their Bluetooth implementation," said Angel Romero, short range wireless product manager at AT4 wireless.

news



Bluetooth low energy – one size fits all

The Bluetooth SIG's market research partner IMS Research has recently published it's latest report covering the Bluetooth industry -"The World Market for Bluetooth Low Energy Wireless Technology - 2008 Edition" and believes future prospects are looking very good indeed.

There is little doubt that Bluetooth low energy wireless technology is the current zeitgeist. IMS predicts that low energy Bluetooth will provide a solution that enables the industry to diversify whilst retaining an interoperable standard.

Fiona Thomson, Research Director for IMS Research's Connectivity Group points out that devices that require an ultra low-power connection are currently using proprietary alternatives, and predicts that the days for such solutions could be numbered, "Considering Bluetooth technology's legacy, Bluetooth low energy technology is a prime candidate to supplant these proprietary ICs, especially in devices where interoperability is a must."

IMS' report identifies several reasons for Bluetooth low energy wireless technology to be a success, but also goes so far as to suggest that it has the potential to be the fastest shipping wireless technology so far. How so? Well, IMS says that factors include a negligible add-on cost, general market awareness and acceptance of Bluetooth, legacy Bluetooth devices and dual-mode replacement.

Highlights of IMS' report include:

- Analysis of key market drivers and inhibitors for Bluetooth low energy technology.
- Market growth forecasts to 2013 for both dual mode and single mode Bluetooth low energy ICs and resulting revenues.
- Market growth forecasts to 2013 for dual mode and single mode-enabled devices including watches, cellular handsets, heart rate and blood pressure monitors.
- Detailed technology review which considers technical specification, Bluetooth profiles & competing technologies.
- A competitive environment analyses the current Bluetooth market situation before considering how the dynamics might evolve.
- Profile of 14 of the most influential IC vendors to the future Bluetooth low energy wireless technology market.

Thomson added that In many cases, especially in the market for cellular handsets, where much of the volumes are expected, it will simply be a case of replacing a classic Bluetooth IC with a dual-mode Bluetooth low energy IC. This will enable consumers to take advantage of the new services and applications that Bluetooth low energy technology can offer.

As a cautionary note, IMS Research says that it does not envisage Bluetooth low energy-enabled devices until 2010.

Anyone interested in buying the report should go to www.imsresearch.com.

Ericsson and ST-NXP wireless merge –TI threatened?

STMicroelectronics and Ericsson have announced an agreement to merge Ericsson Mobile Platforms and ST-NXP Wireless into a joint venture. The 50/50 joint venture will be a major supplier to Nokia, Samsung, Sony Ericsson, LG and Sharp. As ST-NXP Wireless was launched as an 80-20 venture between STMicroelectronics and NXP, ST will acquire the remaining shares under the terms already agreed with NXP.

And what does each company bring to the party? Well, ST will contribute multimedia and connectivity solutions as well as a 2G/EDGE platform and 3G offering, whilst Ericsson contributes its 3G and LTE platform technology. The joint venture will deliver modems, multimedia and connectivity solutions for 2G/EDGE, 3G, HSPA and LTE technologies, plus hardware, software and support for handset manufacturers.

The business in the 50/50 joint venture will be led by a development and marketing company with approximately 7,000 people employed (the company appears not to have a name of its own at the moment - there was nothing mentioned in the official press release dated the 20th August). A separate platform design company, with approximately 1,000 people employed, will provide platform designs to the development and marketing company. Of the almost 8,000 people employed, almost 5,000 will be from ST-NXP Wireless and roughly 3,000 will be from Ericsson Mobile Platforms. The new company will be fabless and will use silicon technologies and manufacturing capabilities from ST and other external providers.

This joint venture, which will supply four of the world's top give mobile-phone makers, could be seen as a threat by one semiconductor business in particular – Texas Instruments. It is likely that Ericsson will not be doing as much business with TI, resulting in TI losing more market share.

TI has enjoyed a dominant position in the cellphone chip market, but has seen its position unsettled by the shift among some of its top customers to a multi-supplier strategy. TI's biggest customer has been Nokia, but the Finnish giant had already started working with other suppliers such as Broadcom and ST.

news

Time for power cable co's to diversify

Keeping all of our mobile devices powered up is, to put it bluntly, a pain in the AC. Not only do you have to have one eye permanently on the 'state of battery' indicator, but you have to carry a collection of adapters to power everything (naturally, there is no commonality). Your laptop, especially, demands that you carry two cables as thick as a baby's arm with a weighty brick in the middle. Very convenient.

Wouldn't it be great if the wireless technology that is taking over the world could be extended to delivering electricity? Though Incisor has reported briefly on this topic once before, it has always seemed somewhat fanciful. Hope springs eternal, though, and help is at hand. Intel has been researching wireless charging technology and has shown it off for the first time.

As part of the final day of the Intel Developer Forum (IDF), Justin Rattner, Intel's CTO, introduced the company's wireless power efforts. The technology enables recharging wirelessly by making use of electric coils that are programmed to resonate at the same frequency. Intel's system uses two metal rings connected to a power amplifier. The two rings transmit power to any device close to it. Using work done last year by Massachusetts Institute of Technology researchers as the platform, Intel was able to light a 60-watt light bulb from 3 feet away. As of today the system is not particularly efficient (about 75 percent efficient when transmitting 60 watts two feet), but given time that could improve. And it is apparently safe too. Which is nice.

There is a way to go before this is consumer ready, and researchers admitted that they were using charging coils that were way too large for use for consumer electronics.

So, the day when we will be able to leave all of our cumbersome power cables behind may be some way off, but it is good to know that some progress is being made. And if your company is currently making great profits out of supplying all of those endless power cable solutions, it might be a good time to think about some new lines of business.

Motorola handset business has new CEO

Sanjay Jha, the former COO of Qualcomm, is now the CEO of Motorola's wireless handset division, which continues to face challenges. The US giant recently fell to third place in the handset market, behind Nokia and now Samsung. Meanwhile, LG Electronics is hot on Motorola's heels in fourth place.

What's more, it is widely known that Motorola's handset business has been for sale since earlier this year, and officials had previously said the the handset business would become an independent public company by the middle of next year Jha, who is now also co-CEO of the whole company, sharing duties with Greg Brown, will have to oversee this complicated transition.

Before moving into management at Qualcomm, where he was president of the CDMA Technologies division, Jha held engineering roles at Brooktree and GEC Hirst Research Labs. He has a Ph.D. in electronic and electrical engineering from the University of Strathclyde, Scotland.

Softransceiver RFIC co raises new funding

BitWave Semiconductor (See page 3, Incisor issue 119) has closed $10 million of additional financing in an initial Series B funding round. The funding will be used to take the company's BW1102 Softransceiver RFIC to market. According to BitWave, the BW1102 moves into full volume production during Q4/2008 for fulfilment of initial supply contracts.

BitWave's Softransceiver RFIC allows a single transceiver to be software programmed to work at any frequency, any bandwidth and for any wireless protocol. BitWave says that this approach overcomes the limitations of fixed-function transceivers and enables the design of multi-mode, multi-band wireless devices targeted at key markets such as cell phones, femtocells, wireless data cards, and public safety radios.

"Thanks to this additional investment and our continuing investor support, we are moving rapidly to place the BW1102 Softransceiver into full production this year and to fully capitalise on the commercial opportunities available to us," commented Dr. Michael Farese, Bitwave CEO. "This funding will enable BitWave to fulfill our initial supply agreements, and to add to our customer base and partner programs in the coming months."

product review

Jabra SP700 speakerphone

Danish headset company GN Netcom is one of the companies that regularly sends Incisor new products to test, and a recent arrival - Jabra SP700 – has been gaining approval amongst those that use it.

Now, it has to be said that this is unusual. Most of the speakerphones we have tested are pretty awful, and more often than not we have found ourselves pulling the device off the sun visor and holding it in our hands in order to hear and make ourselves heard to the person on the other end of the call. Note, that normally isn't a Bluetooth-related fault, it is rubbishy speakers or microphones. But it still leaves you frustrated, illegal and questioning fitness for purpose. As an aside, how many of us end up apologising to the people we are trying to talk to and saying things like 'sorry, the Bluetooth XYZ (insert name of your gadget of choice) seems to be playing up'?

Not only does the SP700 work in the baseline guise you would expect it too, the speakerphone can also be used on its own or to transmit calls to your car's FM radio - allowing you to hear calls over the car's audio system. You just need to tune your FM radio to the frequency set on the speakerphone and you can use your in-car speakers to take and receive all calls. What's more, the SP700 supports the A2DP (stereo music streaming) profile and so you can listen to music stored on your phone while you are driving.

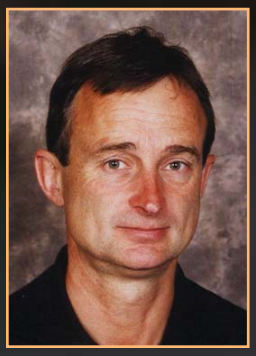
This does work well, although as often seems to be the case, music quality suffers over a Bluetooth link. This must be something to do with the codecs being used. We've also been suffering a bit with the Nokia N95 phone that we have been using to test the streaming capability. This doesn't seem capable of maintaining the streaming delivery, and every track suffers

from regular, frequent breaks in the audio. This was most frustrating on a 4 hour trip into the centre of darkest Wales, where even our national radio stations give up the ghost. We've confirmed that this is a Bluetooth-related issue as the tracks play fine when a wired headset is plugged into the phone. This is most frustrating, and if anyone at Nokia wants to investigate, we would be more than pleased to co-operate!

Anyway, back to Jabra's speakerphone. It has a glossy black finish and with DSP noise reduction & echo cancellation the sound quality is good and, as said before, volume levels are more than adequate. The SP700 also has a voice feature that will 'tell' you when your speakerphone status changes. If you are multi-lingual, this can happen in10 languages. It will also announce instructions such as 'power off', 'the caller's number' and 'connected'. This may seem like a trivial feature, but, once again, if you use a lot of different Bluetooth devices as we do, we are regularly left questioning the status of the gadget – is it on, is it off, is it connected to my phone? A spoken confirmation is useful.

There is even a 'night driving mode' that dims the integrated LED icons. And obviously you will want to know about battery life – well, Jabra quotes that using the FM Transmitter you can look forward to 14 hours of continuous talk time (or music) and 255 hours of standby time. We haven't tested this scientifically, but we also haven't managed to fully deplete the battery yet, despite extended periods of use.

The Jabra SP700 moves the Bluetooth speakerphone game on. It is a very good product that retails in the UK for around £49.99.



Not the best, but the safest – 802.11 for high-speed Bluetooth

By Paul Rasmussen

THE GESTATION OF HIGH-SPEED BLUETOOTH HAS BEEN – AND CONTINUES TO BE, LONG AND TORTUOUS. FOR SOME YEARS THE BLUETOOTH SIG (SIG) BOARD AND THE MEMBERSHIP HAVE AGONISED AND SQUABBLED OVER WHICH WOULD BE THE BEST ROUTE FORWARD – WITH UWB AND 802.11 BEING THE TWO CONTENDERS. BUT IS A PRONOUNCEMENT CLOSE AND WHAT FACTORS ARE DRIVING THE DECISION?

While the label of 'cell phones' will probably stick, handsets are fast moving on from being voice-centric. Devices with integrated cameras, MP3 players, video replay, keyboards and gaming capabilities are becoming the norm. While desirable, these features bring with them the need for data exchange with other devices – and here we're talking of transfers that could easily exceed 100Mb in a single session.

Bluetooth was never designed for this level of interaction - unless the user had several hours to waste, and someone looking to transfer images, video or music tracks to and from their cell phone will want this to happen easily and quickly.

This scenario was envisioned some years ago by the SIG who wisely established a study group to examine the technology options and issues surrounding a Bluetooth version that was capable of supporting high-speed data transfers. In March 2006 the SIG reviewed the study group's report and selected UWB as the technology of choice, primarily because of its capability to transfer data at 100s of megabytes-per-second at significantly lower power consumption than Bluetooth.

All looked set fair for UWB to gracefully fall into step with Bluetooth. But, after more than two years, no Bluetooth UWB option is available.

This delay promoted the SIG to look for a fallback option, and 802.11 was pushed forward as the natural candidate on the basis of its proven technical capabilities →

and the adoption of the Wi-Fi into a small, but growing, number of handsets.

This move, as seen by UWB supporters within the Bluetooth membership, would provide little more than a stopgap given its relatively low transfer rates (25Mbps to 35Mbps) and poor performance when asked to run at low power settings. UWB advocates maintain that 802.11 is at the top of its maturity curve and little more throughput is possible, while UWB is operating at between 260Mbps and 300Mbps today with 1Gbps being possible in the next generation.

Further doubt is heaped upon 802.11 due to the changes required to turn the technology into a PAN that can operate at low power consumption within peer-to-peer applications. Some UWB developers even claim that when 802.11 is switched into being a PAN, throughput drops by around 30 per cent.

UWB Progress

While these same developers would accept that UWB is behind schedule, they state that the technology is advancing as was predicted. "Like any new technology we're finding things we didn't expect," confirmed Stephen Wood, chairman of the WiMedia Alliance and technology strategist within Intel's communication technology lab. "Major OEMs are adopting UWB technology and chipset prices are falling, and we expect them to continue to fall until they level out in around 18 months time. Prices are very much following the traditional Bluetooth curve, and we've spec'ed it to drop to US$4."

This cost model is confirmed by Gillian Ewers, VP of UWB marketing at CSR. "Pricing will follow the same trend as Bluetooth – chip size will decrease and pricing will follow. Cell phone vendors will only be interested if it's priced correctly and some of the early costs have been high. But our design is already on a single piece of silicon, and, although we haven't launched the device yet, the price will be sensible."

This talk of having chipsets ready to go - while others claim the testing of UWB is months ahead of the 802.11 option, could lead the casual observer to believe that UWB is the sensible choice to provide Bluetooth with a high-speed capability.

But, this would appear to be wrong.

The SIG is actively considering the imposition of a new criterion prior to it ratifying either UWB or 802.11 – and this will be based on the technology's 'maturity'.

This likely stumbling block, which some vendors are apparently unaware of, looks set to ensnare UWB in a tangle of potentially subjective measurements allowing 802.11 to sail into the lead.

Grown-up technology

The thoughts behind the maturity of a technology would partly seem to hark back to the very early days of Bluetooth when the founding membership struggled to gain sufficient traction to gain entry into the mobile marketplace.

"It's an enormous effort to create a market from fresh," admits Kevin Keating, the SIG's global marketing director, "and I don't believe the SIG wants to try and build a market around a new technology."

"We're now setting a maturity criterion so we can measure when a technology that hasn't been created within the SIG is sufficiently mature enough in the market for the SIG to give it support. With regard to UWB, for example, what's the uptake, which manufacturers are supporting it, consumer interest, etc.?" Keating acknowledges that this measurement ability doesn't exist at present and is still under review by the SIG. "But we have marketplaces, such as Bluetooth, to look back upon – when would we have said that Bluetooth was mature and ready for deployment in the market?"

"But, we're looking hard at the market to see who's implementing 802.11 and UWB and which are the most mature. Certainly, it would seem today that 802.11 is the radio technology that is already being built into handsets, and it has strong shipment numbers."

The SIG looks set to define the maturity criterion by late September following reviews by the SIG board and member companies. Conventional interop testing is taking place in time for a release of the high-speed Bluetooth specification by around mid-2009.

For John Barr, Motorola's director of standards realisation, the maturity measurement is simple, given that Bluetooth adoption within handsets is now approaching 75 per cent. "The number of cell phones being shipped each year is now in excess of one billion, so high-speed Bluetooth has to be very stable and consumer friendly. This is the maturity driver."

"The price point of Wi-Fi chipsets is falling, and we know we can integrate 802.11 into 100s of million of handsets. That's what driving Bluetooth towards 802.11 rather than something that's unproven and has failed to come to market after several years."

Rebutting the need for speeds in the 200Mbps to 300Mbps range, Barr maintains that transfer rates between 25Mbps and 50Mbps are more than adequate for today's handsets. "Existing cell phones can't really handle much more than these speeds. The mobile device is not a PC with huge horsepower and unlimited power, so the data cannot be transferred that fast. We have to be mindful of what the handset can handle, and, if needed, future versions of 802.11 will have speeds up to 500Mbps."

According to Barr, the SIG board is looking to mandate the current 802.11g or .11a versions, which are both 54Mbps. "With this, we're comfortable we can achieve between 25Mbps to 30Mbps between two devices – a 10x improvement over Bluetooth today and is about what we need for the market. Very high-speed is not a driver today."

But using the popular 802.11g (.11a is considered a non-starter due to very low market acceptance) is not without issues given that it operates in the same frequency spectrum as Bluetooth. While there are established mechanisms to manage this conflict, the likelihood is for high-speed throughput to be reduced. Barr's solution to this hurdle is to prepare for a migration to 802.11n which operates in the 5GHz spectrum.

This mention of evolving the high-speed technology to support a different standard is an aspect that the SIG is keen to promote. Ian MacNamarra, the SIG's chairman and technology manager for Nokia's complementary wireless platforms group, claims that the Bluetooth protocol stack can support almost any type of radio. "Given this, we can adopt an evolutionary approach to high-speed Bluetooth. We could have one standard defined before the other, so we might see a Bluetooth device with a logo indicating a 10x speed capability, and later another standard with a logo of 100x."

If this approach is possible, then 802.11 would seem to be the logical and natural first choice – given the imposition of the maturity criterion. However, the door would appear to be left open – albeit not far, for another technology to provide speeds approaching 1Gbps.

But, for all the attributes of UWB, pushing its way through this door will be difficult – the maturity aspect will work against it, if not get worse, as 802.11 – with all its drawbacks, becomes the de-facto radio of choice.

Choices in delivering high-speed Bluetooth

Mr. Tortoise, forget what Aesop told you. You don't stand a chance of winning

By Gillian Ewers, CSR

There's no denying that Bluetooth is excellent at what it does: transferring files and streaming data between devices such as mobile phones and headsets, streaming stereo music between battery powered MP3 players and Bluetooth headphones; or backing up files from camera phones on a PC, and so on. Using the basic Bluetooth data rate of 1Mbps or its enhanced data rate (EDR) of 3Mbps, files can be transferred at speeds that are fast and more importantly, the result is an efficient use of power. File sizes on mobiles are growing and higher speed wireless technologies are needed to support these.

Following ten years of developments and the production of billions of products in the hands of consumers, Bluetooth is now widely accepted as the most successful short-range wireless technology ever. Bluetooth is also recognised as the most capable and efficient wireless technology in terms of managing wireless connections, for pairing securely with other devices and for deciding on the most appropriate speed for transferring files. CSR has spent many years developing the technology to ensure that the end-user experience is maximised – a lot of CSR's development effort has gone into the software that backs up the company's leading BlueCore hardware.

Bluetooth is also proving itself as a very power efficient control mechanism – a technology able to decide and activate the most appropriate transfer mechanism to suit the application. At the moment that decision is restricted to deciding on whether standard 1Mbps or the higher Bluetooth EDR 3Mbps radio should be deployed depending on the version of Bluetooth at both ends of the link. CSR is developing its Bluetooth software to extend this potential to control other higher speed radios.

This becomes increasingly relevant when you realise that file sizes on mobile devices are growing: the resolution of camera phones is increasing with each new generation of handset; the amount of music on a phone and the ability of the phone to store and process large files is also expanding rapidly.

It is important that mobile phone users have wireless technologies capable of handling these larger file sizes. It is also important that these technologies just work, to maximum effect and without the user having to know or decide on the most appropriate technology for a particular file size.

As part of CSR's Connectivity Centre and its strategy of smart integration, CSR is developing the two proposed variants of higher speed Bluetooth technology: Bluetooth over UWB, and Bluetooth over Wi-Fi (802.11b/g). But why the need to support two?

If a user is transferring a file from a mobile phone to a computer there is a higher chance the PC will support Wi-Fi today. Using the mobile variant of 802.11n, the file can be transferred at perhaps 20 Mbps, and this is 7 times faster than Bluetooth EDR. However Wi-Fi is not currently found in many mobile phones or similar portable devices. Although this may change as CSR's embedded Wi-Fi UniFi product range is designed explicitly for the embedded device market, specifically cellular handsets, and offers the industry's lowest power consumption. It is uniquely positioned to extend the application of Wi-Fi to a wider range of portable applications.

As we've just discussed, file sizes in mobile devices are continually increasing and CSR sees a need for the much higher speed Ultra Wide-Band (UWB) permitting data transfer speeds up to 480 Mbps. Because UWB involves a high speed burst of energy, it is important that this power is controlled within any device that depends on a battery. CSR is therefore convinced that the combination of Bluetooth and UWB makes perfect sense. The Bluetooth radio monitors for activity, and when it finds a radio it makes an enquiry about the technologies available. If higher speed radios are on offer, the Bluetooth software on CSR's BlueCore activates the higher speed UWB radio, the file is sent and the UWB radio immediately re-enters sleep mode to conserve energy.

This power control is so effective that Wi-Fi over Bluetooth, and particularly UWB over Bluetooth, offer a power efficiency that is better than standard Bluetooth. A Bluetooth v2.1 + EDR radio consumes roughly 33mAh of power for each gigabyte of data transferred. Bluetooth over Wi-Fi consumes an estimated 28mAh/GB. Bluetooth over UWB only consumes 2mAh/GB, making it by far the most power efficient method when large files are involved.

So, the reason CSR is supporting both Bluetooth over Wi-Fi and Bluetooth over UWB? The very high speed and power efficiency of UWB and the availability of Wi-Fi in PCs. The ubiquity of Bluetooth and its ability to control the higher speed radios in mobile devices ensures power consumption is minimised and that files are transferred in the most power efficient method. And all of this can happen without the user worrying about which technologies are actually in use.

Perhaps the hare really can beat the tortoise after all. Sorry Aesop…

Hacking accusations re-visit Bluetooth

EVERY NOW AND THEN IT SEEMS A SECURITY EXPERT FEELS THE NEED TO PUT HIS HEAD ABOVE THE PARAPET AND TAKE A POP AT WIRELESS SECURITY – OFTEN IT IS WI-FI, BUT AT THIS JUNCTURE IT IS BLUETOOTH'S TURN AGAIN.

ANDREW LINDELL, CHIEF CRYPTOGRAPHER AT SECURITY COMPANY ALADDIN KNOWLEDGE SYSTEMS IS KICKING UP THE DUST OVER BLUETOOTH SECURITY. LINDELL CLAIMS THAT BLUETOOTH 2.1, WHICH IS DESIGNED TO BE MORE SECURE THAN THE PREVIOUS VERSION, IS ACTUALLY FAR MORE VULNERABLE, MAKING IT EASY FOR AN ATTACKER TO OBTAIN A PASSWORD WHEN HE OR SHE EAVESDROPS ON A USER PAIRING UP TWO BLUETOOTH DEVICES.

THE QUESTION IS – IS HE CORRECT? →

At the Black Hat briefings, which took place in Las Vegas during August, Lindell said that while it is possible to use 2.1 securely, the odds are stacked against it. “Good protocol should be hard to get wrong and easy to get right. Even the best protocols can be badly implemented; in Bluetooth it is the opposite. Unless you really know what you are doing, it's easy to get wrong."

Lindell’s suggests that the problem is that the protocol is wide open if a fixed password is used, and secure if a one-time password (OTP) is employed. The framers of version 2.1 intended it to use OTPs, believes Lindell, but didn't mandate their use anywhere in the 1,400-page protocol document.

As a result, claims Lindell, in Bluetooth 2.1 a fixed password can be stolen in less than a second using a man-in-the-middle attack, regardless of the length of the password. Whereas in Bluetooth 2.0, a long password could well defeat the attacker. Lindell described a second attack, in which an attacker can easily obtain the password of a lost or stolen Bluetooth device.

On the Aladdin web site, Lindell put it like this:

“As part of my position at Aladdin, I reviewed the security of the Simple Pairing Protocol of the new Bluetooth specification, version 2.1. On the one hand, I found that there are significant improvements to the pairing protocol: standard cryptographic primitives are used, and the link key is well protected since it is derived from a Diffie-Hellman key exchange (carried out in an Elliptic curve group, for greater efficiency). However, I also found a huge vulnerability in the pairing mode that is based on passkey entry (i.e., the mode where a password is used in the pairing procedure).”

“There are actually two attacks. In the first, an eavesdropping attacker can learn the password in real time, irrespective of its length. This is not a problem if a different password is used every time. Note that this "should" be the case if the user types a password into two devices, like a laptop and cellphone. However, often a user will use the same password every time; in such a case, the pairing procedure becomes vulnerable. In addition to the above, devices without an interface for typing in a password have a fixed password (this password can be changed from the default, but in general is fixed). In such a case, an eavesdropper can learn the password and then pair itself with the device. Needless to say, this is a very serious vulnerability. In the second attack, an attacker who finds (or steals) a password-protected device (with a fixed password) can interact with the device a small number of times and fully learn the password, thereby enabling it to pair with it. Specifically, if the device has a 6 digit password, it suffices to attempt login approximately 10 times. In contrast, a secure password protocol would require the attacker to try approximately 500,000 times! Once again, this shows a serious vulnerability in the protocol.”

And just when you thought that he had said enough, Lindell - who seems determined to get the backs up of the Bluetooth SIG and its member companies - also commented that although Bluetooth version 2.1 was released more than a year ago, there are almost no implementations, due to barriers to implementation including the OTP issue. What research Lindell bases this ascertation on is not clear.

Is he right, or is he wrong? Are we getting all the facts or is this a security consultant trying to build a name for himself and his company? Here at Incisor we are certainly not techy enough to comment on the veracity of Lindell’s protestations, and we probably don’t need to point out that this type of exercise is how security consultants make their living. However, we are pretty confident that one of the good people at Bellevue, or a security expert from somewhere else in the SIG community (who wrote this part of the 2.1 spec, we wonder?), will have a pithy response to this latest round of questioning of Bluetooth’s inherent security levels. And we are more than willing to provide column space for a reply.

Watch this space.

‘Often a user will use the same password every time; in such a case, the pairing procedure becomes vulnerable’

Snippets

Keithley shows 8x8 MIMO Test System

Keithley Instruments is claiming to have the industry’s first measurement-grade 8x8 MIMO system. The system is used for primary research of next-generation RF MIMO devices and technologies and provides support for MIMO research applications ranging from two channels now up to eight. It is aimed at commercial test applications on signals such as 802.11n Wi-Fi, 802.16e Mobile WiMAX Wave 2, and future standards such as 4G LTE (Long Term Evolution) and UMB (Ultra Mobile Broadband).

Bluetooth

CSR takes compliance testing in-house

CSR has achieved recognition by the Bluetooth SIG as a Bluetooth Recognised Test Facility (BRTF). CSR’s test facilities are regarded as having developed to the point where it can entirely test its own firmware, rather than using an external testing house. BRTFs are organisations recognised by the Bluetooth SIG as able to perform ‘Category A’ tests as defined by the SIG’s Test Case Reference List and Test Plan Generator (TCRL and TPG). BRTFs may only perform tests on behalf of their own company.

New report: Bluetooth Technology in Mobile Handsets

IMS Research will publish a new Market Research report, ‘Bluetooth Technology in Mobile Handsets’ in November 2008. The report will examine what effects High Speed Bluetooth and Bluetooth Low Energy may have on the handset market, the likelihood of Bluetooth technology being incorporated into the handset baseband, and how multimedia capabilities in handsets will affect demand for specific Bluetooth profiles.

Low data rate / low energy wireless

CompTIA survey shows increase in RFID use

The Computing Technology Industry Association (CompTIA), reporting on the results of a new worldwide survey, says that IT customer interest in RFID is on the rise. The IT companies surveyed said that 46% of their customers have implemented one or more RFID solutions as pilot projects or production deployments, up from 34% in a 2007 survey. Asset tracking was cited by 32% of the IT companies surveyed as the most popular deployment, followed by personal identification (28%), supply chain (25%) and retail marketing (15%). Services, government, finance, healthcare, retail, communications and manufacturing were among the industries represented.

uwb / wireless usb news

WiQuest raises UWB performance bar

We've heard the taunts (mostly from the Wi-Fi guys) that UWB solutions haven't to date delivered on their performance promises (see Incisor's WiMedia special issue for the definitive story). Well, WiQuest Communications has upped the ante by launching a Wireless USB Platform based on its WQU210 single-chip, CMOS silicon that it claims is the first to enable new Gigabit bandwidth-intensive applications.

Steve Perna, WiQuest CEO and president told Incisor, "The availability of our integrated CMOS RF/PHY/MAC platform will be the catalyst for our customers to migrate UWB from the early market adoption stage to the mass market adoption stage. Compared to earlier architectures utilizing Silicon Germanium radios, the new WiQuest CMOS architecture offers customers over 50% lower active power, lower cost and footprint area with higher performance and reliability. This next generation technology platform from WiQuest once again raises the bar for the UWB industry, customers and users."

So, what lurks under the bonnet, or hood as our American friends would have it? Well, the WQU210 is a low power CMOS System-On-Chip (SOC) combining RF, baseband PHY, MAC engine, high-speed security processor, quality of service (QoS) manager and a variety of host interfaces. WiQuest explained that wireless USB Host designs can take advantage of the integrated high speed PCI Express subsystem implementing a Wireless Host Controller Interface (WHCI) and supporting both WiMedia standard data rates up to 480 Mbps as well as WiQuest's 1 Gbps extended data rates for increased throughput applications. You will note that this last bit sounds rather like a proprietary extension to the spec. We asked WiQuest to clarify this – please see the panel below.

Major OEMs like to keep things simple, and so the fact that the WQU210 operates in lower and upper band groups, providing a single world-wide product configuration, will be good news. The range of the lower bands is complimented by the additional regulatory flexibility of the bands above 6 GHz.

This new solution from WiQuest was due to start sampling in September.

Vince Holton talks to Wayne Daniel, WiQuest, about the above 480MBps UWB space

VH: In your WQU210 chip announcement you talk about 'WiQuest's 1GBps extended data rates'. Could you clarify for us what that means?

WD: WiQuest supports all the standard WiMedia rates from 53.3 to 480 Mbps. Our silicon as well as WiQuest enabled end products (Dell Notebook PCs, Kensington Wireless USB Dock, Belkin & D-Link Adapters/Hubs, Lenovo Notebooks, etc.) are WiMedia PHY registered and Platform certified. In addition to the standard rates, WiQuest implemented extended PHY rates from 558 to 1037 Mbps. These rates can be used between WiQuest devices while other non-WiQuest devices are also connected to a WiQuest host at standard rates; all on the same channel. The WiMedia channel width is the same when using WiQuest extended PHY rates – it does not use wider channels, and it can co-exist with other non-WiQuest pairs on the same channel.

VH: Exactly what the 1GBps solution is offering?

WD: WiQuest adds rates from 558 to 1037 Mbps using advanced coding techniques. These are useful to provide higher throughput for bandwidth intensive applications (wireless docking with video, file transfers, etc.).

VH: How it is doing it?

WD: If the range is short between a host and device and will support a signal to noise ratio high enough, the extended rates are used seamlessly on a packet by packet basis. If range increases, PHY rate adaptation lowers the PHY rate to use a lower rate.

VH: Does this require WiQuest proprietary IP?

WD: Yes, this is WiQuest IP. The WiQuest extended rates were implemented well before the standard group decided to extend the PHY rates in the next version of the specification.

VH: How does it fit in with the overall WiMedia spec?

WD: WiQuest extended data rates operate within the extensions allowed by the current WiMedia standard. The WiMedia standard was written to be extensible and future-proof. Each WiMedia media access slot (MAS) may use different PHY rates for high speed communications (high PHY rates) to short range devices and lower speed PHY rates to longer range devices. The WiMedia standards body has a roadmap to increase PHY rates and WiQuest implemented the PHY extensions using the methods allowed within the standard. The exact coding methods for higher PHY rates in the data rate extension of the new specification are being decided in the standards group. WiQuest has been active in the standards working groups and has made many contributions.

uwb / wireless usb news

Wireless USB will prevail

According to In-Stat's latest report, "Wireless USB 2008: The Journey Begins", W-USB finally hit the market in 2007 in notebook PCs from Dell and Lenovo, and in hub and dongle solutions from Belkin, IOGear, and D-Link. In-Stat principal analyst Brian O'Rourke made the following observations.

The debut of these devices was a bit inauspicious, with relatively few devices shipping worldwide in 2007. However, the beginnings of a new wireless ecosystem have launched, and should lead to increased shipments in the years ahead.

Wireless USB is based on the same host/device architecture as wired USB, so the PC is the centre of W-USB world. And the Dell and Lenovo releases mark a promising start. But the question for W-USB is: Where next? In wired USB, there was a natural progression from PCs to PC peripherals to Consumer Electronics (CE) and mobile phones. However, wired USB was significantly less expensive than W-USB, which made it an easy decision to add for vendors of even the most price-sensitive PC peripheral and CE vendors. A W-USB chip solution, on the other hand, currently sells for over US$10, even in high volumes. This makes it very difficult for these same vendors to add, especially when there is no guarantee that W-USB will penetrate the vast majority of the PC market, as wired USB did. These relatively high ASPs will make W-USB adoption a relatively long-term process.

As UWB chip companies gear up production and ASPs decline, additional PC, PC peripheral, and CE vendors will adopt the application. Notebook PCs will lead the adoption of W-USB.

UWB, but not as we know it …

OK, this is not about wireless, but it is about UWB. The 1394 Trade Association has announced the adoption of the first global standard for networking digital content over coaxial cables and it is specifying using UWB. The new 1394 Over Coax standard is designed to enable what are described as 'the industry's fastest whole-home network in a multi-supplier ecosystem featuring protected high-definition and multimedia content'.

The 1394 Trade Association's "no new wires" home networking standard provides for data rates up to 800 Megabits per second, enabling a high-speed multimedia home network that can work with all 1394 and IP-enabled devices over coax wiring. The MAC/PHY layers specified in the new standard are available now in a new chipset from Pulse-Link using its CWave UWB technology. Regular Incisor readers will remember Pulse-Link. We featured them several times when they were evangelising UWB over wireless links, but for the last couple of years Pulse-Link seems to have been focussing its efforts on this UWB over coax work.

The new standard also serves as the basis for the whole-home networking backbone defined by the High-Definition Audio-Video Network Alliance (HANA). HANA solutions enable consumers to share HD content across audio-video devices in a trusted environment.

Incisor formally apologises to its readers for running a story about sending data over cables, but they are using UWB, and we do cover that.

Sorry.

Wireless USB (WUSB) Device Controller IP now available

Innovative Logic (which seems to like to abbreviate its name to Inno-Logic) has released its Wireless USB Device Controller IP. This includes implementation IP as well as verification IP. The implementation IP is fully compliant to RMM guidelines, and we are told that this will ensure smooth migration from one technology to another.

Some of the key features of Inno-Logic's WUSB IP include full compliance with the wireless USB 1.0 specification and the ECMA 369/368 UWB PHY-MAC interface specification, support for all transfer types - Control, Bulk, Isochronous and Interrupt transfers and up to 7 endpoints (endpoint 0 is for control transfer and rest are for data transfers). The IP also supports the industry standard 32 bit bus interface - AMBA AHB/AXI or AVLON etc., and power saving features like sleep mode.

Dinesh Tyagi, president & CEO of Inno-Logic, seemed pretty confident with prospects for Wireless USB. "The demand for WUSB based products will soon increase exponentially. Wireless USB will be the most preferred choice for all vendors in the next 1-2 years".

Kensington Wireless USB docking station uses WiQuest

WiQuest Communications has been selected as the sole Wireless USB solution provider for Kensington's Wireless USB Docking Station, which is the first one to be certified by the USB Implementers Forum (USB-IF).

A secure wireless connection from a notebook PC is automatically made to an external display/monitor, speakers and up to 5 wired USB peripherals without plugging any cables into the PC. Docking a notebook to a display is accomplished by "coming into range" of the Wireless Docking Station. To undock you just move the notebook away.

The Kensington Wireless USB Docking Station uses WiQuest's Wireless USB Device Mini Card reference design. The single radio reference design is configured with multiple ports to support a variety of PC peripherals.

Coming soon: Bluetooth low energy special issue

Following the recent WiMedia Special Issue, **Incisor.tv** will now produce an issue dedicated to Bluetooth low energy wireless technology.

To include:

- Bluetooth SIG participation
- Incisor.tv video presentation, filming in London, Sept. 08
- Definitive editorial overview of developments in Bluetooth low energy

To contribute, please contact:

Vince Holton – Incisor TV
Email: vholton@incisor.tv

INCISOR.TV

A FINGER ON THE PULSE OF WPAN

One Year On: Does ZigBee have the X-Factor?

by Dean Anthony Gratton

We have to cast our minds back to October 2007 and virtually finger through the numerous Incisor issues that followed over the past year or so. It seems a full-featured story surrounding ZigBee hasn't been published since then and with the obvious absence from the technology press, what has the technology been up to?

In fact, Incisor's October 2007 issue featured an article (Does ZigBee have the X-Factor?) surrounding the troubled low energy wireless solution and it seems appropriate for us to follow-up its adventures one year on. The article featured a story depicting ZigBee having a bash at the X-Factor and, alas, we all witnessed the technology failing to reach boot-camp! However, the technology's other contenders, namely Z-Wave, EnOcean and Bluetooth low energy successfully made it through to London. But, sadly, almost one year on, the only boot ZigBee received was to live a life of cabaret entertainment successfully securing a regular performance on a holiday cruise ship. In the year following ZigBee's unsuccessful pitch, ZigBee was reduced to performing a rendition of "I Wanna Dance with Somebody" (Whitney Houston, 1987) wearing a silver sequined rah-rah skirt with a boob tube in a burlesque homage to the eighties. The hapless act ended rapidly following a public outcry by the ship's crew and its passengers: "we're going down", the act rather than the ship to the relief of the passengers.

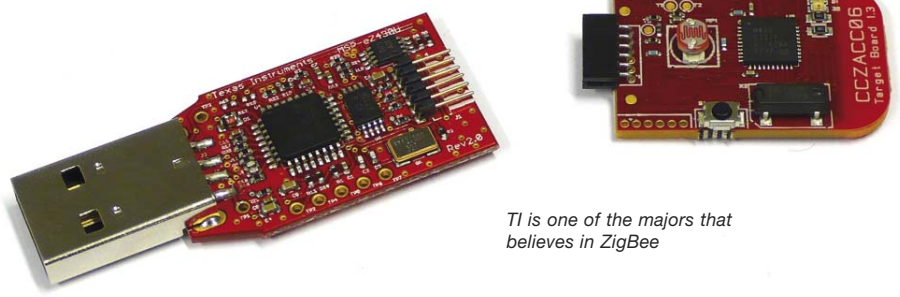
Seriously though, what has ZigBee been up to over the last year? A year that has seen a growth in popularity towards making us a more eco-friendly nation. We find ourselves smitten with a new trend, a new catchphrase, which has been knocking around for a while, namely 'low energy wireless'– okay, admittedly not an entirely new concept. However, nowadays we are constantly reminded that we should remain green, conserve energy and sustain an eco-friendly perspective of the world around us, and rightly so. Golin Harris for the ZigBee Alliance agrees, "With soaring energy costs, utility companies and consumers are demanding low-cost and low-energy alternatives to improve efficiency via smart grids and Home Area Networks (HANs)" and, as such, numerous government-enforced initiatives have guided us to ensure an ever eco-friendly stance.

ZigBee has experienced a somewhat turbulent ride over the years since the Alliance's formation. The technology has floundered with several of its protocol specifications, which has left the industry confused and frustrated. In last month's issue (Zensys, Veni, Vidi, Vici), Incisor reported that "ZigBee has suffered some early compatibility issues with its protocol stack." In particular, since its launch, ZigBee has offered three revisions of the protocol stack, which are "neither backward compatible nor interoperable with each other." At present, the technology offers its current revision, which it calls ZigBee PRO. The new specification affords manufacturers a comprehensive feature set enabling flexibility with their products. And, whilst ZigBee's foundation is firmly secured in IEEE 802.15.4, which offers the PHY and MAC layers, the software protocol stack proposed by ZigBee seemingly has let the technology down. The berating doesn't stop there either, in a damning report, ZigBee has been accused of being unstable when in the presence of other wireless LAN technologies (as reported by Zensys – WLAN Interference with IEEE 802.15.4, 2007). The report seems to suggest that ZigBee endures "debilitating levels of signal interference", which can only concern the many adopters of the technology that form the ZigBee Alliance (www.zigbee.org). Surely, any additional overhead to combat coexistence and interference issues would ultimately complicate the technology along with consuming additional power from the limited battery source. Nevertheless, the ZigBee PRO edition of the specification offers interference immunity, along with self-organising and self-healing mesh networking to support a sturdier environment when utilising the 2.4GHz and 868/915 MHz frequencies.

Unsurprisingly, ZigBee isn't entirely alone with a low energy wireless solution: the usual suspects are Z-Wave, EnOcean and the newcomer Bluetooth low energy derived from Wibree (which was invented by Nokia). In our initial look at the competition we consider Z-Wave, which is dominating the US home and automation market whilst vying for the European coastline – although, Europe has now become Zensys' biggest growth market. In fact, Fiona Thomson, Connectivity Research Director at IMS Research, commented in last month's issue "Zensys is adamant that personalised security and connected home control is becoming mainstream". Furthermore she added, "[Zensys'] success to date, particularly in the US has attracted big name investors, such as Cisco, Intel Capital and Panasonic". ZigBee what exactly have you been doing for the last year? Well, according to Golin Harris for the ZigBee Alliance, "ZigBee is far from being quiet". Earlene Tang, Golin Harris' representative continues, "It is being specified into critical energy solutions by governments and utilities in North American and Australia." Although, Tang poignantly mentions that researchers from ABI named ZigBee as "the most likely candidate for HAN success" as it "enjoys wide support from utilities" over Z-Wave, 6loWPAN and HomePlug Command and Control (HPCC)."

On the European shores in Germany, EnOcean, which formed its Alliance this year (April 2008), uses a clever energy harvesting technique detecting environmental changes to energise its sensors. What no batteries? Yes, ZigBee, Z-Wave and Bluetooth low energy rely on efficient battery technology to sustain longevity with battery life from one to five years at least – EnOcean highlights "no-one

→



TI is one of the majors that believes in ZigBee

wants to maintain thousands of batteries in a commercial environment". Zensys commented that EnOcean seems to be dominating the commercial sector and Lew Brown, EVP Marketing at Zensys supports this argument by noting that, "EnOcean has been viewed as purely a commercial control solution and not viable in residential (at least now and in the near term)". However, Incisor caught up with Graham Martin, EnOcean's Alliance Chairman and CEO, who was, at the time, diligently energy harvesting himself on Lake Ammersee, Upper Bavaria, Germany. We saw him windsurfing, capturing a gentle breeze, which seemingly propelled him confidently across the lake, although he seemed to disagree with Brown's perspective, "most of the information from ZigBee and Z-Wave is hype", he said whilst catching his breath. As Martin was formerly Vice President of the ZigBee Alliance, his words must hold some water. An exhausted Martin continued, "The EnOcean wireless standard for sustainable buildings is the clear leader in wireless home and building automation with thousands of commercial buildings and tens of thousands of residential buildings (soon to be hundreds of thousands) already deployed and proven since first deployments in 2003."

Likewise, ZigBee doesn't seem to be sitting still on this - Earlene Tang from Golin Harris, offered some insight, as to ZigBee's milestones over the last year. She highlights, "Southern California Edison's SmartConnect program plans to automate 3.5 million meters from 2009 through 2012, with plans to replace 5 million electric meters with 'next generation smart meters' utilizing ZigBee". Tang boasts, "San Diego Gas & Electric intends to replace all 1.4 million electric meters in its service area and modify 900,000 gas meters by installing add-on wireless ZigBee modules". She continues with "Pacific Gas & Electric, a combined natural gas and electric utility provider for northern and central California, announced a program to put smart electricity meters in the homes of 5 million PG&E customers." Okay Earlene, we get the picture – you've been busy!

In turning our attention to the youngest wireless member of the low energy clan, we find Bluetooth low energy is genetically derived from a healthy Bluetooth royal family, which sees Bluetooth low energy evolving to take another wireless crown in its already successful portfolio. In the new generation, the technology purports simpler pairing and ease-of-use and perhaps, this wondrous contender might make the rest of the group a little envious. The Bluetooth Special Interest Group (SIG), like ZigBee, has been proactively ensuring its successful future in planning a profile specifically for medical devices as well as other low-powered applications, such as watches and sports equipment. In a demonstration made by CSR (surely you know CSR – they are the purveyor of all Bluetooth-enabled things), the company illustrated its Bluecore7 technology operating with a modest amount of power. Bluetooth low energy seems to be dominating a lot of the technology press lately, as CSR touts a new generation of silicon which, as we already hinted at, is targeting a new generation of low energy products.

ZigBee has sustained numerous iterations with its protocol stack specifications and hopefully, we may see more stability and assurance from the Alliance with their ZigBee PRO flavour. Nonetheless, whilst the ZigBee Alliance releases its numerous 'milestones,' and congratulates itself, the technology didn't hit the ground running and endured incompatibility issues from the very onset. Arguably, this would suggest why the technology hasn't triumphed as well as the other low energy alternatives, albeit it might be early days for the Just Jack (Starz in their Eyes) wannabes, as ZigBee now boasts an incredible 290 members in its Alliance – according to Golin Harris. It seems there is something quite flat and uninteresting about ZigBee (putting aside the sequined rah-rah skirt and its numerous accolades), but it really is difficult to put your finger on it; if you like, it can be compared with something you have tasted in the past, but don't want to try again. Fundamentally, it is this kind of reaction that reduces ZigBee to a shy and quiet wannabe, lacking confidence with its peers. Similarly, it also creates an ambivalent impression with the industry when there are other low energy alternatives out there. It seems that Simon Cowell has a difficult decision to make and clearly remains undecided. One year on: Does ZigBee have the X-Factor? Indeed, ZigBee has put together an excellent performance reaching some remarkable milestones, but Simon seemingly remains undecided and whispers among his colleagues, as to whether ZigBee will reach boot-camp this year.

INCISOR TV Video presentations

When it comes to assessing what is really going on in the market, there is no substitute for seeing products in action and hearing 100% accurate information from the people at the sharp end. Incisor TV provides that insight.

Click on the links below to watch recent Incisor TV presentations

WiMedia special - UWB - a high performance solution / part 1

WiMedia special - UWB - a high performance solution / part 2

WiMedia special - WiMedia and Bluetooth

WiMedia special - Updating the WiMedia roadmap

WiMedia - The future for UWB

Bluetooth low energy wireless technology

IncisorTV commercial for CSR – BlueCore7

IncisorTV commercial for CSR RoadTunes

IncisorTV commercial for CSR BlueCore Player

A guide to Bluetooth Version 2.1 + EDR

10 years of Bluetooth / Best Bluetooth of CES 2008

CES 2008 – Profile of Parrot

Introducing Incisor

2007 Wireless Symposium

Bluetooth / Wibree launch event (full version)

Incisor TV overview: the Bluetooth SIG / Wibree Forum merge

Best Bluetooth of CES 2007

Incisor profile: Icron Technologies and Extreme USB

Wireless USB special - Introducing Wireless USB

Wireless USB special - Wireless USB in use

Wireless USB Special - Regulatory, approvals and interoperability

Wireless USB special - The future for Wireless USB and UWB

Wireless USB special - Wireless USB at CES 2007

Vince Holton introduces the High Speed Bluetooth Special Issue

Anders Edlund of the Bluetooth SIG - Bluetooth and UWB combined

Robin Heydon, CSR - Bluetooth & UWB - The semiconductor company perspective

Motorola's Steve Deutscher examines High Speed Bluetooth mobile concepts

Motorola video - Jordan's morning

low energy wireless news

EnOcean wireless promotes a healthy climate in the home

The phrase energy-harvesting and the name EnOcean are cropping up more and more (see '**TI looks to energy harvesting**' on the following page). Now we learn that WeberHaus, a German-based eco construction company, is implementing new installation concepts in sustainable homes using EnOcean wireless sensor technology. WeberHaus is offering four home automation models that can be combined to match specific self-build specifications and requirements. These include single room and central control of lighting, under floor heating, blinds and window monitoring, door entry security and central monitoring.

WeberHaus told Incisor that its homes have an extremely low heating requirement and consequently need sensitive means of under floor heating control. The EnOcean-enabled system consists of solar powered sensors that constantly gauge room temperature through an individually positioned thermostat, which sends commands through the EnOcean system to the receiver on the heating circuit distributor. As the sensors are powered by solar cells no maintenance is required (the energy accumulator is scaled for 60 hours). Also, the systems' central programming functions make it convenient and easy to use.

Room temperature control can also be combined with the supervision of windows so that the heating is regulated appropriately if windows are open. This supervision takes the form of window handles featuring integrated transmitter modules that send a signal to the monitoring centre when they are opened or closed for the convenience of someone leaving the house.

The door entry phone is the central monitoring and control system for home lighting, blinds, windows and doors. Functions include an indoor/outdoor communication station with voice or video, depending on customer requirements, all lighting on/off via a central switch, central or group blind open/close, and door/window status. The base system has an integrated display with 10 LEDs and push buttons, which can be extended to 30, and all functions are programmable.

Rival systems all need batteries, of course, and this factor enabled EnOcean to throw one more ingredient into the melting pot. In addition to the ecological impacts of battery use, such as unfriendly disposal, a frequent argument used against wireless technologies is the radiation they produce. EnOcean says that this is where the extremely short transmission times of EnOcean radios present a further substantial advantage. The ECOLOG Institute found the high-frequency fields produced by self-powered EnOcean switches to be a hundred times weaker than those of conventional switches. This means the radiation pulse (electrosmog) dissolves in the air and low-frequency (50/60Hz) electromagnetic emissions are also reduced.

To date, EnOcean has sold some half a million units and estimates the market potential for self-powered wireless modules to be several hundred million modules a year.

All very clever, eh?

... and EnOcean receives VC of 4.5 million Euros

EnOcean seems to be gaining traction in the market, as evidenced by a recent VC injection of 4.5 million Euros. According to EnOcean's announcement, the funds will be allocated for acquisition of new markets worldwide and continued development of its self-powered wireless technology for energy-efficient systems in the building sector. The money men seem to be behind EnOcean's proposition, and since it was founded the company has raised over 20 million Euros of venture and growth capital.

EnOcean's business model will apparently remain unchanged with this new investment and the target market will remain sensor technology for sustainable buildings. "This new financing will be focused on expanding the European and North American markets, and establishing new markets, especially in Asia. In addition, we're investing in further development of our technology and products," commented Uwe Thumm, CFO of EnOcean GmbH.

Rolf Dienst, general partner of Wellington Partners GmbH, sees very high growth potential ahead for EnOcean GmbH. "I'm convinced that EnOcean can tap this enormous market potential with its technology for energy-efficient solutions," said Dienst, "You might say EnOcean technology is the quasi foundation for smart, green buildings."

Innovision and Sasken partner for NFC

Innovision Research & Technology and Sasken Communication are partnering to provide NFC IP and software solution. Courtesy of this partnership, Innovision can supply its customers with the Sasken NFC Protocol Stack software solution, for integration its GEM NFC hardware IP solution.

This combined IP and software solution will enable semiconductor companies to develop and then build in NFC capability, either for stand-alone solutions or as part of System-on-Chip (SoC) integrated NFC solutions within wireless connectivity devices such as Bluetooth, Wireless LAN and UWB.

Sasken is developing its protocol stack, targeted for various environments including SoC implementations. The protocol stack supports ISO18092 and ISO14443A/B reader/writer modes and provides an ETSI HCI compatible interface towards upper layers. The solution is configurable and is designed to work on Sasken calls 'scarce resources'. Presumably that means low power.

low energy wireless news

TI looks to energy harvesting

Regular Incisor readers will have seen several recent features discussing energy harvesting technology and its role in the wireless sensor market (e.g. see Dean Gratton's feature 'Zensys: Veni, Vidi, Vici in last month's issue).

Texas Instruments' (TI) seems to have identified energy harvesting as a significant technology, as it has recently been demonstrating its advantages coupled with RF technology for wireless sensing, monitoring or ambient intelligence. It has paired with AdaptivEnergy, a company that has developed a demonstration kit using what is calls Joule-Thief technology to harvest energy in order to power TI's ultra-low power MSP430 microcontroller and CC2500 RF 2.4-GHz transceiver to collect data, control the operation of a system or send sensed data to central collection sites.

The Joule-Thief energy harvesting device enables energy harvesting modules to power applications such as wireless sensors that could be used to gather ambient intelligence to detect and report critical conditions in factories, automobiles, office buildings, homes and other environments. As an example, Joule-Thief-enabled sensors could harvest energy from the rumbling vibrations created by traffic on a bridge, then send that data from all the wireless sensors on the bridge to a collection point where it would be analyzed to monitor structural soundness.

We have heard the marketing pitches for various low power sensor technologies, but unless some form of energy harvesting is going to be integrated, they all have some inherent challenges – namely that often they will require wiring and in most cases they use batteries that will need replacing on a regular basis. Would you want to put a couple of thousand wireless sensors in an office building and then have to deal with replacing expired batteries throughout their/the building's life, with many of them in difficult or dangerous to reach locations?

No, probably not.

ViVOtech best at contactless payment, ticketing, and NFC

ViVOtech has been ranked at the top of the latest Vendor Matrix released by ABI Research. Cubic Transportation Systems and OTI (On Track Innovations) claimed the second and third spots in ABI's most recent evaluation of worldwide Contactless Reader vendors.

The mysterious-sounding Vendor Matrix is apparently an analytical tool developed by ABI Research to weigh up vendors' positions in specific markets. Vendors are assessed on the parameters of "innovation" and "implementation" across several criteria that are specific to each vendor matrix.

For those of us who were left a bit quizzical by this methodology, ABI Research principal analyst Jonathan Collins attempted to clarify matters, "What this Vendor Matrix shows is that the dedicated contactless payment vendors such as ViVOtech and OTI, and those that built their contactless offerings around transportation deployments, such as Cubic and ASK, are increasingly converging as transportation systems move toward adoption of open contactless payments. The two markets are merging, and the vendors in this space will increasingly be required to offer products, services, and support across a range of contactless payment and ticketing applications."

So that is it then. In the world of NFC and contactless payments, there are a number of companies addressing the sector, they are doing things in an increasingly similar way, and some of them are doing it better than others.

wi-fi / wlan news

With hotspots, not all things grow equally

- In-Stat

Market research company In-Stat has been looking at the Wi-Fi hotspot marketplace. Here are a few things that should make the hotspot community happy. In-Stat's findings reveal that:

- The number of hotspots providing public wireless LAN access continues to grow globally.
- The numbers of people who are using hotspots continue to grow.

Here is the bad news, access revenues do not appear to be keeping up with growth in use. A survey soon to be published by In-Stat, "2008 Global Hotspot Market – A Time of Change and Growth" shows that nearly 50% of respondents said they would only use a free hotspot. This trend was further reinforced with other questions regarding respondents' willingness to pay. Because of this trend, hotspot operators are turning to other methods to generate revenues.

One of the bigger trends developing in the hotspot market has been bundling. Operators have started bundling hotspot access with other services, such as fixed and mobile broadband. This way consumers can access hotspots without paying a separate fee, and operators can generate some access revenue by bundling the cost of the service into a bigger service package that consumers are willing to pay. While this grows revenues for operators, it does not grow revenues as fast as it would if they could get each user to pay directly for access. Another similar method to growing revenues has come from positioning hotspot access as an amenity service.

A well publicized example of hotspot as an amenity service comes from Starbucks. With Starbucks' recent transition of its hotspot service from T-Mobile to AT&T, Starbucks now offers hotspot access as an amenity service. Users of Starbucks' reward card can access Starbucks hotspot network for free. In this way the cost of the hotspot is built into the cost of the coffee. Hotels have used this strategy for the last several years.

Free in room Wi-Fi has replaced free HBO on hotel marquees. Hotels see Wi-Fi as just another amenity expected by travelers. The cost of the service is built into the room fee. Since many hotels outsource their hotspot networks, the operators of those networks are paid by the hotel, and not by the end-user. In-Stat believes bundling and positioning the hotspot as an amenity service will continue. People want to use hotspots; they just don't see paying for them as an extra service. As consumer budgets get tighter, this trend won't change. Hotspot operators need to adjust their business practices to address this trend.

wi-fi / wlan news

Wi-Fi blossoms in Universities

A new report by ABI Research predicts that 99 percent of North American universities will have a Wi-Fi network by 2013, with most networks in the form of 802.11n equipment.

The report covers several drivers for 802.11n growth on campus. ABI analysts also found that institutions with limited funds are jumping to 802.11n to "future-proof" their networks, while those with less emphasis on research are being more conservative about 802.11n deployment.

According to ABI Research vice president Stan Schatt, “ABI Research expects 802.11n uptake – which is today fairly small in the education market – to ramp up steeply to quite a high rate of penetration.”

ABI gave several reasons for this. Many students now assume a campus Wi-Fi network as a given, and many of their shiny new laptops will be “n”-compatible. Universities have great bandwidth demands, as lecture halls may need to serve a large number of users with multimedia content at any given time. 802.11n’s greater speed and capacity can address that need.

Moreover, says Schatt, “Universities are breaking new ground by using video over Wi-Fi in a number of innovative ways. This is driving the adoption of high speed 802.11n. Students in the near future (at least the diligent ones) will be just as likely to watch their favourite professor’s lectures on their laptops as they will be to view ‘America’s Next Top Model’.”

However, a few barriers to adoption do still exist. Some institutions are concerned about the impact of 802.11n’s increased bandwidth on the wired side of their infrastructure. Some have limited budgets, and some – particularly those with less emphasis on research – may be conservatively inclined to wait for confirmation of the 802.11n standard before taking the plunge.

And so say all of us.

Certification for Voice over Wi-Fi debuts

The Wi-Fi Alliance (WFA) has developed a new certification program for voice-capable Wi-Fi devices in home and small office environments—the Wi-Fi Certified Voice-Personal program. This certification program extends beyond interoperability and tests the performance of products to help ensure that they deliver good voice quality over the Wi-Fi link.

By allowing subscribers to utilize Wi-Fi for voice as well as data on converged phones, the WFA suggests that carriers can manage licensed spectrum resources better, as subscribers make and receive calls using a combination of licensed and unlicensed Wi-Fi spectrum. Additionally, the WFA claims that voice over the Wi-Fi network can mean improved indoor coverage.

Voice over Wi-Fi is typically used within mixed voice and data environments, in which multiple data streams compete for the available network resources. The Wi-Fi Alliance has designed things so that products that successfully achieve Voice-Personal certification will prioritize voice communication over data, audio, or video traffic. They will also have to meet strict performance levels for key metrics that ensure a quality experience in voice applications: those metrics being packet loss, latency and jitter.

Femtocells to replace Wi-Fi access points by 2013

The fixed-mobile convergence market (FMC) is on the brink of very interesting times, according to analysts at ABI Research. UMA-based Wi-Fi dual-mode solutions have seen some significant penetration in both Europe and North America thanks to successful market introductions by T-Mobile in the US (T-Mobile @Home) and Orange (unik) in France, Spain, and the United Kingdom.

The first real competitive solution that could rival Wi-Fi-based products has now appeared, in the form of Sprint’s nationwide (US) femtocell-based AIRAVE solution. The questions remain: is there room for both types of convergence in the market; and which solution is best placed to succeed?

ABI Research forecasts a total of 103 million access points of both types to be in service by 2013, and research director Stuart Carlaw told Incisor, “We expect cellular-based femtocells to have taken over the baton from UMA- and SiP-based Wi-Fi solutions by 2013, seizing 62% of the market. Although UMA-based Wi-Fi solutions have seen early gains in greenfield markets, these solutions have not proliferated much outside their current carrier footprints. This can be attributed partly to the carriers’ desire to assess femtocell developments, but also to lingering concerns regarding the concept of Wi-Fi based fixed-mobile convergence.”

events

DATE	EVENT	LOCATION	NOTES	LINK
Sept 10 - 12 2008	IEEE International Conference on Ultra Wideband	Hanover, Germany	-	http://www.wimedia.org/en/events/events.asp?id=events
Sept 17 - 18 2008	Wi-Fi World Conference at Wireless China	Beijing, China	-	http://www.wirelesschina-summit.com/
Oct 6 - 10 2008	Bluetooth UnPlugFest 31	Budapest, Hungary	-	https://www.bluetooth.org/Events/sig_events.htm
Oct 12 - 14 2008	Wireless & Mobile Computing, Networking & Communications (WiMob 2008)	International Conference Centre, Avignon, France	-	http://www.lia.univ-avignon.fr/wimob2008
Nov 4 - 6 2008	Bluetooth Developers Conference	COEX Convention & Exhibition Centre, Seoul, Korea	-	https://www.bluetooth.org/Events/sig_events.htm
Nov 18 - 20 2008	ID WORLD International Congress	Milanofiori Congress Centre, Milan, Italy	RFID, biometrics and smart card technologies	http://www.idworldonline.com/index.php?id=about
2009				
Jan 8 - 11 2009	International Consumer Electronics Show	Las Vegas, Nevada, USA	-	www.cesweb.org
Feb 16 - 19 2009	Mobile World Congress	Fira de Barcelona, Spain	-	www.mobileworldcongress.com
April 1 - 3 2009	CTIA Wireless 2009	Las Vegas Convention Centre, Las Vegas, Nevada, USA	-	www.ctiawireless.com
Oct 7 - 9 2009	CTIA Wireless I.T. & Entertainment 2009	San Diego Convention Centre, San Diego, California, USA		www.ctiawireless.com

INCISOR™

for the short range connectivity environment

PRODUCED/DISTRIBUTED BY:

Click I.T. Ltd
Hampshire Gate
Langley, Rake,
Hampshire GU33 7JR, England
Telephone: +44 (0)1730 895614

Incisor provides commercial and promotional opportunities in the short range wireless sector.
Contact: Vince Holton
Email: vholton@incisor.tv
Tel +44 (0)1730 895614

www.incisor.tv