Wireless Connectivity World 2005 review issue

INCISOR™

NEWS FROM THE BLUETOOTH™ AND SHORT RANGE RF ENVIRONMENT ISSUE 83

IN INCISOR THIS MONTH

Welcome to the Wireless Connectivity World 2005 review issue of Incisor magazine.

This issue assumes a different format, as we review the news, announcements and product and technology demonstrations that took place at Europe's largest (only?) annual show dedicated to the short range RF sector.

As you will read in our main review (see across), the show was not hugely well attended, either by sponsors, exhibitors or general delegates/exhibition visitors. Having said that, most of the wireless alliances and associations were present, including the Bluetooth Special Interest Group, the WiMedia MBOA Alliance, the DS-UWB Forum, the ZigBee Alliance, and Frank Hanzlik of the Wi-Fi Alliance was present, but without a booth. As we report here, there seems to be a new-found awareness in the wireless world that it is a good idea for these bodies to co-operate for the greater good.

The wireless show market seems to be in a state of flux at the moment. Should there be a WiCon-style show that covers all technologies, or are focused shows better? At the end of our WiCon review, we ask you, our readers, to let us know what you think about whether, when and where these shows should take place.

We look forward to publishing your views.

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Features:

Show news sections:

Plus:

Bluetooth/UWB special focus

Wireless Connectivity World 2005 Incisor overview

WiCon returns to London

Ticker tape, or tribulations?

Incisor travelled to Wireless Connectivity World 2005 not knowing quite what to expect – would this be a show on the up and up, as we have been given to believe, or would the trend of continuing shrinkage still be apparent? Indeed, would WiCon be as big as it was in its first iteration, as Bluetooth World, when that show first took place, in London, back in 1999?

Planning to be at the Excel conference centre in London's Docklands area (East of the centre of London) for all of the two days of the show, our trip didn't start well. A car journey that should have taken no more than two hours took three and a half, courtesy of a nine mile traffic tailback in the Docklands environs. Access to Excel is via a road system that at the best of times can be described as a dog's dinner of a road network. Throw in some road works, and chaos ensues.

Courtesy of all of this, we arrived too late at the show for the first day keynotes. And we weren't

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alone. No matter whom we spoke to, and how they got to Excel – car, train, 'plane into London City airport, or whatever, no-one had an easy time of it. One well-known American analyst was even ripped off by a mini-cab driver from one of the authorised companies, who span a yarn and managed to charge her £120 to for a taxi ride from the airport to her hotel alongside Excel. Fortunately, this story had a happy ending, as the hotel helped out, the driver was reported to his firm and 50% of the charge was returned to our friend, in cash, and within a few hours. 'Leaves a bad taste, though.

It's not easy to come up with a good site for an exhibition centre, but Docklands just doesn't work well for Excel. It's bleak, inaccessible and just not welcoming. The RAI in Amsterdam, by contrast, which has hosted this show twice, is a paragon by comparison. Still, if a London-based conference organiser is having a hard time commercially making a show work, it makes sense to stage it close to home in order to keep its own costs down.

So that is show access dealt with. What of the show itself? Let's get the main facts out there to start with. There weren't many people there – exhibitors or visitors. Few people had big stands – CSR, Freescale, Philips, Texas Instruments having some of the largest. These, you will note, are all semiconductor companies. There's still money in chips, obviously.

Perhaps the single biggest space at WiCon (apart from a very large bar and multiple seating areas) was taken up by the ZigBee Pavilion. Around 10-12 companies took space there. This was a good turn out, and confirmed that things are starting to take off for ZigBee and ZigBee companies.

But the busiest time at the show, by far, was at the end of the first day, when the Bluetooth SIG threw a cocktail party at the large central bar/seating area to celebrate its announcement that Bluetooth chip shipments had reached 5 million per week. Suddenly, this part of WiCon looked busy and buzzy!

PEACE BREAKS OUT IN WIRELESS

Incisor spent the whole of the two days at the show, and talked to many, many people, as our interviews in this issue confirm. If there was one trend that could be discerned wherever we went, it was that the wireless industry seems to be finally realising that the wireless world is not a war zone, and just because there is more than one short range wireless technology, this does not mean that you have to fight with them. Now, the talk is of convergence, co-operation and a need for co-existence. Bluetooth is formally aligning with UWB, and has a developing relationship with NFC as an alternative association/pairing mechanism. NFC is getting it together with RFID, and Wi-Fi is also now working hard to be considered for some applications that demand that it will work happily alongside these other standards.

It has taken a long time for our industry to see that different wireless technologies each do have things that they are best at, that no single one of them can do everything, and that there may indeed be some overlap in some areas, but – hey, so what! When you think about the fact that many of the semicon companies are involved in several, or all, of the wireless technologies, and that this means that there has often been fighting (or at least a lack of cooperation and a pursuance of opposing goals) between different parts of the same company, it is pretty hilarious.

No, the only real and current war zone is the one within UWB, as the WiMedia MBOA Alliance and the DS-UWB Forum and their member companies slug it out to establish a winner in the battle to establish a modulation standard. How long will it take for this one to resolve itself? Depending who you talk to, it could be as soon as Christmas this year (Freescale), or 12 months from now (the Bluetooth SIG), or a decade (Mike McCamon, chairman of the DS-UWB Forum). Incisor believes that the tie-up with Bluetooth will make this thing happen sooner than it otherwise would, but that there will be more blood shed on the road before we reach UWB nirvana.

THE FUTURE FOR WICON

Will the WiCon show be the venue for celebration when one or other UWB party is celebrating victory? That is hard to predict. A banner over the main exit point from the show said 'See you at WiCon 2006'. Incisor was probably not alone in feeling a twinge of doubt about this. Based on the number of people there, it must be very hard for the organisers (Informa) to make money out of this show, and if they are not making money, they are not going to continue to stage it. It does seem to have been very hard to transition what was a Bluetooth show into a broad stroke wireless event. From talking to companies exhibiting at WiCon, its not that they have a lot of other shows to go to that fulfil WiCon's brief. At most other shows they attend, wireless is part of a bigger portfolio of products and technologies on display.

There is another factor that is currently working against WiCon, and that is that there is a seemingly universal view that it is an expensive show for companies to attend. Couple this with low numbers of visitors and you can see why companies are staying away in droves.

Incisor's view is that the WiCon organisers need to find ways to encourage more visitors to come along. If large numbers of people are turning up, the sponsor and exhibitor companies will be happy, and will find ways of justifying the costs. We also think WiCon needs a better venue. These may not be the heady days of the early Bluetooth World show, but we remember that companies were fighting to attend that show when it was held in Monaco. For heavens sake, it was somewhere they really wanted to go – and industry execs were fighting to find ways of being able to bring their families along too! Informa also organises the 3GSM show, which, by comparison with WiCon, is huge. For many years this has been held in Cannes, South of France. Next year, 3GSM moves to Barcelona.

WiCon enjoys its busiest moment - free drinks at the Bluetooth SIG cocktail party.

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Will this work? We are not sure. We spoke to more than one of the big multi-nationals that were at WiCon, and that are always at 3GSM, and heard them tell horror stories about the logistical and geographical problems they are already facing as they try to get ready for 3GSM 2006.

The next in the series of WiCon shows takes place in Santa Clara, California in November. The Bluetooth SIG (BSIG) has had an ongoing commercial agreement with Informa, dating from when WiCon was a Bluetooth-only show. We checked again at WiCon, and the BSIG is still committed to sponsoring and participating in the WiCon Americas event. We felt the need to ask, as people at WiCon were speculating that the Americas show could be cancelled, even at this late stage.

We hope that this does not happen, as many people a) still regard WiCon and similar events as great networking opportunities and b) are short of another WiCon-like event to go to. At events such as 3GSM, CeBIT and CTIA, even the big fish of the short-range RF world can find themselves a little lost.

If you have views on this topic, email me and we will publish them and get a forum of views going. There are a lot of intelligent people out there, and it would be good to share opinions.

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Maybe? Or maybe not?

Snippets

Snippets

NEW ISM BAND TRANSCEIVER FROM XEMICS

XEMICS new TrueRF XE1283 combines a full-featured ISM-band transceiver together with an ultra-low-power RISC micro-controller. This combination of high-power transmitter and sensitive receiver means the link budget exceeds 128 dB. Ranges of up to several kilometers can be achieved at low data rates, and with minimal power consumption. XEMICS is also introducing the DP1283 'drop-in' RF module based on the XE1283 circuit. The XE1283 and DP1283 are intended for low-power sensing networks with an emphasis on battery-powered (down to 2.4V) applications such as automated meter reading (AMR), home automation and access control as well as voice and data over RF.

BLUETOOTH

Infineon sells off wearable electronics activities

Readers of Incisor with a long memory may remember us reporting on a line of activity clothing with embedded technology such as Bluetooth. Now, within the framework of a management buy out (MBO), Infineon has turned over its activities in this area to Interactive Wear AG. Infineon says it had conducted research on the integration of electronic functions into textiles and developed this technology to the point that it is ready for the market, but is now concentrating on its core business. As part of this MBO, which has now been completed, the rights to Intellectual Property (IP), such as patents and licenses, now belong to Interactive Wear, along with developmental hardware and software and the existing customer base as well as the parts inventory and the finished wearable electronics products. The parties involved have agreed not to make the purchase price public.

WI-FI/WLAN

Houston Airport and Sprint deliver high-speed Wi-Fi

Passengers flying through Houston's George Bush Intercontinental Airport now have a more productive way to spend their time. The Houston Airport System (HAS) and Sprint have announced the availability of Sprint PCS Wi-Fi Access at Bush. The high-speed wireless technology will enable busy travellers to conduct business that they normally could only conduct at the office or at a facility where they could plug their computer into a jack.

RF Micro Devices extends activity in cellular handset market

At WiCon, Incisor met with RF Micro Devices, which was announcing that it has extended its traction in the cellular handset market with its complete line of system-on-chip (SoC) Blue tooth products, transceivers and protocol stack software. RFMD's goal is to make it easier for handset manufacturers to integrate Bluetooth into current- and next-generation cellular handsets. RFMD's UltimateBlue solutions support the latest Bluetooth features such as Enhanced Data Rate (EDR) and streaming music, both of which the leading cellular service providers are requiring in their feature-rich handsets.

Frank Morese, vice president, Wireless Connectivity Business Unit, RFMD, said, "RFMD's Bluetooth solutions continue to gain traction in the high-volume market for cellular handsets. Our Bluetooth solutions have been qualified for numerous phone designs, and we expect multiple new handsets will incorporate our Bluetooth solutions this year. This summer, we anticipate that shipments will commence to major handset manufacturers."

Incisor chatted with David Favreau, general

Dave Favreau, RF Micro Devices.

manager, RFMD's wireless personal networking (WPAN) product line, who commented, "The advent of mobile phones with MP3 playback and storage capabilities is driving increased demand for Bluetooth technology. Through the advanced audio/video capabilities of our Bluetooth solutions, RFMD is giving consumers the freedom to experience CD-quality audio via wireless headset connections to their mobile phones. RFMD will continue to meet the growing demand for Bluetooth technology in cell phones through the reduced system cost of our on-board solutions and the migration to EDR capabilities."

RFMD offers a complete line of Bluetooth SoC solutions for mobile phones, and also offers HCI software, upper layer protocol stack software, all major profiles and development tools. Favreau gave Incisor a quick run-through of the highlights: 'The SiW4000 SoC Bluetooth EDR solution is the world's smallest Bluetooth EDR solution in 0.13 micron with best-in-class current consumption, and the SiW3500 SoC Bluetooth solution is Bluetooth V2.0 qualified for improved interoperability with existing Bluetooth products. Our SiW1722 transceiver is specifically designed and OEM-qualified for Bluetooth-enabled CDMA mobile phone ASICs. As far as software is concerned, RFMD's embedded protocol stack and profile software delivers a flexible solution that is easily ported to mobile phone platforms. More than 20 individual profiles are available, such as stereo audio profile (A2DP) and remote control profile (AVRCP), which are being requested by an increasing number of carriers.'

Agilent Technologies demos wireless networking test products

Agilent Technologies was showing several new products at WiCon as part of its wireless networking test portfolio.

The company was claiming two 'world firsts'. One of these was what Agilent claims is the industry's first multiformat test set to include Bluetooth EDR *(see page 7 - 'Who has world's first Bluetooth EDR test solution?)*, and the other was the industry's first multiband OFDM UWB signal creation software. These were in addition to its existing wireless networking test products for ultra-wideband (UWB), Bluetooth, WLAN, WiMAX and multiple-input multiple-output (MIMO):

"Keeping up with the wireless connectivity standards is challenging for lead adopters who can't always wait for the standards to stabilise," said Pat Byrne, president of Agilent's Electronic Products and Solutions Group. "Agilent continually introduces solutions to cover the evolving wireless connectivity applications. We provide a breadth of products and expertise to assure confidence for wireless designers and manufacturers bringing new products to market -- we help speed the entire process."

CSR chip shipments pass the 100 million mark

Anyone watching the Bluetooth semiconductor market knows that CSR has been very successful. Regardless of this, it was still impressive to hear during WiCon Week that CSR has shipped over 100 million Bluetooth chips since its foundation, with devices manufactured by Advanced Semiconductor Engineering (ASE). The company believes that this reflects the fact that Bluetooth is growing in popularity for existing applications such as mono headsets and mobile phone handsets, and is also being adopted in wider applications such as in-car infotainment and newer applications such as stereo music streaming.

Over 100 million Bluetooth chips were manufactured and shipped from the Chung Li (ASECL) and Kaohsiung (ASEK) facilities of ASE, a long-term partner of CSR. ASE has made strategic investments in capacity and technology, enabling it to meet CSR's escalating demand for packaged Bluetooth chips.

As a public company, CSR has taken on the responsibility of needing to account to more than just its immediate shareholders. Unsurprisingly, then, some disquiet was recently expressed when it became apparent that there had been a major fire at ASE's Chung Li manufacturing plant.

CSR CEO John Hodgson says past 12 months have seen huge growth in Bluetooth-enabled devices.

"The recent fire at ASECL, has caused some disruption in the delivery of CSR's BlueCore chips," noted John Hodgson, CEO, CSR. "However, ASE has quickly deployed manpower, material, and equipment to alternative ASE facilities at Chung Li, Kaohsiung, and Shanghai and is working hard to satisfy our customer orders in the shortest possible time." He continued, "Our team has been working closely with ASE for over five years. We appreciate the company's excellent semiconductor assembly and test solutions, backed by a superior customer service and support organisation. We look forward to continuing this relationship as we collaborate on advanced packaging technologies for our leading-edge Bluetooth chips."

CSR's wafer fabrication partner is the Taiwan Semiconductor Manufacturing Company (TSMC).

"The past twelve months have seen huge growth in the number of Bluetooth-enabled devices," Hodgson continued. "Consumers now expect their mobile handsets to incorporate Bluetooth, a demand which device manufacturers have understood and built into their designs."

Demonstrating this trend, Samsung launched its first Bluetooth-enabled GSM handset at the end of 2004 and CSR counts LG, Motorola, Nokia, Panasonic and Sharp among its cellular customers. Embedded Bluetooth is also gaining more ground in PC hardware, in-car infotainment and handsfree systems, home entertainment and personal music systems.

"The speed with which we have reached over 100 million chips shipped, indicates the strength of demand for Bluetooth in the global market," added Glenn Collinson, sales director and co-founder of CSR. "Innovative generations of BlueCore like BlueCore3-Multimedia are now pushing the boundaries of Bluetooth. Popular applications such as wireless stereo headsets which can connect to a phone and separate music sources, handling calls as they are received, are now a mass-market reality."

Brainboxes launches new Bluetooth hardware and software

Brainboxes launched a new range of Bluetooth products at Wicon. On the hardware front Brainboxes has developed a new Bluetooth serial port adaptor to enable 'dumb' devices with RS232 serial connectors to connect wirelessly with other devices.

The Brainboxes BL-819 is ideal for printers, scanners and other devices since it brings Bluetooth wireless technology to devices without the need to install any software. The BL-819 Bluetooth v1.1 qualified adaptor is a Class 2 device, operating at 2dBm, which gives the device a maximum operating range of up to 30 metres. A size of only 7.5cm x 3.4cm, and a weight of 24g means that the Bluetooth adaptor can be applied to a wide variety of peripherals.

Brainboxes says that whilst the 9-pin RS232 based BL-819 adaptor does not require any software installation, the device can be easily configured via Windows or Linux systems via 3 simple and easy to use configuration utilities, without the need for a specific configuration application.

On the software front Brainboxes launched its all-new Pocket PC software for supplying GAP, SDAP, SPP, FTP, OPP, LAP (Client), DUN (Client), PAN (Client), HID, and Active Synch. The software works with Microsoft's Pocket PC 2000, PPC 2002 and PPC 2003.

Eamonn Walsh, managing director of Brainboxes commented, "Printers - in particular those used in industrial or business applications - are an ideal application for Bluetooth, but one in which the technology has been relatively slow to take off." Walsh continued, "With the launch of the Brainboxes BL819 users can now bring the advantages of wireless connectivity to a wide range of devices without the need for complicated configuration or software installation."

Cam Con software tools extend application potential of Bluetooth platform

Cambridge Consultants has released a software development toolset that extends the application potential of CSR's BlueCore family of ICs, which it describes as the leading single-chip platform for Bluetooth applications. The new tools allow users to develop application software to run natively on the XAP RISC microcontroller embedded in all BlueCore devices. This is said to free up a significant amount of computing power, providing developers with even more flexibility to implement hostless, Bluetooth enabled products, based on a single low-cost device.

Up to now, this development option has only been available directly from CSR's application support service, or through Cambridge Consultants, which is CSR's licensed design partner. For all other applications, BlueCore comes with a virtual machine environment - which provides a robust and protected environment for general-purpose development.

Cambridge Consultants' says that its new tool suite - xIDE for Interface Express - gives users unrestricted access to the full native power of BlueCore's XAP microcontroller core, and that this opens up significant additional computational bandwidth that may be used to run more complex software - such as application programs with many Bluetooth Profiles.

"BlueCore's virtual machine has served the first waves of relatively simple Bluetooth applications well, allowing developers to bring single-chip products such as headsets to market very easily. It's undoubtedly been a major factor in successfully introducing many OEMs to wireless technology and 'deeply embedded' systems, and in the success of the Bluetooth standard", says Cambridge Consultants' Tim Fowler. "These new development tools recognise the growing familiarity of such OEMs with embedded design, and the rapidly evolving applications potential of the wireless standard. Bluetooth has recently been augmented with faster data rates for instance - which BlueCore is the first to support.".

The library of application profiles available to OEMs includes many popular ones such as A2DP, BIP, CTP, HFP, OPP, SAP and SPP.

Ezurio ships Intelligent Version 2.0 Bluetooth Module

Ezurio Ltd, a management spin-out of TDK Systems Europe Ltd, announced the availability of the next generation of its Intelligent Bluetooth Serial Modules, supporting the features of the new Bluetooth Version 2.0 specification.

Ezurio's latest module is based on CSR's BC04 Bluetooth chipset. EDR-specific enhancements include higher data rates over the air, lower power consumption, better rejection of interference and coexistence with Wi-Fi networks by implementing AFH (Adaptive Frequency Hopping), and improved voice quality from enhanced Synchronous Connections (eSCO).

Ezurio's modules contain a full Bluetooth protocol stack within firmware, in addition to which Ezurio has implemented an application interface layer inside the virtual machine of the BC04 chipset. This abstracts the complexity of Bluetooth to a set of simple AT commands, similar to a PSTN modem.

The module is shipped as a Class 1 radio, with an optimised RF front end, and Ezurio claims ranges in excess of 250 metres outdoors, compared to the less than 100 metres of competing products. The module incorporates a high gain, ceramic patch antenna which is largely immune to RF detuning, allowing system designers extra flexibility in designing the module into their packaging.

"Product designers across a wide variety of industry sectors are coming to the conclusion that Bluetooth is now a mature wireless technology and want to use it to cut the cables in their equipment. However, they realise that that integration normally needs specialist skills that they do not possess. We have opened up the market for integrated Bluetooth by taking that complexity away" said Nick Hunn, CTO of Ezurio.

The modules are fully Bluetooth approved as end products. Engineering samples are apparently now shipping with volume production available in June 2005. Ezurio also used the WiCon exhibition and conference in London to announce that it would launch both Wi-Fi and ZigBee products in the latter half of 2005.

Anritsu launches test solution for Bluetooth 2.0 EDR

Anritsu launched a new Enhanced Data Rate (EDR) measurement capability for its MT8850A and MT8852A Bluetooth Bluetooth test instruments for developers and manufacturers. Anritsu claims this is the first dedicated solution to enable Bluetooth EDR developers to quickly test the transmitter performance of their new products against industry standards.

When the Bluetooth Special Interest Group (BSIG) released the EDR version of the Bluetooth specification, it also added 3 new transmitter test cases that Bluetooth devices must pass for product qualification.

With the launch of option 17 - a PC application that captures and process EDR packets - Anritsu's MT8850A and MT8852A now support all EDR transmitter test cases. Measurements supported are differential power, carrier frequency stability, modulation accuracy (DEVM) and transmitter encoding errors.

The MT8850A and MT8852A demodulate packets transmitted from the EDR Bluetooth chip without the need to establish a test mode connection. This makes the application ideal for developers of Bluetooth EDR chips as radio layer measurements can be performed before the completion of test mode signalling within the chip's protocol stack.

But who really has world first Bluetooth EDR test solution?

For us poor journalists, trying to work out the veracity of 'world first' claims is never easy. Every day brings several new press releases that trumpet such achievements. This Bluetooth EDR test set claim from Anritsu hit our desks at the same time that Agilent also claimed a world first Bluetooth EDR tester, and both of these followed a recent release from Frontline Test Equipment (see - Redefining the wireless test equipment paradigm – Incisor issue 79). As our readers may share our confusion about world firsts, we asked Frontline to comment on this particular set of claims:

Frontline's FTS4BT product is what is known as a protocol analyzer (the name 'sniffer' is slang that has become a popular term). The key uses today for FTS4BT are as follows:

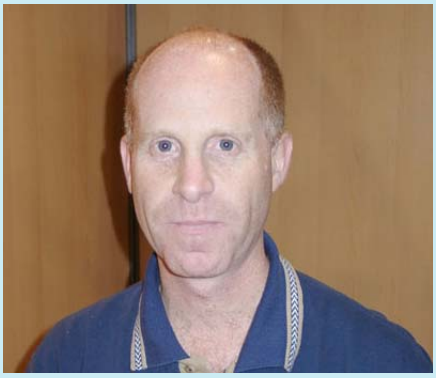
1) ***Debug:*** *Software and hardware developers trying to figure out why their stuff isn't working.*
2) ***Test:*** *Test engineers (or possibly software and hardware developers) watching the interaction between their own products and somebody else's products and trying to figure out why the two devices aren't interoperating as desired.*
3) ***Verification:*** *Engineers proving to somebody that a device really is behaving as it should. That somebody could be internal to their company or an outside person such as a Bluetooth BQB. Just because something appears to be working, it doesn't mean it is doing it in the standard way. This is important because in order for standards to work, everybody has to actually conform to the standard.*

For example, if you and I agree that when we want to talk about the sport played at Wimbledon we write "Ibis Hotel", you and I will communicate just fine with each other. But the standard (in this case an English dictionary) says that the right way to do this is write "tennis". A tool like FTS4BT drills down below the surface and exposes every detail of what is going on in the communication link so that this detailed verification can be done.

Anritsu's big market for its Bluetooth tester is production. As a Bluetooth device such as headset comes down the assembly line, it must be tested to prove that the Bluetooth portion is working well (e.g. - is the RF in spec, etc?). As you can imagine, as the number of Bluetooth products increases so does the number of production lines--and you can't really run a production line without a good production tester. So this is a pretty big market and one that Anritsu, Rohde &Schwartz, Agilent, etc. are willing to fight over.

A much smaller market for this type of tester are labs where having such a tester gives engineers a nice quick way to do some very important testing. For example, if you were to walk into a company such as CSR, Texas Instruments or Infineon, you might find some Agilent testers being used by their testing department and maybe by some small number of their hardware and software engineers.

In the case of EDR, there really aren't any products (except from Apple) that are in production yet--so there is no need yet for production lines to have their testers upgraded. So, what Agilent has done is to focus on the non test production community because this is where the immediate need for the product is.



Frontline's Eric Kaplan.

Philips brings the Connected Consumer to life

Philips Electronics demonstrated a range of leading-edge connectivity solutions at WiCon. Philips's aim was to show real-life examples of how wireless technologies and devices are converging to simplify the life of the 'Connected Consumer'. These included the latest developments in silicon for wireless technology, cellular and short-range convergence and the evolution of the mobile phone as a payment mechanism.

For a detailed overview of some of Philips' activities, read our interview over the page with Paul Marino, vice president and general manager business line connectivity, Philips Semiconductors, but here is a brief summary of Philips' technology displays at WiCon:

PUTTING THE PHONE AT THE HEART OF YOUR HOME.

In this live demonstration, Philips showed how the cellular phone can be employed as the central control point for wirelessly enabled homes, and how the mobile can interact and share photos and multimedia entertainment with the Media Centre.

SEAMLESS INTEGRATION WITH NFC, BLUETOOTH AND WI-FI.

Here Philips demonstrated the ease and flexibility with which devices equipped with NFC and Bluetooth can be paired to share rich multimedia content. These two demonstrations explained how anyone can gain simplified and secure integration between a variety of Bluetooth and Wi-Fi devices - helping to create wireless networks rapidly and easily.

802.11G WLAN FOR MOBILE HANDSETS.

This demo showed the full wireless potential of the Philips 802.11g WLAN chip. This is a System in Package (SiP) that supports Bluetooth and WLAN coexistence as well as providing high levels of integration.

BE ON TV WITH BLUETOOTH AND NFC.

Using NFC, a Sony Ericsson P900 camera phone was paired with a Nokia HS-4W Bluetooth Headset and the Nokia Bluetooth Image Viewer to show how easily devices can be connected and used. Once paired, the phone was used to take pictures of willing visitors. The results were then instantly and wirelessly transmitted to a Philips LCD TV.

BLUETOOTH STEREO HEADSET REFERENCE DESIGN.

Visitors also got a preview of Philips' new reference design, which was claimed to provide the industry's highest level of integration in a Bluetooth stereo headset as well as high quality audio.

"Our Bluetooth headset reference design gives OEMs all the necessary building blocks to deliver compelling products designed around real consumer needs at less risk and cost than proprietary Bluetooth chips," said Paul Marino. "By providing a plug-and-play offering that incorporates a complete hardware and software solution, we're making the process of developing new Bluetooth audio products simpler for our customers, without compromising quality. We believe consumers will enjoy using these headsets with their Bluetooth MP3 phones and music players as they are easy to use and will enrich their multimedia experience." The Bluetooth 1.2 Stereo headset reference design will be available end of June 2005.

Philips and the world of Bluetooth, UWB, Wi-Fi and NFC

Paul Marino, VP and general manager of Philips Semiconductor's Business Line Connectivity Group is one of those people with a strong and colourful opinion on most things wireless ('take everything I say and divide it by ten'), and Incisor always welcomes the opportunity to talk. Add to that Philips' place amongst the leading wireless solutions providers and it goes without saying that a meeting at WiCon was a welcome opportunity.

The main theme of Philips' presence at WiCon was its current 'sense and simplicity' marketing campaign, which is currently being rolled out across industry and consumer media. Unsurprisingly, Marino was playing his part. 'Sense and simplicity is Philips' number 1 message. And across every product and technology. It is powerful, relevant and vibrant. Philips is committed to delivering relevant technologies to consumers. Those consumers do not care about technology per se, nor should they have to. It must be simple.'

Marino went on to illustrate how a technology that was being demo'd by Philips at WiCon – NFC – could enhance user experience of wireless. 'We wish to find additional uses for technologies to solve consumer problems. A great example is using NFC to enable quick pairing for Bluetooth devices. NFC was not built for this, but in use it is wonderful.' Marino's colleague Sour Chhor, general manager of embedded & contactless security, Business Line Identification division at Philips had talked Incisor through a demo that showed NFC as a pairing device for Bluetooth. By simply touching two NFC and Bluetooth-enabled devices together, they were paired. Chhor also transferred a picture using an NFC link with no user involvement. Both examples showed how intelligent use of technology can make things quicker, simpler and better for the consumer. Incisor had seen Sony carry out a similar demo at another show. Chhor commented 'With Philips, Motorola, Nokia, Samsung, Microsoft, TI, Visa and Mastercard, Sony is one of 30 companies that are part of the NFC Forum. This is a not for profit organisation that has been working to develop NFC apps and which is now seeing increasing traction for NFC.'

Incisor asked Marino whether we had just seen the future – would NFC replace traditional Bluetooth pairing techniques? 'It will be an additional technique, not instead of pairing' said Marino. 'We can't assume that NFC will be everywhere, although it is also worth noting that the WiMedia MBOA Alliance is considering NFC as leading candidate for its association model. Other alternatives have been considered. There will be detractors that say "you've invented a bad technology that doesn't do what it is supposed to, so you need yet another technology to make it work" but this is not true. Maybe the original pairing model isn't perfect - it works, but you can make it simpler. So we are just making use of an existing technology to help.'

There are other, more traditionally discussed uses for NFC. 'Cellphones are ubiquitous and personalised. In addition to all of the accepted uses, what a lot of sense it makes to use it to make electronic payments in the most natural way – by waving it like a wand in front of a payment machine, or an e-poster.

'Wireless must be simple' says Philips' Paul Marino.

Incisor's first conversations with Marino always centred around Bluetooth, and we asked him to comment on the current market. 'Bluetooth is ubiquitous across all levels of phone. The attach rate will continue to grow at 20-30% per annum until it reaches around 70% by 2008. To do this, Bluetooth has to go below the $2 price point. I talked about $1 Bluetooth as far back as 2003. It is possible to achieve a $1 price point for Bluetooth if you do a full integration onto a baseband device, or you just have a minimal transceiver on the outside and all of the baseband and associated components get absorbed onto another host processor. Historically, we have seen that the evolution of components has gone this way. Think of a V.90 modem, for example. This went from an external box, to an internal card, to on the motherboard, and then to software. Where Bluetooth is today, it is becoming so pervasive that it is inevitable that it will be integrated in this way.'

When Incisor asked Marino how long it would take for Bluetooth to become completely integrated, he made an interesting statement. 'There is one thing that will hold back the integration process, and that is the Bluetooth specification itself. For as long as one or two of the major participants involved in the standard development insist on making changes to the spec, for absolutely minimal benefit to the consumer, integration of Bluetooth will be inhibited.' This is a thought-provoking comment, though it is unlikely we will find out who Marino was referring to.

Philips is a major player in UWB as well as Bluetooth, and this was another subject on which Marino had challenging views. 'At WiCon we are also celebrating the Bluetooth SIG finally adapting – or at least considering - the UWB transport layer as the next generation high data rate, rather than inventing another radio. This is an act of sanity, and I'm on record as far back as 2003 saying that this should happen. The industry should stop inventing standards for everything – stop putting your engineers to work and just spinning their wheels. Engineers will always want to do something different – Bluetooth competing with ZigBee, or Wi-Fi competing with UWB. Its nonsense. So much engineering creativity is wasted, when it should be focused on achieving an economy of scales, getting products to master a technology and make it cost-effective and pervasive.. We should focus on commonality, and put all of this engineering creativity into the service of customers.'

OK, but what of the future for Bluetooth and

continued ▶

Philips shows how NFC can enable applications for payment and download via the handset and a movie poster.

UWB? 'Merging the good things that Bluetooth has in place and putting it onto a very good, high speed air interface, that has been defined in layers – you can have W-USB, 1394 Bluetooth and finally, wireless IP - is a very good thing. You will be able to use all of the established and robust Bluetooth controls to go through UWB in order to move large media objects around, or through a traditional Bluetooth transceiver to communicate with the huge, existing installed base of Bluetooth devices. This new commonality, and this new mentality, where we learn from one another rather than competing with one another, makes perfect business sense, and makes the consumer the focus of our activities.'

Knowing that we weren't going to get a boring, 'me-too' answer, Incisor questioned Marino over the mess in the UWB industry. We weren't disappointed. 'You think there is a mess? Let me try to show you that there is no such mess. There is a body, in the WiMedia Alliance that contains all of the major equipment manufacturers, and all of the semiconductor companies. That body also includes Microsoft. So, we are not talking about people who are interested in it (UWB), or think about it, or observe it, we are talking about people doing it. So, we have a de facto eco system, which will implement the integration of a WiMedia solution in every laptop, 85% of all the cellphones, in every printer and every digital camera. Why would anyone stop and consider what one single company plus 100 universities think (Ed. - Marino is talking about Freescale and the DS-UWB Forum here)? With the background of all of the good work that has been done in the Bluetooth sector, which ensures interoperability, compatibility and everything around the standard, the WiMedia Alliance companies will just build wonderful products. You cannot push aside the combined strength of all of these major players.'

Undoubtedly, but with UWB striving to gain worldwide regulatory approval, the ongoing fight – which Freescale will not give up easily based on its huge investment – is going to disrupt the process and cast doubts. Wouldn't it be easier if some sort of compromise could be reached? Not so, according to Marino. 'People think that the reason a compromise won't happen is because one or other partner is stubborn, or thinks it can win. But that is not why it should not, or will not happen. The reality is that what is proposed in terms of merging the UWB solutions will achieve only the lowest common denominator. Whether you have an MBOA or DS-UWB solution, you will only be able to communicate with the other at 1MBps. When a consumer has been sold on the concept of 480Mbps or higher, how is he going to feel about that and just how much bad perception do you want to create? It would be like TDMA in North America in 1996 all over again, when they nearly destroyed the digital telephony market. On top of this, to achieve this you would have to add additional hardware, which ups the cost and which again affects the consumer.'

Philips is prominent in most of the wireless associations, as Marino confirmed. 'We are a major player in and are vice-chair of the WiMedia Alliance – including being the editor of the MAC spec and proposer of NFC as the pairing mechanism for UWB and Bluetooth. In the WLAN area, Philips has made a conscious decision to avoid the cut-throat area of Wi-Fi in the computer space and will concentrate instead on Wi-Fi in cellphones. It makes total sense for the consumer to have one phone that at any time it is next to a network can lower their phone bills. The technology exists to make it possible. The first cellphones are hitting the market now. It will be voice over wireless LAN that creates the snowball effect. I believe the result will be unimaginable.'

We left this meeting feeling that, once again, Marino had provided an interesting and illuminating, cross- wireless industry view, and had cemented Philips' delivery of its WiCon messages.

Would that this would happen more often!

Implementing the Bluetooth AV profile on mobile phones

by John Halksworth, CSR

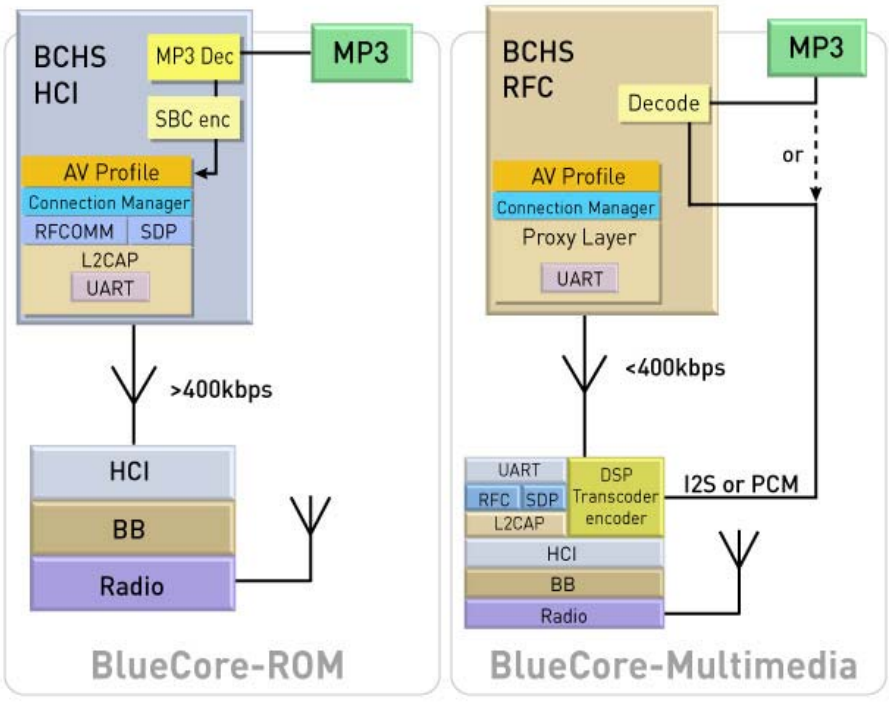
Mono wireless links for mobile phone headsets have come of age. After the initial impetus provided by hands-free legislation, the benefits of avoiding tangled lead sets soon became obvious to a wider audience. Many people now use Bluetooth binaural headsets with their phones for all voice communication. Given that listening to music while on the move also has enormous consumer appeal, it is no great surprise that manufacturers of Bluetooth products are keen to capitalise on this market success by providing people with stereo wireless links for music players.

The first stereo Bluetooth headsets are now appearing on the market. However, from the consumers' point of view, the situation is still not ideal. They have to purchase two different items of hardware, download their music files to the player via a computer, and then carry both products around with them. Mobile phone manufacturers are now urgently looking to address these issues, with a number of leading companies already announcing that they will shortly have products with combined phone and music player functions; it is generally considered that these are likely to prove the 'next big thing' in consumer electronics and enjoy very high sales figures.

Technically, the biggest obstacle to providing a stereo wireless link between a mobile phone/music player and headset concerns audio compression and the overhead this places on the phone's host processor. The most popular format for music files is MP3 – though the ubiquitous iPod uses Apple's proprietary AAC standard – which have to be decompressed by the phone, and then recompressed into a form suitable for transmission to the headset via Bluetooth. The Bluetooth Audio Video (AV) profile used for such audio streaming applications employs a compression standard known as Sub-Band Coding (SBC), which was defined by the Bluetooth SIG primarily to avoid any interoperability issues being caused by incompatible CODECs. This royalty-free CODEC demands 350kbps bandwidth for hi-fi quality audio, which although higher than most common algorithms – MP3, for example, requires 128kbps – is still well within the standard data rate capability of Bluetooth V1.2.

The problem is that decompressing and recompressing audio signals for streaming involves copious instruction cycles. This imposes a significant burden on the phone's host processor – so much so in fact, that some existing designs simply do not have enough processing power for the task. Many Bluetooth chip manufacturers use third-party RISC-based co-processors to reduce the number of instruction cycles needed for decoding music, but this approach is expensive and increases power consumption. CSR's work with manufacturers of mobile phones and add-on Bluetooth modules had highlighted this potential audio streaming problem at an early stage, and the company consequently offers a choice of solutions for implementing the AV profile, as shown in the diagram below.

Most phone manufacturers currently implement Bluetooth with a Host-Controller Interface (HCI) split between the host and the radio subsystem (as shown on the left of the diagram), though a few – such as Samsung and Pantech – have chosen to taken advantage of the uniquely flexible partitioning offered by CSR's BlueCore Host Software (BCHS), and employ an RF communications split. The latter approach, in which the full Bluetooth protocol stack is placed on the radio subsystem, with all



Implementing the Bluetooth AV profile in a mobile phone depends upon available resources.

continued

host to Bluetooth communication accomplished using serial messaging, significantly reduces the load on the host processor.

If the phone employs USB or a 921.6kbps UART for HCI communications and the application can sustain a throughput of more than 400kbps over this link, and also providing that the host processor has sufficient spare capacity for MP3 to SBC transcoding, any of CSR's BlueCore3 or BlueCore4 devices can be employed for audio streaming. The versions with integral ROM are especially suitable for use in phones – they have extremely small footprints and are very cost-effective for high volume applications.

However, if – as is probably the case – one or more of the above conditions cannot be met, CSR's BlueCore3-Multimedia single-chip Bluetooth device provides an ideal alternative solution. The chip contains an embedded Kalimba DSP co-processor and stereo CODEC, and is designed specifically for high performance audio headset applications. Capable of 32 MIPS, this powerful DSP offers single cycle MAC and 24 x 24 bit multiply, and requires fewer instruction cycles than its RISC-based equivalents. It also has flexible interfaces to the BlueCore3 subsystem, as well as a bi-directional audio interface that supports industry-standard formats such as PCM and I2S. MP3 data can either be sent direct to the DSP over this link, or, if sufficient host processor capacity is available, via a dedicated MP3 CODEC. Either way, the DSP handles all SBC encoding prior to Bluetooth transmission.

CSR's BlueCore3-Multimedia chip is available in a 120-ball VFBGA package with an exceptionally small 7x7mm footprint and a height of just 1mm. Phone manufacturers can either choose to integrate this in their designs, or use one of the third-party Bluetooth modules on the market that already incorporate the chip, such as the latest 10x10mm UGX6 from Alps Electric (see above).

John Halksworth is Product Marketing Manager with CSR; john.halksworth@csr.com

Sponsored contribution

The new UGX6 Bluetooth module from Alps Electric incorporates CSR's BlueCore3-Multimedia chip.

WiMAX

One-box solution for transmitter measurements on WiMAX signals

A new option for WiMAX (does everyone know that this is an acronym for 'worldwide interoperability for microwave access'?) expands the range of functions of Rohde & Schwartz' high-end Signal Analyzer - the R&S FSQ. This results from R&S' FSQ-K92 Application Firmware permitting TX measurements on OFDM signals in accordance with the IEEE 802.16-2004 standard.

With a data transmission rate of up to 75Mbps, WiMAX is projected to replace cable-based solutions such as DSL.

Munich-based R&S develops, produces and markets communications, IT and T&M equipment and systems with an emphasis on mobile radio, broadcasting, general-purpose and RF test equipment, radio monitoring and radiolocation, radio communications and communication security.

R&S claims that it provides the only WiMAX test solution that consists of just one box, and which records and analyzes the signal and graphically represents the results. Optional I/Q inputs allow direct signal analysis in the baseband.

The signal analyzer records and analyzes the signal, which may range from 1.5MHz to 28MHz. It then outputs the results in a table, or displays them graphically. All parameters that are key to describing signal quality can be seen at a glance, including EVM values, frequency drift or I/Q errors. This allows designers to exactly characterize the modulation quality and other parameters such as adjacent channel power or spectrum mask of their WiMAX application.

The new software update for the R&S FSQ Signal Analyzer is available now from Rohde & Schwarz.

The genesis of UWB and W-USB

Incisor interviews Jason Ellis of Staccato Communications

In the WiCon preview issue of Incisor, Staccato Communications – a leading player in the WiMedia MBOA Alliance of UWB companies – examined the recent announcement by the Bluetooth SIG (BSIG), and celebrated the coming together of Bluetooth and UWB.

When Incisor visited Staccato's booth at WiCon, Jason Ellis, senior manager business development and marketing, took the time to talk us through some of the background to the development of the UWB physical layer (PHY) and media access controller (MAC), and the future for developers considering UWB, Wireless USB (W-USB) and Bluetooth systems.

We started out with Ellis describing how what we know today as UWB came about. 'The PHY is the bit that is UWB. Then there is the MAC – the IEEE 802.15.3 MAC and the MBOA MAC. 15.3 was developed by Kodak and Extreme Spectrum, and their usage model was digital camera to kiosk - consumers transferring pictures over a short range wireless connection, with no other users, direct from the camera to the kiosk in order to get them printed. This looks more like USB as a host device, and had many limitations. As more and more consumer electronics companies looked at it, and the IEEE picked it up, its failings became apparent. UWB is much more capable than this – we wanted the vision of UWB to extend out to 20-30 years, and to be able to handle many more applications – especially IP-based, peer to peer connectivity. The 15.3 MAC was not a good MAC for this.'

'An informal group was started in Japan involving Sharp, Toshiba, Philips Sony, Samsung and Panasonic. They wanted a MAC that was more like the Internet – fully distributed, completely decentralised and good for mobile devices. This capability works better for ensuring quality of service (QoS), video distribution, mobility and robustness in peer to peer and peer to host device situations. They

Jason Ellis, Staccato Communications.

started to define this MAC, and were invited into the MBOA (Intel, Philips and Samsung were already involved with MBOA). The culmination of this is the MBOA MAC spec which will be finished by the end of the month *'(Ed. – this month being May).'*

The world of short range RF is a complex place, with more than one standard. This was taken into account, as Ellis explained. 'A lot of the effort went into defining how to handle different data transfers and different usage scenarios, keeping 1394, W-USB, IP and Bluetooth in mind. So you have a PHY and a MAC, and the convergence layer is basically just a set of policies saying "lets all be good neighbours". It's a way to influence how W-USB behaves, for example, preventing interference.'

'Above this, you now have protocols that run on top. W-USB - version 1.0 of which was formerly launched during WiCon week, simultaneous with the first ever W-USB developer conference which is taking place in Santa Clara, California - was re-written slightly. This was because with wired USB, interference isn't an issue. Continuous streams of data are sent. This can't happen in a wireless scenario as you need to co-exist with other wireless systems. The spec was re-written with this in mind, optimising for wireless over the air.'

Interference wasn't the only issue. 'They have also put in association models and security, which will be familiar to Bluetooth developers. To implement Bluetooth over this you simply have to load the protocols from L2CAP up. W-USB and Bluetooth can be interleaved and running at the same time, on the same chip, without changing the hardware. It just takes a firmware update to implement Bluetooth. This makes life extremely simple for anyone contemplating implementing W-USB and Bluetooth.'

As a player in the WiMedia Alliance, Ellis felt that Staccato and the other member companies enjoyed a significant advantage. 'The Bluetooth SIG hasn't announced support for either WiMedia or DS-UWB yet, but if it were to go with its own radio, or DS-UWB, implementing

Staccato's Ripcord System-in-Package (SiP) module is comparable in size to current Bluetooth radios and contains all electronics and passive elements necessary for operation except the antenna.

continued ▶

UWB continued

Bluetooth and W-USB would necessitate an 'either/or' situation, as they are completely separate radios and there may be interference and co-existence issues, as you have different MAC packets and PHY issues. This is one of our key messages – its not W-USB or Bluetooth, it is W-USB AND Bluetooth, which we can provide to the customer, all at the same cost as it just involves a firmware upgrade. It's up to the customer to decide how they use both. At this time more education is needed, as the customers haven't yet figured this out.'

Ellis finished off our comment with one interesting observation. 'W-USB is very aggressively going after the whole Bluetooth market. They want to be able to provide stereo headsets, for example. That said, feedback from our customers is that they are not over-excited by W-USB for its long-term potential. They see it as here and now, to be implemented as they see fit.'

So, we may be about to see another challenge to Bluetooth from the Wireless USB part of the UWB industry. Will it succeed? It's impossible to say, though there must be some validation felt by the BSIG and member companies that yet another technology is to take a pop at its market position.

New blood at Artimi

During WiCon week, single chip UWB systems semiconductor company Artimi Inc. announced that Colin Macnab has joined as chief executive officer. Macnab was formerly vice president of marketing and business development at Atheros.

"Colin is an experienced executive with extensive knowledge and track record in the wireless communications semiconductor and systems industry," said Kaj-Erik Relander, general partner of Accel Partners and director of Artimi. "Colin has the breadth of start-up to IPO experience necessary to lead Artimi forward in becoming the market leader in UWB systems semiconductor products. Colins strong relationships with target OEM and ODM customers in Asia will be instrumental in further developing Artimi's growing customer base."

"Artimi's exceptional engineering and management teams have made major achievements in developing their single chip UWB technology," stated Macnab. "Artimi's low cost, high performance complete UWB system solutions will enable consumer electronics companies to rapidly develop UWB enabled wireless products - whether it be digital media adapters, high definition digital televisions, laptop computers or mobile phones. I am looking forward to working with the Artimi team and using my business development experience to strengthen Artimi's position in the global UWB markets."

Snippets

Snippets

BLUETOOTH

Bluetooth Shows Signs of Growth - Reuters

According to global news agency Reuters, Bluetooth technology is beginning to show significant signs of growth after nearly a decade of use. This growth is attributed to an increase in the number of applications, such as wireless headsets used with music players and wireless phones, as well as standardization of the technology. With this growth, comes a drop in price and increase in sales. More than 264 million Bluetooth chips are expected to sell this year, averaging $3.80 per chip, compared to 69 million chips sold in 2003 at $6.40 per chip. It's a good job we have Reuters to tell us this stuff.

UWB

New VP of sales for Focus Semiconductor

FOCUS Enhancements, which Incisor readers will know as an UWB/video production and conversion technology integrator, has announced Mark Zadeh has joined the company as vice president of sales for its Semiconductor Group. Zadeh reports to Tom Hamilton, executive vice president and general manager of FOCUS Enhancements Semiconductor Group. Zadeh has over 20 years of industry experience in the semiconductor and technology industry. Most recently, he was the director of sales and business development at Planar Systems, Inc., where he developed its worldwide sales organization and channel strategy. A Focus spokesperson commented 'This news is more than a new hire, it's a strategic move to continue the advancement of Focus' UWB technology. The UWB industry is heating-up while market leaders expect to ship working chips before the end of 2005.'

New mood at Freescale?

Can DS-UWB overcome WiMedia MBOA challenge?

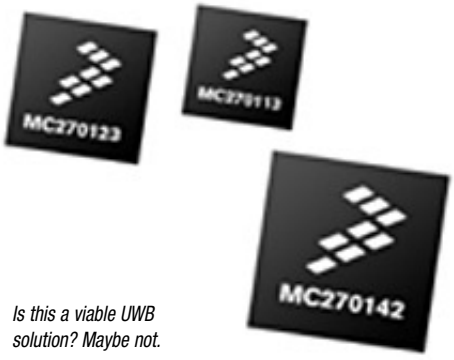
In the convoluted world that is UWB, one or two characters stand out. Martin Rofheart of Freescale is one of these. A co-founder and CEO of Xtreme Spectrum, the UWB start-up acquired by Motorola in 2003 (this part of Motorola subsequently being spun off as Freescale Semiconductor), Rofheart worked closely with the US regulatory community on UWB's approval by the FCC, and was involved in the standards and products development for wireless technologies such as IEEE 802.15.3, IEEE 1394. Wireless USB and TCP/IP. For the last couple of years, there have been few more passionate proponents of DS-UWB. Incisor has interviewed Rofheart several times, but the chance to meet up again at WiCon was not going to be missed.

Freescale was demonstrating streaming of MPEG HD video at WiCon, using its UWB solution and Mini PCI hardware over a distance of 45 metres. Rofheart explained 'We are showing how the FCC waiver enables an increase in performance - 38Mbps at the lowest compression rate and a doubling of range for a given performance level. This package is deliverable now, and consumer products will be available in the US for Christmas this year. This marks the completion of our first phase manufacturing.' While it is good news that UWB-enabled products will hit the streets in time for the holiday season, the viability of this level of UWB equipment falls into question later on, as well shall see.

Though impressed by the demonstration, Incisor launched in at the deep end – when, when, when, was the UWB community going to get its house in order? Unsurprisingly, Rofheart's view of things was different. 'In reality there is no mess in the UWB market – there are two sets of organisations and only a few individuals that have passionately held beliefs that are different about what the right technology solutions are. For a variety of reasons, you have a relatively large group on one side, and a small group on the other. This situation will persist until somebody delivers a solution that actually works. I don't mean logos, or web sites, specifications or trade associations. I mean data rate, form factor, functionality, range, power consumption, user experience and price point. You've seen this with Bluetooth. When they got enough of these factors right, it's as if a switch has been flicked and it takes off.'

Martin Rofheart, director of UWB operations, Freescale.

OK – maybe so, but in reality how close is Freescale and DS-UWB to reaching this point? 'We are at an in between stage,' said Rofheart. 'We have a PCI-based solution that is manufacturable, and delivers 100MBps at 20 metres. But this isn't going to change the world today. The price point is not right, the data rate is not compelling enough and the power consumption is not where we are heading. But it is a stake in the ground. We believe that we can deliver a solution as samples by Q4 this year for CES and 3GSM in Barcelona at the beginning of 2006, with 500MBps, at 500mW performance and at a sub-$10 price point for the complete radio bill of materials (BOM). This will really excite consumers. This will include a 1394 interface, USB 2.0 and TCP-IP, and I believe at this stage we will also have a Bluetooth solution completed prior to CES.' Now, this was very interesting, because – certainly for the first time in any interview that Incisor has carried out with Rofheart - there was an admission that the UWB solution delivered so far by Freescale might be something other than perfect. Are the winds of change blowing through Freescale?



Is this a viable UWB solution? Maybe not.

Incisor also pointed out that Rofheart's prediction of an UWB/Bluetooth solution by the end of 2005 was considerably more ambitious than the Bluetooth SIG's (BSIG) estimate that it would be 12 months (from now) before the convergence software to enable UWB/Bluetooth to co-exist was completed. 'Indeed, but someone has to demonstrate that a thing can be done, and how you would do it, so that they can get a feel for it.' We didn't know quite what Rofheart meant by this, but assumed it meant that Freescale would demonstrate an early UWB/Bluetooth prototype.

We did not feel that Rofheart had really convinced us that the world of UWB now resembled the Elysian fields, and so, like a terrier with a rag, we pulled him back to the subject. And a concession was forthcoming, accompanied by a true, Rofheart-style prediction. 'It does appear that UWB is in a mess. That will change within 2 quarters of someone demonstrating a solution. Based on our demonstrating our solution at CES and 3GSM, that means that UWB will be 'clean' by this time next year. You will understand who is doing what, where they are, how it works, and what the benefits are in any circumstances. It will be obvious how it is going to end in the January/February time frame.'

Wow! So there will be one dominant UWB technology within one year? 'That is certainly a possibility. I think that we will clearly be in a world where we will understand the impact DS-UWB will have' Rofheart responded.

Rofheart also believed that UWB's path to market will be eased by authorities outside the USA making regulatory approval more easily accessible. 'Based on our current understanding, Freescale is expecting – with about a 50% likelihood - that waivers will be granted in certain Asian countries that will enable sales to be made to consumers during 2005.'

As the conversation progressed, Rofheart seemed to be suggesting that the UWB market will divide by applications. 'I think there will be a set of mobile and entertainment applications where DS-UWB is established. It doesn't mean that consumers will see three different PHYs and two different MACs,

continued ▶

UWB continued

and choose between them. It's not like buying ingredients to make a pie. It will be obvious which technology can target which consumers.'

We needed to explore this further. If DS-UWB is able to first deliver the type of solution described above, can this really overcome all of the other factors that currently weigh against it – including not least the much greater number of high profile consumer electronics, telecoms and semiconductor companies – inc Microsoft – that are aligned with the WiMedia MBOA Alliance? 'Of all of the companies in the WiMedia Alliance that actually build products, there is only a handful that are not also talking to Freescale. And, a trade body only has any point or value once you have solved the biggest problem – to deliver a viable and working solution that benefits consumers. We will have interoperability, certification and production issues all resolved.'

Despite what was perceived earlier as a possible chink in DS-UWB's armour, at this stage Rofheart was back to sounding his normal, 130% confident self. Since we last met him at 3GSM in February, and taking into account factors such as the Bluetooth announcement, and Microsoft joining the WiMedia Alliance, has Freescale's position improved? 'I think it has stayed the same,' said Rofheart, continuing with a comment on Microsoft. 'I didn't regard the Microsoft/WiMedia announcement as significant as I thought they were in it already. I couldn't see a world with Wireless USB (W-USB) where Microsoft would not be involved – how could that be? I cannot see that Microsoft would ever see that there could never be a DS-UWB PHY in any system or operating system, and so I regard this announcement as very neutral.'

And the Bluetooth announcement? 'The Bluetooth thing is very positive, but there will be a pendulum effect. Bluetooth was hugely over-hyped. Initially, the pendulum of support swung all the way in one direction, When the over-hype became public, the pendulum swung all the way in the other direction and it was declared dead. Now I think it is swinging back again. The same is going to go on in UWB, until someone solves this by delivering solutions. Freescale is close, but hasn't done it yet, neither have other companies.'

Isn't this, though, some sort of radical volte-face? Everything we have heard or read to date has insisted that Freescale was delivering a working, viable UWB product. And here we heard what seemed to be a second concession from Rofheart. 'I don't think that with the 110MBps solution, and this set of products, we have delivered a level of performance that has earned ubiquity, and which delivers real value to consumers. We have not done that yet.'

The winds of change are strengthening to a gale, it seems.

Incisor also asked Rofheart's opinion on whether the BSIG would need to choose between DS-UWB and the WiMedia Alliance, if one of the two modulation standards had not emerged as a leader? 'They won't need to. I think that the BSIG's timeframe (1 year) is correct, and that they will be looking for one organisation to deliver real value. Which is a excellent position.'

And then came another bombshell. We asked Rofheart what would happen if the BSIG ultimately chose to work with the WiMedia Alliance MBOA version of UWB, not the DS-UWB solution from Freescale? Fully expecting him to rebuff this possibility, Incisor was taken aback when Rofheart once again switched into conciliatory mode. 'If they didn't choose DS-UWB, it would be because there was a better alternative, available within a certain timeframe. That would mean someone had a better execution, and a better vision. The reality of life – for us and everyone else that doesn't have a crystal ball – is that we may not be correct.'

We had entered new territory here. This interview had seen, for the first time, Rofheart and Freescale admitting that a) its current solution isn't ideal, and cannot be a ubiquitous solution and b) that Freescale might not win the battle to establish an UWB modulation standard. How much should we read into this? Is Freescale preparing to admit defeat? Our conversation with Mike McCamon of the DS-UWB Forum had painted an equally bleak picture.

One thing is for sure. Freescale has a substantial investment in DS-UWB, and Rofheart is a fighter, and – we assume – has an intellectual and personal financial stake in seeing DS-UWB succeed. At Incisor we do not believe that Freescale is about to roll over and die.

This struggle is likely to continue for some time yet.

UWB at 20 meters for home, enterprise applications from Freescale

Freescale Semiconductor demonstrated what it described as the industry's longest-range commercial Direct Sequence Ultra-Wideband (DS-UWB) communications solution in a wireless projector and media blaster at WiCon. In fact, as Incisor reports in its interview with Freescale's director of UWB operation, Martin Rofheart, we saw this demo running at nearer 40 metres. Freescale says that this performance gain is a result of the recent Federal Communications Commission (FCC) ruling, and is double the range of previous UWB solutions.

The demonstration at WiCon saw a high-definition media stream being broadcast wirelessly from a laptop to a USI digital media adapter card, which then projected the video to a 40-inch television display. Achieving a data rate of 110 Mbps, the wireless transmission between laptop and media adapter card was officially to be done at a distance of 20 meters, double the rate of previous UWB demonstrations, though as we saw, greater distances also worked. Both the laptop and the digital media blaster used Freescale's XS110 solution in a UWB module developed by USI. The media adapter card, provided by USI, received the video stream via the UWB link and then converted the digital video into a variety of output formats for projection to the screen.

In March 2005, the FCC approved a waiver expanding the rules for UWB. Specifically, the waiver removes the requirement to reduce power for gated systems that burst intermittently. Relative to the original rules, under this waiver Freescale's DS-UWB approach may be re-certified to achieve up to 30x greater data rate across a network, or deliver a video stream using up to 30x lower power from the battery, or deliver the same data rate across the network but at double the distance and with greater robustness.

With just a firmware update, Freescale's current UWB chipset, the XS110, was modified to take advantage of the waiver, and has been submitted to the FCC for re-certification under the new rules. Rofheart commented: "The waiver's impact on Freescale's future UWB products is expected to be even more significant, resulting in up to 30x improvement in power consumption, data rate and capacity for key applications. While the FCC waiver affects use only in the US, we believe the prudent testing and measurements behind this decision will be key for other regulatory concerns worldwide."

DS-UWB Forum chair sees continuing conflict

Regular readers of Incisor will remember Mike McCamon's period of stewardship of the Bluetooth Special Interest Group (BSIG). McCamon wasn't there long (industry talk was of a failure to see eye to eye with Mike Foley, who joined the BSIG from Microsoft and now does McCamon's former job at the BSIG). Whatever the reason, McCamon's move to chairmanship of the DS-UWB Forum could be seen as an 'out of the frying pan, into the fire' situation. However you look at it, DS-UWB is widely viewed as the underdog in the WiMedia MBOA versus DS-UWB' struggle to gain control in the UWB modulation standard battle.

Incisor took the opportunity to talk to McCamon at WiCon, and tried to keep the conversation out of the UWB mire for a while by asking him to comment on the recent Bluetooth/UWB announcement.

'With my Bluetooth background I knew that UWB – and high data rates generally - had been talked about in the Bluetooth community for some time. Device manufacturers don't want to put lots of radios in a device. No-one knows where this discussion will go, but fewer radios would be a good goal.'

OK, but isn't it likely that UWB will slow down Bluetooth's impressive market success, due to the massive issues that have to be overcome before UWB can become a global solution? McCamon believes that to see things this way is to over-simplify. 'Bluetooth has a lot of things still wrong with it. Profiles, for example. There are too many ways of doing similar things. Maybe you could have one profile for audio, for example, and be able to negotiate how you could use it, and how fast you could do it. This rather than having a different profile for every different way you might handle audio. Interoperability and usability still need work, too, and maybe this is the time to tackle both issues at the same time as part of the architecture. Looking at the positive, I started the Bluetooth 'lets publicise the milestones' programme, and so I'm kinda gratified to see the 5 million chips announcement this week.' It's possible we had touched a raw nerve, here, by launching McCamon into a discussion involving Bluetooth.

Mike McCamon, chairman of the DS-UWB Forum.

But surely, we asked, is there any way that a Bluetooth/UWB combo product could possibly have less problems? 'It depends how you implement it' said McCamon, continuing 'The ten finger rules says it takes ten fingers to go from first customer shipments to an established market position, and I'd say that at this stage Bluetooth is not off the first hand. There are many interoperability and usability issues, and UWB hasn't even started down this road. It could be a decade before all of this get resolved. Currently this looks like 1990 in the wired networking market – there were 4 or 5 types of network cable you could put on your PC - token ring and Ethernet – plus stuff we've already forgotten about – and all sorts of protocols on top of the wires. Nobody was betting on TCP-IP – it did not have the big companies backing it and came out of nowhere – and it really took from 1990 to almost 2000 to get us to realise that if you were going to put IP in any device, you weren't going to put token ring in it. The world started talking about Bluetooth in 1998 – and seven years down the line its only now approaching being a success and an established technology. And this was without a UWB-style standards debate going on.'

As Bluetooth seemed to be a sensitive area, we moved on to discussing McCamon's move to the current job at the DS-UWB Forum, at the apex of the UWB industry's volatility. McCamon seemed to have accepted that life was not to be calm or boring, commenting 'Working in UWB is more interesting than working in the toilet paper industry.'

But there must have been more to it than most people's need to do a job – paying the mortgage, school fees, etc. - that caused McCamon to step into another war zone? 'Part of the reason why I joined DS-UWB (after the miserable politics of standard organisations such as the BSIG had made me think 'never again') was that when I looked at the UWB situation – where the only conflict that goes back further in time is the one between the English and the French – I thought that my experience might mean that I could help pull the sides together. We've tried to set the Forum up so that – unlike other trade organisations where it is only 5 – 10 companies that benefit and everyone else goes along for the ride – we allow for more accountability and more openness.'

For all of this good ambition, McCamon really doesn't have an easy job. 'Within the IEEE, the DS-UWB group had repeatedly proposed a common signalling mode, which ought to mean that more than one PHY can exist and people don't have to worry about buying one type of UWB or the other. This has been repeatedly rejected by the other side. We will continue to try to build it into our specification. The logic is that we will not only enable people to have more of a share of the IP so that they can make money, but we also provide an option of scalability, so that we could have very low data rate UWB as well as very high data rate.'

According to McCamon, the problem runs deeper than technical issues. 'Our attitude at the DS-UWB Forum is to get around all of the problems by being open, and being inclusive. I invite the people from the other side to all of our member meetings – every single time – and no-one has taken me up on the offer. I will keep trying, and you would hope that at some point they will look at their customers and understand that it is good for those customers and for the

continued ▶

UWB continued

DS-UWB Froum was not wasting money on extravagant booth space at WiCon.

industry if the two sides can decide to work together.'

Now, the DS-UWB Forum has been widely described as having only one significant participant, which is Freescale, and the rest of its membership is made up of what Philips Semiconductors' Paul Marino describes as "100 universities'. Whatever the truth of this, the opposing WiMedia Alliance does have a considerably larger group of influential companies behind it. In this situation, and considering its influence, is McCamon's philosophy completely aligned with Freescale? 'The paradox of a trade group is that each member company really wants what is best for them and the only way a trade group can work is if this is managed. I think there are people at Freescale that are paid to achieve what Freescale wants to achieve, but I think that through the Forum there is a sense of wanting to compromise, as they aren't going to be able to do this on their own.

But in reality, should the DS-UWB Forum be dominated by one company? 'It's a difficult issue, but I say that the WiMedia MBOA is no different – it is dominated and driven in the same way by Intel. That association has spent a lot of time recruiting members, and I'm not sure that you can recruit people to a trade group – they have to want to join. Our Forum may be populated by smaller companies, but I believe that they have joined us because our approach and the way the spec has been designed are truer to what UWB is all about. People who have joined us have done so for principle rather than pure business level reasons.'

When we asked McCamon who he thought was going to win the DS-UWB versus WiMedia MBOA battle for PHY supremacy, he cleverly sidestepped the issue. 'I think the customer is going to win, because where there is competition there is innovation. And having all of these technologies, not just within UWB but with Bluetooth now too, I think the industry companies and their alliances are going to have to do things better, and be more responsive to what the device manufacturer customer wants. If pushed, I think there will be two or more types of UWB for a while – including a low date rate UWB which has been looked at in the IEEE 802.15.4 group. The customer will be the main beneficiary.'

Incisor has previously reported that the BSIG has indicated that a point will come when – if the UWB market hasn't resolved the modulation standard debate – it will have to choose one or the other. We asked McCamon whether he thought this would happen? 'No. They don't have to. I think there are people there that will WANT to – but this won't be for benefit of the customer or the market, it will be back to that paradox of the trade group.' When we pointed out that the BSIG had said that it would indeed choose, McCamon looked visibly taken aback, and said 'That would be a shame. Having said that, I'm encouraged that we are even having this discussion about UWB, because for a while I just didn't think it was going to happen, just because of the politics and the people involved, so things do change. In spite of all of our best efforts, the customers will pick something. Strange things happen.'

From our discussion it was clear that McCamon has been frustrated and even amazed but the way things have – or rather haven't – progressed. 'The IEEE situation is really mind-boggling how terrible it is. It's not even really about the main technology issue – it is really ugly and very deep-seated. Both sides are also trying to play the press, too. I can't be any part of that. It's really odd for me now – especially with the Bluetooth thing. If you drew a Venn diagram I would be one of the ones near the middle, and I really hoped that – like some major historical figure that drew everybody together – I could have figured out a way to make a lasting contribution to bring all of these technologies and the main players together. But it seems it's not to be. Some of the things I have seen communicated from the other side are just so bad, and I'm sure that people on this side are doing the same thing. Somebody ought to do a calculation to work out how much money has been wasted on the IEEE process for UWB. If 200 people fly to that IEEE meeting in Australia, at £4,000 per ticket, that adds up to a lot of money just to go down there, do your email, vote no, do nothing and come home. It is absolutely mind-boggling. I've been to two of these meetings, and it blew me away.'

Despite the fact that our talk took place in a jovial and good-natured atmosphere, it was absolutely clear that for McCamon and colleagues in the UWB sector, life is far from fun. And it hard to imagine that the DS-UWB side is having a better time than the WiMedia MBOA folks. McCamon tried hard to come up with some good news to conclude what had been a fairly depressing summary of the current situation. He struggled, and only managed to come up with 'If we don't do something, somebody else will.'

The world of UWB needs a White Knight. Who is it going to be?

ZigBee takes centre stage presence at WiCon

The ZigBee Alliance (ZBA) had probably the largest single stand area at WiCon, set out as a pavilion and populated by a good number of ZigBee companies. Chipcon, which is probably today the leading ZigBee chip supplier, chose to have its own booth space nearby.

To discus this new, higher profile presence from ZigBee, Incisor talked to Bob Heile, chairman of the ZBA. Heile hails from Boston in the USA, but doesn't seem to have been there for a while. 'I've been in Europe since March travelling to Germany, Finland and Italy, and while I've been here I nipped across to Australia for the IEEE meeting in Cairns. There was an opportunity to go back home briefly at one stage, but I thought there was no point – with events like the first commercial ZigBee conference in Paris, there are just so many things going on!'

Incisor remarked upon ZigBee's higher visibility at WiCon. 'We are seeing real growth and take off' Heile commented. 'For the first 2 years, while our spec was being created we deliberately kept a low profile. We have started raising our heads above the parapet in the last quarter.'

This is all very well, but isn't it true that the ZigBee Alliance has not yet published its spec? 'That's true, but not important. The spec was ratified in December and is available to our members. The finished document, which runs to several hundred pages, is currently being completed by merging the six individual docs and adding some nice indexing and instructions on how to do stuff. This is being carried out by volunteer resources, which is why it's taking a while. We are now in review stage, and will publish it shortly. Probably early June – certainly before the member meeting.' said Heile, explaining how it works for companies wanting to get into ZigBee. 'The ZigBee spec is published with no fee and you can do everything with it except anything for commercial gain – if you want to build a product or market a service that involves ZigBee, then you have to become a member of the ZBA at one level or another – starting with the adopter class at $3500 or, if you really want to get involved, the participant class at $9500.'

Heile continued 'Our efforts are now shifting to the next really important space – applications. Customers understand applications, not technologies. Our Application Framework Group sponsors development of specific apps. While there is no funding assistance, we provide support - moral and practical – to companies that are developing applications. The idea is to promote development of stack layer and applications within the general community to encourage everyone - academics, the open-source community and industry companies - to be creative and innovative.'

While the ZigBee spec now exists, there are people that have either already started to implement systems using just the 802.15.4 radio and not the ZigBee software, or are considering that this is the way they will go. The strongest likelihood being that they will use some custom/proprietary software. Was this a problem? Heile thought not 'It is true that there are proprietary alternatives to using ZigBee. However, we are not seeing a mass migration in this direction. In the early days, many people didn't want to participate in the development of the ZigBee standard, but now it is here they are very interested in using it – remember that there are four platform vendors announced and more on the way, so it's happening now.'

'802.15.4 is fine if you don't want to do the mesh networking. The 15.4 radio is a good radio, and not power-hungry, but it's the stack that people are interested in. We are coming up with similar profiles to Bluetooth – lighting/home security and building automation – but we are also seeing a lot of interest from companies wanting to use the whole platform to write their own specialist applications. There is a lot of richness in how this is being deployed, with multiple applications arranged above the core, mesh network.

One way that ZigBee platform providers can encourage the use of ZigBee is to provide customers with Reference designs. CSR has famously done this to great success in the Bluetooth market. Is the same happening in ZigBee? 'Absolutely. Ember, CompXs, and Chipcon/Figure 8 all doing CSR style application and reference design development to help develop the market and make it as easy as possible for people to design in ZigBee. Remember that the customers are not radio people. I think there will be companies appearing that will just be selling modules.'

'People are thinking about clever and broader applications for ZigBee. An original idea was to put a ZigBee-based lighting control system in a commercial building. Then, of course, you also

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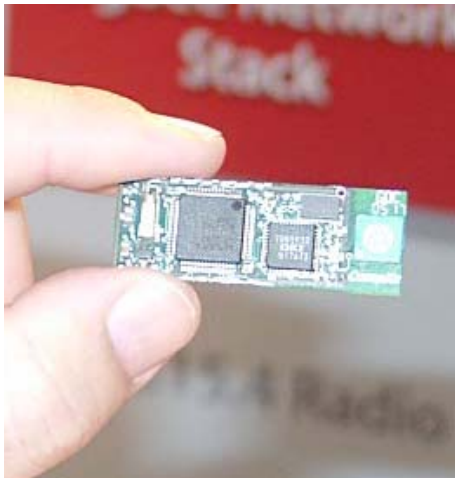
ZigBee continued

have a security system as it allows you to know whether there are people in a building - and a maintenance system because you can predict when the lights are going to burn out. It's the same in the home as in a commercial environment. The possibilities are limitless.'

So ZigBee is a technology that is coming of age, and the growing openness will continue, even if the ZBA is zealous about maintaining privacy at its Zig Fests. At these events, companies get together to test products that are under development to iron out interoperability and compatibility problems. 'Just like Bluetooth Un-Plug Fests, the three monthly ZigFests are conducted under NDA. Even I can't be there! Competitive info is valuable and this is why we keep stuff close to our chests. However, we welcome anyone to come along on the 15th June when the ZigBee Open House Exposition session takes place in Oslo, Norway. Outsiders are welcome and there will be 26 companies quite ready to talk!'

There has been ongoing discussion in the industry about whether Bluetooth can do what ZigBee can do, and vice versa. Heile believes talk of crossover is fairly pointless. 'I was talking to a Bluetooth guy who said "Bluetooth can do some of that ZigBee stuff – like lighting control' and I replied - yes, but in an 8 node network environment – what happens when you add a home entertainment system and want to introduce themes, so that when you turn on the home entertainment system all of the lights switch to a mood lighting mode. You can't do that with Bluetooth any more because you've exceeded the number of devices. It's the same with front door opening – Bluetooth can do it, but it can't then connect in to your ZigBee-based security system with 40 or 50 nodes around the house.'



CompXs shows current ZigBee silicon.

Whatever Heile says, Incisor's view is that there will be continuing 'bleed' into Bluetooth's territory. If it is not already happening, we would bet money on the fact that there will be boffins somewhere saying 'what if ZigBee had a slightly higher data rate? Then we could …' Heile was amused, but resigned. 'Yeh, its gonna happen. But the ZBA has a core focus and my message is that we should stick with it.'

Heile then did go on to make a somewhat provocative statement, which suggested that the quiet guys of the WPAN industry may have higher aspirations after all. 'If something really encroached on Bluetooth – such as Wi-Fi, which is more of a threat to Bluetooth than ZigBee, and is already turning up in cellphones – if Bluetooth really started to falter, then ZigBee could move upscale and Wi-Fi would come down scale to fill the gap. No more Bluetooth.'

A stimulating thought, but as we know well, Bluetooth isn't faltering, and has recently opened a new door with its alliance with UWB. Heile (who also has interests in UWB) was cautious in his reaction to this development. 'We will see what comes of this (Bluetooth and UWB). Mentioning UWB in the same sentence as Bluetooth certainly grabs attention.

We asked whether engaging with the frenetic world of UWB could damage all of the Bluetooth SIG's (BSIG) good work so far to maintain a stable, interoperable and well-managed standard? 'My first reaction is that it sounds like the BSIG is being reasonably conservative. After all, until UWB gains regulatory approval in world markets there isn't a market. UWB still has a lot of territory to cover to prove itself – until Japan and Europe come up with regulations, we will just have to see.'

And finally, as Heile had attended what should have been an important IEEE meeting in Australia, we asked him if there were any interesting developments? 'Nothing on UWB – just the same old, same old. DS UWB still has a lot of support in the IEEE. It must do to get 50% votes consistently, but no-one can get the 75%. It needs something to happen in the market to drive it – commercial pressure.' How is that market developing? Freescale says it has been shipping finished product for a long time. Heile's reaction was revealing. 'No comment. I remain sceptical on all aspects of UWB, which is not an easy technology. No solutions I have seen so far would be acceptable commercial solutions. They have all been too expensive, or too flaky, or too something. Throw in the ambiguous regulatory environment and these are some big hurdles to get over. Marketplaces are littered by technologies that sound so very good, but never go anywhere, and other technologies that started not so very good, but slowly get better. The MBOA was recently focussing on Wireless USB (W-USB), but is now broadening its ambitions again, which I think is a mistake.'

Heile continued 'There is a window of opportunity, and it is closing. There are other technologies that can offer a high data rate. The area that UWB is looking to cover could be covered by 802.11n. It was also hoped that 802.15.3 could be that technology, as it was intended for multi-media. At 50 metres its data rate is very high compared to any of these other technologies. You lose 50% with 802.11 just on overhead, whereas 15.3 loses only 20%. Even though I believe that 15.3 is the better technology, it's just not happening, because people are confused by UWB. People claim that 15.3 is 100 times better than 802.11n, but the closer you come to an 11.n release, if it is good enough, if it can handle a video stream, then you can get a foothold and the technology can grow. I think that UWB is still in a state of shock, and needs to get its house in order.'

Strong words. While Heile is best recognised today as the head of the ZigBee Alliance, his engineering background and wider industry activities make him well-placed to be a wireless industry commentator, and Incisor has certainly met many people that value his opinions. Even Bob Heile, though, cannot accurately predict the way the high (or low, for that matter) short range RF market will go. Like us, he maintains a watching brief.

Bob Heile is heading the now more visible ZigBee Alliance.

The ZigBee marketplace gets a little smaller

Integration acquires CompXs

As the WiCon preview issue of Incisor was published, we were advised of an acquisition taking place in the ZigBee sphere. US company Integration Associates has acquired CompXs, a ZigBee company profiled by Incisor in issue 80. Incisor stopped by at WiCon to talk with John Meyer, marketing director at CompXs, and Hans Van Leeuwen, director, wireless products at Integration.

Integration is a company that hasn't featured so far in Incisor. We asked about the background to the company? Van Leeuwen explained. 'Integration is a fabless semiconductor company based out of Mountain View, California, with a European operation in Hungary, where a group of 25 people handles all of our RF design. We are a 13 year old, private company with around 100 employees, which has always been profitable – even through the Bay Area downturn.'

CompXs has been in ZigBee from the beginning. 'We have always been regarded as one of the main movers and shakers in the standards committee' said Meyer. 'We have been heavily involved in the development of the software technology – the network and MAC layers. We have not been developing RF, so we have had no radio chip design. We have been working with OKI in Japan, which has provided us with a radio.'

Hans Van Leeuwen, Integration Associates.

This was apparently one of those situations where combining two companies made an awful lot of sense, as Van Leeuwen explained. 'Joining forces with CompXs was complimentary, with very little overlap - from silicon and the RF design right up to the MAC and the protocol layer. Integration has a lot of the skills CompXs needed, including RF design capability. We were originally an ASIC company – selling to the military. These days we have a wider customer base. Boeing, for example, has just committed to 1500 Integration chips for one plane – plus we have infra-red and wireline products. Our philosophy is to make designs as easy to use as possible. Our EasyRadio product typifies this.'

'Our RF design team in Hungary had been developing Industrial, Scientific and Medical (ISM) –band radios, which were very innovative. We were also developing 900Mhz designs for ZigBee but were lacking software designs to go on top. Our 802.15.4 radio is currently in development, and not quite finished yet. Our chip will ship this year. The first manifestation will be 900Mhz module.'

Meyer complimented the Integration RF device. 'The unique thing about Integration's 900Mhz radio is that it requires no external components on the RF side. OKI's chip needs a whole bunch of things externally to integrate it with the antenna. Designing in this external circuitry in itself is a challenge, but then getting it into reliable, large scale production is another, big challenge that the Integration solution avoids.

Both Ven Leeuwen and Meyer see future business potential for ZigBee modules. Meyer commented. 'Modules will help to stimulate the market through ease of integration, and EZRadio will cost reduce the product.' Integration will also go after the pure RF chip market for 802.15.4 radios.

Incisor wondered where Integration's acquisition of CompXs leaves the partnership with OKI – the former RF partner? Meyer replied 'Our partnership with OKI will continue. We will continue to support ZigBee software on OKI radios, and will continue to sell the OKI device – OKI is still committed to the ZigBee market. We have a good relationship with them, and we hope that this will continue and opportunities to work together will grow.'

Jon Meyer shows ZigBee device.

Incisor asked Van Leeuwen whether there were other factors that caused Integration to acquire CompXs? 'As we have described, the two companies had something the other needed. Apart from the fact that we were a perfect match, our two companies have known each other for some time, and now the time was right. There are only a few companies that have developed the software to this level, and CompXs was the only independent company left. But that was not the reason we bought them. We would not, for example, have bought

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ZigBee continued

Figure 8 Wireless *(Ed. – Figure 8 is now owned by Chipcon)*, as there was no synergy there at all. The fact that CompXs was based in the UK was very convenient for co-operation with our RF people in Budapest, Hungary. Being physically close and in the same time-zone made sense for both companies.'

> 'we are now in a very strong position'

Incisor asked the question about how much Integration had paid for CompXs, but Van Leeuwen wasn't revealing anything. As for the future of the combined companies, CompXs' UK operation will expand, and is now a wholly owned subsidiary of Integration. CompXs' US company has been completely merged into Integration. The product roadmap includes 2.4Ghz and 900Mhz modules – with ZigBee running on top of all silicon products. At this time, Integration has no plans to address markets such as Bluetooth or other short range RF areas.

We asked Meyer to summarise the market position of the combined companies. 'We are now in a very strong position. We are one of the very few companies that has 900Mhz and 2.4Ghz capability, owning all of the technology from the antenna right up to the top of the application software stack. Integration is already used to delivering in high volumes – tens of millions of chips per month - and has all of the necessary production and test systems behind it. We will be a very strong 802.15.4/ZigBee player, and will be one of the principal market enablers. Look out Ember, look out Chipcon – we are ahead of all of them!

Confident words. We wish them well.

Freescale demos single-package ZigBee-compliant solution

Freescale Semiconductor's portfolio of wireless monitoring and control applications has been expanded with the addition of a system in a package (SiP) ZigBee solution.

The MC1320X family includes three pin-compatible standalone 2.4 GHz RF transceivers with an integrated Tx/Rx switch on the silicon which provides a smaller board footprint. The MC1320X also allows the use of differential or single-ended antennas and easy integration of external LNAs and PAs for increased performance. The SiP and integrated transceiver/receiver (Tx/Rx) switch support Freescale's Simple MAC (SMAC), the IEEE 802.15.4 MAC and the ZigBee protocol stack.

Freescale was demonstrating the ZigBee-compliant SiP solution at WiCon. The demonstration showcased a mesh network of ZigBee-enabled home interior lights, security and emergency sensors.

'Extension of our ZigBee product will give OEMs an integrated solution that is cost effective, flexible to design with, and low power,' said Brett Black, commercial wireless operations manager, Freescale. 'We expect it to drastically accelerate the development of wireless applications in industries such as monitoring, automation and control applications for home, industrial and healthcare environments.'

TI drives WLAN into mobile devices

With already four generations of mobile WLAN solutions, Texas Instruments (TI) was staking its claim in the mobile Wi-Fi marketplace at WiCon, stating that more than 20 TI WLAN-enabled mobile devices are shipping today. Leading manufacturers and design houses including Nokia, NEC, Motorola, HP, and BenQ are amongst TI's customers. TI wants to drive WLAN and Voice over WLAN (VoWLAN) into enterprise and consumer mobile devices.

Incisor talked to TI's Matt Kurtz at WiCon. Kurtz is senior business development manager at TI's mobile connectivity solutions division (MCS), which is part of the wireless terminals business unit. MCS handles mobile wireless LAN and Bluetooth products in smart phones, cellphones and PDAs. Kurtz explained: 'MCS' responsibility is to make sure that there is a consistent approach across all connectivity sectors that TI covers. We have been active in mobile WLAN since, 2001 - shortly after we entered the mainstream WLAN market. Initially there was resistance from carriers, who feared a loss of revenue, but now this is changing.'

The mobile WLAN market is set to grow fast. An analyst at market research company In-Stat predicted that by 2010, there will be 296 million WLAN-enabled mobile phones on the market, with 46 percent of these devices enabling VoWLAN capabilities. In-Stat commented: 'By looking at TI's existing WLAN portfolio and customer base, it's clear that the company remains well-positioned to deliver some of the industry's most innovative, attractive mobile connectivity solutions. Combined with TI's 16 years of wireless expertise, this is a recipe that can drive VoWLAN into the mainstream market.'

> 'this is a recipe that can drive VoWLAN into the mainstream market'

In March of this year, TI introduced the WiLink 4.0 platform which includes single-chip WLAN solutions using 90 nanometer (nm) manufacturing technology. The two mobile single-chip solutions use TI's DRP technology, resulting in 802.11b/g and 802.11a/b/g products. The WiLink 4.0 platform also

illustrates the company's single-chip roadmap, including Bluetooth, mobile digital TV, and a single-chip solution for mobile phones. 'We expect to see the TV chip sampling before the end of 2005, and shipping in volume during 2006' commented Kurtz.

TI's Residential Gateway and Embedded Systems division delivers integrated DSL and WLAN gateways to ODM and OEMs. In addition, the group is focused on the emerging WLAN-enabled consumer electronics (CE) market. Kurtz defined mobile WLAN's target markets. 'Unlike cellular, Mobile WLAN coverage will not be everywhere. It will be in defined spaces such as homes and businesses. Having said that, access spots combining broadband and WLAN are now starting to appear, especially in the USA. We see 2006 as the year when first significant implementations will take place, with real take-up happening in 2007/2008.'

Incisor also discussed the UWB/Bluetooth announcement with Kurtz, who was amongst the groundswell of industry players thinking that this is a very positive move. 'Historically, TI has been very involved in the development of the Bluetooth specification,' said Kurtz. 'And having already established a strong position in UWB, TI will now be involved in a liaison role between UWB and the Bluetooth Special Interest Group.' Kurtz concluded our interview with the comment that this exciting new market opens up many application opportunities, with Wireless USB, and UWB in cellular handsets being early - and equally important – target markets.

Opening the Wi-Fi kimono

Incisor talks wireless networking with the Wi-Fi Alliance

Of all of the short range RF technologies that Incisor covers, we are least close to what is going on in the world of Wi-Fi/WLAN. We're setting out to correct this, and kicked the programme off with a meeting at WiCon with Frank Hanzlik, managing director of the Wi-Fi Alliance. This is a global, non-profit industry association of 200+ member companies that are working together to promote the growth of wireless LANs. The Wi-Fi Alliance has created testing and certification programs to ensure the interoperability of WLAN products based on the IEEE 802.11 spec, and to improve the user experience for mobile wireless devices.

Hanzlik explained 'We are stable with about 200 members and have certified about 2000 products. US research says that 54% of consumers look for the Wi-Fi certified logo. This means our brand is working. Initially we were looking to make sure that products worked in the home and the office. Now we have Wi-Fi in airplanes and many other places.'

'The structure of the Wi-Fi Alliance is similar to the Bluetooth SIG. We maintain a lean staff, and most work is done by volunteers. Our HQ is in Austin, Texas. We have a task group structure to develop initiatives – e.g. voice, interoperability, test plans, and running plug-fests for interoperability. We are also rolling out online tools to automate test processes. A key difference between us and many other trade associations is that the Wi-Fi Alliance started out with interoperability rather than performance in mind. This helps our certification programme to be bullet proof. Now this is done, we are looking at performance too. Our processes will continue to evolve - maybe to a self-certification model.'

We went on to discuss the Wi-Fi Alliance's current activity. 'Now we are spending more time on ease of use. It's almost acceptable for things to be hard for the early evangelist, but when you go for the mainstream it has got to be simple. The reality is WLAN configuration is better than it was, but is not there yet. It may be simpler to set up a network now, but it is not simple to set up security, and that is not acceptable. We've got an initiative called 'simple configuration' which is really trying to address that.'

Security is an issue that has hung like a millstone around the neck of the WLAN industry. Hanzlik believes that things are improving. 'There has been lots of progress. WEP is so yesterday! We now have 1,000 WPA and WPA2 qualified solutions. Both of these are very strong and sturdy, which brings us back to the big challenge of making WLAN security easy to set up. There are lots of initiatives along the lines of 'press this button' –type configuration, and NFC-style stuff.'

Wi-Fi brand is working, according to Frank Hanzlik.

Picking up on a theme that seemed to be running through WiCon, Hanzlik also suggested that the time for warring between wireless specs is past. 'We are now doing much more partnering with other technologies such as Bluetooth, WiMAX and the broadband folks. It's time to realise that these technologies are largely complementary. And you have to remember that the best technology doesn't always win. You can't just work in your own industry today as converged devices are proliferating. A lot of companies are involved in many of the technologies, and the industry alliances are understanding that they must work together. All of this is with the aim of enabling the wireless world.'

'Our interoperability programme is part of this. We have taken steps to make it easier to get products certified. There is much more choice of test labs – there are five now, not just one.'

Hanzlik also gave Incisor a heads-up on the current state of the WLAN market. 'There is a big trend towards combined a/b/g solutions – they are actually starting to be in same ballpark as b/g stuff. You want the headroom but you have to have the backwards compatibility. The next stage will be for 802.11 a/b/g/n products. It is hard to buy a PC today without Wi-Fi (and for this we must thank Intel and others who have supported WLAN), but we are now moving beyond the PC. The next big growth areas for Wi-Fi are in consumer electronics and in converged devices. These are being targeted now to ensure continuing growth. Think about it – 700 million cellphones are forecast to be sold in 2006, and a 5-10% attach rate would be great. Big names like Nokia, Motorola, Samsung, CSR and TI are participating in these initiatives. Some compelling solutions are coming out of it.'

Many of the semiconductor companies that Incisor monitors have pledged themselves to the Wi-Fi cellphone market. If confidence in the market is high amongst the semicon companies, do the WLAN people feel the same way? 'Convergence is very new but everyone believes this opportunity for Wi-Fi and cellular is going to happen' said Hanzlik. 'And it's happening at all levels. The Wi-Fi versus 3G debate has gone away. Wi-Fi will never be everywhere cellular is, and cellular will never be as fast as Wi-Fi, but if you can have them both together it does create a great platform for voice and data services. While products to seed this market are starting to show now, it's a journey that will take a while. Smartphones, for example, have taken 5 years to take off.'

Incisor asked what the next steps were in the Wi-Fi roadmap? 'We will continue to work on Wi-Fi/cellular convergence certification, and making it easier for handset manufacturers to certify their handsets. We will be putting performance testing in place for carriers. 802.11e comes out in July or Sept. This is the quality of service (QoS) initiative release. QoS stuff and power save are main targets for this year. In the consumer electronics area, we want to make it easier to make non-PC devices (e.g. Sony's Playstation) certifiable. Fast roaming is very important for Voice over Wi-Fi (VoWi-Fi). Proprietary solutions are available to day, but these are not acceptable for major corporates. And, of course, '11n' is the next speed bump in WLAN 802. We believe that 11n will happen in Q1 2007. Some people were getting hung up with the 11n stuff at the IEEE meeting last week! Our goal is to have a certification programme in place when the 802.11n standard is ratified by the IEEE. We managed this with 'g'.'

And will 802.11n, with its very high data rates, be in competition with UWB? Hanzlik didn't think so. 'It is a networking technology. UWB is more about ad hoc, short range stuff, so the two are complementary rather than competitive. The market will sort out overlap areas. Kodak, for example, which was one of the original companies behind the UWB concept, is now putting Wi-Fi in cameras. Maybe 11n will be the UWB of the future? We try not to get too hung up about where Wi-Fi can go. People will stretch it to mesh stuff, and the city of Philadelphia is stretching Wi-Fi across 135 miles of the city. People are also looking at ad hoc WPAN stuff, but we won't get in the way. The market will decide, but the LAN is the sweetspot.'

There seems little doubt that more and more WLAN devices will be hitting the market. Incisor hopes that the Wi-Fi Alliance and its members are able to achieve real progress in making WLAN equipment easier to use.

After all, consumers have problems pairing Bluetooth devices …

Incisor directory of wireless industry companies

As time goes on, more and more companies join the wireless industry, becoming part of the global network of companies that are working to take wireless technology to market.

On an ongoing basis, Incisor includes a listing of companies providing products and services within the short range RF sector. Beyond the simple listing, wherever there is an open book icon (🕮) alongside the company name, you will be able to obtain more information and contact details for that company by clicking on the icon. This provides a link to an expanded profile of that company.

Incisor continues to be the only continuously published magazine dedicated to Bluetooth and short range RF technology, and is received at more than 1300 companies across the world, and enjoyed by an estimated readership of 25,000 individuals. To add your company or a profile for your company to this directory listing, email: directorylisting@click.co.uk

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Wireless industry calendar of events

DATE	EVENT	LOCATION	NOTES	LINK
June 1 - 3 2005	BREW 2005	Manchester Grand Hyatt San Diego, San Diego, California		www.brew2005.com
June 8 - 9 2005	The Networked Home	Rennaissance Hotel, Amsterdam	-	www.ibctelecoms.com/networkedhome
July 11 - 13 2005	m-Business 2005	Sydney, Australia	The Fourth International Conference on Mobile Business (IEEE sponsored)	http://www.mbusiness2005.org
Nov 15 - 16 2005	Wireless Connectivity Americas	Santa Clara Convention Centre, Santa Clara, USA	-	www.wiconamericas.com
Nov 29 - 30 2005	WiCon Asia	Suntec International Conference and Exhibition Centre, Singapore	-	www.wiconasia.com

Further wireless industry events will be added to the calendar as soon as they are announced. See notes below regarding editorial submissions.

Incisor publishing schedule

Each month we will publish the main themes of the next four issues of Incisor magazine to assist companies in the wireless industry when planning PR and marketing activity.

Issue 83 - Wireless Connectivity World review issue.
Includes full WiCon World review
Copy Deadline: 1st June Date of Publication: 8th June

Issue 84 - July
Fabless semiconductor companies – can you build a successful business without a fab? Plus WLAN / Wi-Fi focus issue – developments in the 802.11 world
Copy deadline : 23rd June Date of Publication: 30th June

Issue 85 – August - Wireless in the Americas
2nd annual review of US wireless companies
Copy Deadline: 22nd July Date of Publication: 29th July

Issue 86 - September - Positioning wireless
Annual review of the status of all wireless standards
Copy Deadline: 24th August Date of Publication: 31st August

For further information regarding any issue of Incisor, contact Vince Holton (see below).

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Editorial contributions are welcomed. Companies should send press releases to the editorial contact across.

Individuals are invited to express their views as to the content and style of Incisor.

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