

# INCISOR™

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Video enabled  Issue 166

February 2012



## INCISOR.TV ROUNDTABLE UNITES SHORT RANGE WIRELESS

### THIS ISSUE

ROUNDTABLE EVENT BRINGS TOGETHER MULTIPLE SRW DISCIPLINES  
BLUETOOTH BEST OF CES  
CES 2012 REVIEW  
FORECASTING A WIRELESS-ENABLED 2012

# did everyone play nicely?

In the last few issues we've been providing pre-event publicity for the filming of Incisor.TV's Ultra Low Power Wireless Roundtable event, which took place during January alongside CES 2012. We'd obviously sold the event well, as we had strong support – six of the most important and influential organisation operating in this sector took part.

Now, our web TV channel means that sitting in on this fascinating event is a possibility for people from all over the world, and not just the tiny fraction of the ecosystem that made it to Las Vegas.

I'll be honest, and admit that I wasn't sure what to expect. We had top execs from organisations that go head to head every day in a super-competitive marketplace, all sitting within feet of each other in one room. Would bad words be said? Would rocks be thrown? There was no way to tell before we all sat down around that big table in Las Vegas.

To find out just what did happen, watch the movie on page 6. I was there (no, really?), and I will say that I found it fascinating. It certainly cemented in my mind the value of such an event, and the fact that web video is the perfect mechanism to allow people all over the world to be part of the proceedings.

I have just one regret. As I explained last month, neither the Wi-Fi Alliance nor the ZigBee Alliance was able to participate. Both of these technologies were part of the discussion, and both needed to have been able to respond to comments that were made. However, to do so you had to be there. Maybe next time?

**Vince Holton**

**Publisher & editor-in-chief, Incisor / IncisorTV**

## INCISOR.TV FOCUS THIS MONTH



4iiii Innovations shows ANT-based sports and fitness solution.

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### INCISOR.TV ROUNDTABLE UNITES SHORT RANGE WIRELESS

Could we really do it? Could we bring together competing technologies such as Bluetooth, ANT+, EnOcean, DECT, and spokespersons from the most important semiconductor and design companies, without bloodshed? Watch the movie to find out.

### CES 2012 REVIEW

Cambridge Consultants brings us its wireless takeaway from CES 2012, the consumer electronics industry's largest annual shindig. Wireless technologies were, once again, showing a growing influence at the show.

### BLUETOOTH BEST OF CES

Incisor.TV partners with the Bluetooth Special Interest group to create a movie covering the SIG's 7th annual Best of CES competition.

### FORECASTING A WIRELESS-ENABLED 2012

Dean Gratton asks what can we expect over the year in the wireless industry? Then delivers some educated guesses and reflects on the "nice to haves" in 2012.

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## Nordic enters race to market for Bluetooth Smart

Nordic Semiconductor demonstrated two Bluetooth Smart products at CES, one of which had been previewed in [last month's issue of Incisor](#), the other being the nRFready  $\mu$ Blue Desktop – which Nordic claims is the world's first fully functional reference design for a Bluetooth low energy (or Bluetooth Smart as Bluetooth low energy devices and sensors will now be marketed to consumers) wireless mouse and keyboard combo.

Working with a laptop with built-in support for Bluetooth Smart devices and running a developer preview of Windows 8, this reference design apparently delivers over a year of battery lifetime for the mouse and up to 10 years for the keyboard from a single pair of AA batteries.

The nRFready  $\mu$ Blue Desktop is based on Nordic's  $\mu$ Blue nRF8001 Bluetooth low energy Connectivity IC. It provides wireless computer peripheral makers with a hardware and software reference design that cuts down on development risk, time, and cost. Nordic told Incisor that the design delivers a wireless mouse and keyboard battery life performance comparable to its proprietary 2.4GHz RF solutions, but with the ability to operate without a USB dongle on Bluetooth Smart Ready computers.

And, to re-cap on the nRFready  $\mu$ Blue Smart Remote reference design, this is also based on Nordic's  $\mu$ Blue nRF8001, and combines Bluetooth low energy ultra-low power wireless connectivity and interoperability - including up to one year of battery life - with navigation features such as a multi-touch TouchPad, motion control, and a QWERTY keyboard. Nordic suggests that unlike other RF technologies relevant to remote controls - such as



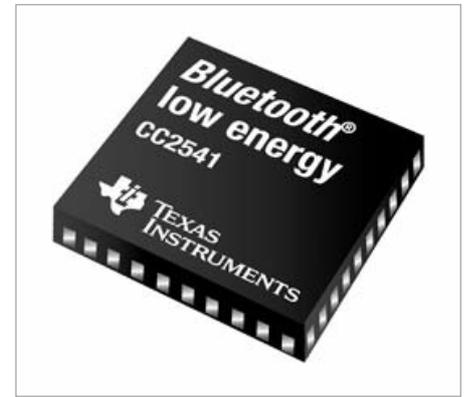
ZigBee RF4CE and proprietary 2.4GHz RF - Bluetooth low energy enables connected TV manufacturers to use a single Wi-Fi / Bluetooth v4.0 combo IC for all connectivity in the box instead of having to add a dedicated radio to handle the remote. This, Nordic claims, provides cost savings and better co-existence performance.

Both the nRFready  $\mu$ Blue Desktop and the Smart Remote will be made generally available during Q1 2012.

## Bluetooth SIG announces Innovator of the Year 2011

The Bluetooth Special Interest Group (SIG) has declared Guilherme de Paula from Pancreum, LLC as the Bluetooth Innovator of the Year for 2011. Pancreum's CoreMD design was selected by an expert panel based on the most innovative use of Bluetooth low energy technology and the company was awarded US \$5,000 prize money, a Bluetooth Qualification Program voucher worth up to US \$ 10,000, and the revolutionary dual-mode Bluetooth protocol analyzer from Ellisys, valued at US \$40,000. More than 330 entries were submitted into this year's Bluetooth Innovation World Cup.

The Bluetooth enabled CoreMD provides a wireless communication and power infrastructure for replaceable, wearable medical devices that can sense body conditions like temperature, heart rate, or interstitial glucose, alert the user that a certain threshold has been reached, or even administer drugs such as insulin, glucagon, or amylin. The CoreMD is used in the Pancreum Genesis, an artificial pancreas system that acts as an insulin pump, continuous glucose monitor, and glucagon pump. The SIG suggests that using Bluetooth technology to link the CoreMD to an application on the user's



smart phone transforms the daily experience. Gone is the constant need to test levels, monitor data changes over time, and manually administer injections. Instead, the smart phone app puts real-time integrated health information at the user's fingertips and empowers them to control their Pancreum Genesis with a few taps on their phone's screen.

In addition to Pancreum, two runners up were selected from the nine finalists. Michael Setton's Senspods were selected in the "Automotive, Entertainment & More" category and Diesel Dogs' Smart Weights was chosen in the "Sports & Fitness" category.

## New Bluetooth low energy system-on-chip from TI

Texas Instrument's new Bluetooth low energy solution was demonstrated at the Consumer Electronics Show (CES). TI told Incisor that its new CC2541 Bluetooth low energy system-on-chip (SoC) is aimed at Bluetooth Smart sensor applications for consumer medical, sports and fitness, security, entertainment and home automation. TI is claiming a 33 percent reduction in power consumption compared to its previous-generation CC2540 SoC when transmitting at 1 milliwatt output power, while maintaining RF performance. The CC2541 is pin-to-pin compatible with the CC2540, which TI says allows manufacturers to take advantage of the power savings through an easy migration of existing designs. An associated CC2541EMK development kit will also be available to further simplify and reduce design time for new Bluetooth Smart devices.

TI also gave a sneak-peek of its upcoming CC2541DK-SENSOR development kit for Android- and iOS-based smartphone applications.



## Cambridge Consultants helps Armour innovate with Bluetooth car kits

Technology design and development firm Cambridge Consultants was demonstrating the new, next generation Talk 2 and Play 2 Bluetooth car kits developed for Armour Automotive at CES. The Talk 2 and Play 2 connect to Bluetooth-enabled smartphones, MP3 devices and SatNavs for conducting phone calls and playing music, and are claimed to be the only devices of their kind available to offer simultaneous connection of two devices without losing functionality on either device.

The Talk 2 and Play 2 family is designed for professional retro-fit and apparently offers almost instantaneous synchronisation on start-up, enabling users to make calls or play music significantly sooner after connection than other devices on the market. The music databases of iPods and iPhones can be browsed through the car kit interface on the dashboard to make controls easier and safer for drivers, and a user interface ensures that music can be found in only a few clicks even when the database contains many thousands of tracks.

The products are based on Cambridge Consultants' own XAP processor core, and use CSR's BlueCore5 with built-in Digital Signal Processing. With a lot of Bluetooth experience under its belt, Cambridge Consultants was able to deliver all the connectivity through a single Bluetooth chip, and suggests that it has reduced component costs significantly. In turn, and through these cost savings, Armour told Incisor that it was able to invest in higher sound quality and additional features and functionality whilst still competing on cost in an already established market.

Cambridge Consultants also participated in the Incisor.TV Ultra Low Power Wireless Roundtable event that took place in Las Vegas alongside CES. View their contribution, featured in the movie on p6 of this issue.

## ... and shows low cost, ultra-spectrum-efficient, licence-free radio mics based on DECT

Cambridge Consultants has also launched a reference design for low cost, high performance radio microphones using the Digital Enhanced Cordless Telecommunications (DECT) platform. Cambridge Consultants told Incisor that by taking advantage of DECT, the new radio microphone design delivers high audio quality with no interference and quadruples the range of existing radio microphone technology, whilst also lowering the total bill of materials (BOM) costs to under \$12 for each microphone.

The new microphone design deploys Cambridge Consultants' DECT-based Salix audio distribution platform, delivering 15kHz audio bandwidth with automated set-up and frequency management. DECT has a dedicated license-exempt band in most countries worldwide and also ensures that the new microphone platform has high spectral density, allowing up to 40 microphones in a single space without mutual interference or spurious effects. It also extends the range of radio microphones up to 100 metres without requiring line of sight to the transmitter, as opposed to existing technologies that typically allow a range of 25 metres. DECT's automatic frequency band allocation ensures that the new microphones can be 'paired' with the receiver(s) with a simple button press.

The microphone system reference design is apparently available as a hardware documentation package including photoplot and assembly information, with executable software for both transmitter and receiver ends. Alternatively, source code licensing is available for custom design.

### Footnote:

As a purchaser of eye-wateringly, shockingly expensive radio mics for in-house use, Incisor.TV welcomes this development! We've known for years that the video production/TV industry was paying too much for these simple devices.

## Mvix unveils Bluetooth proximity communication system

Is the age of Bluetooth-based marketing upon us? Maybe, maybe not, but Mvix has announced the launch of an end-to-end proximity communication system called MvixAir – built on Bluetooth, mobile wireless and short-range radio signal technologies. MvixAir is an out-of-home communication platform allowing marketers and event managers to communicate with their audience via their mobile phones. Mvix told Incisor that this network-based hardware-software solution is suitable for large venue locations like malls, trade-show events, stadiums, and outdoor arenas.

Mvix's proximity system allows communication of information, special offers or product discounts via mobile phones at relevant locations, such as in a shopping mall, in a store, or at an airport. The receiver (audience) decides whether he/she wishes to receive the message at that moment. A range of information can be sent to the audience, from a simple discount coupon to a video clip, prize draw, public service announcement or even a link to the website.

The MvixAir system is a bundle of small, embedded device (hotspots) and a web-based content management platform. Using a combination of multiple, network-based hotspots and the campaign management portal, campaign managers can send information to mobile phones via Bluetooth, or mobile wireless to the audience.

Bluetooth-based proximity marketing systems have been around for a while, but never seem to have taken off big-time. We're certainly not aware of ever having been marketed to in this way, and, as you can imagine, the Incisor crew is pretty Bluetooth-tastic, and we do get around a bit.

# new products



## Parrot displays range of connected solutions for the car

Parrot unveiled three connected solutions for cars at CES, all based on its Asteroid platform and running on Android OS.

If not betting the farm on its Android platform, then Parrot is, at least, making a substantial investment in this part of its business, which is all about putting Android into the car. The French company's thinking is that, boosted by the development of smartphones, mobile Internet is experiencing exponential growth, and new mobile web users seem to prefer Android: 26% of cellular phones sold worldwide are smartphones, and 52.5% of them run on the Android OS. Parrot told Incisor that it has spent 3 years working to adapt Android to the car environment in order to create the Asteroid platform.

Parrot's new aftermarket solutions included the Parrot Asteroid CK, Parrot Asteroid NAV and Asteroid 2DIN.

Asteroid CK is a Bluetooth hands-free system with a 3.2" colour screen, that attaches to the vehicle's dashboard and comes with a wireless remote control. It connects to the Internet via a 3G key or a tethering phone connected by Bluetooth or USB, and can access Internet services for geo-localisation, driving assistance solutions, or playing music, either from web radio or 'music on demand'. The built-in voice-recognition technology can be used to make or accept phone calls by voice, while keeping hands on the wheel. However, it can also be used to search for an album or artist from various connected sources of music (iPod/iPhone, USB key, SD card). Music files may also be shared by Bluetooth stereo A2DP from a cell phone.

Parrot Asteroid NAV builds on the spec of the CK by expanding to a 5" multi-touch screen and by adding a navigation solution. Additionally, the Parrot Asteroid NAV offers many audio settings, courtesy of its Virtual SuperBass2 and the Sound Spatializer systems.

The Asteroid 2DIN replicates the features of Asteroid NAV, but puts them into a 2DIN-connected multimedia car radio that fits into the central column of the dashboard in many vehicles. This version also has 2 inputs - one of them dedicated to displaying a rearview camera - and 1 video output.

All three systems are described as 'coming during 2012'. Prices have yet to be announced.

### What about the car companies?

A large part of Parrot's business is supplying OEM solutions, and the OEMs and developers working on in-car solutions haven't been forgotten. Parrot's FC6100 module enables auto and equipment manufacturers to integrate all or some of the features of the three new projects into new generations of vehicles as original equipment.

And, to complement the Asteroid platform, a software development kit is accessible online for developers. Besides porting and adapting applications already available in the Android Market to the specific format of Asteroid systems and automotive use, developers will also be able to design new applications and offer drivers and passengers original services built around four concepts: geo-localization, driving assistance, contact management and music.

Each new application developed can include features offered by the Asteroid platform, such as voice recognition or hands-free telephony, and will be offered to users via an "Asteroid Market" available in the second quarter of 2012.

## After an iGrill, take an iShower

iDevices, the creator of the iGrill Bluetooth cooking thermometer featured by [Incisor.TV at CES 2011](#), has added iShower to its portfolio, and the company displayed it at this year's CES.

This is a water resistant, Bluetooth-enabled speaker that plays music directly from all Apple devices (including iPhones and iPods) and Android devices. iShower mounts in your shower or can be taken to the beach or pool for up to 15 hours of safe listening.

iShower remembers up to 5 Bluetooth pairings, letting users enjoy their favourite music with their preferred music source in aqua-centric environments that would otherwise potentially harm their device. Featuring long-range Bluetooth with a 200-foot range, the iShower is easily detachable for use in the backyard, the pool, or even the beach.

Key features of iShower include play/pause/forward/rewind & volume functions, a 200-foot range, and a claimed 15 hours of streaming audio on 3 AA batteries.

Priced at \$99.99 in the USA, iShower is available immediately.

# Competing technologies play nicely at Incisor.TV Ultra Low Power Roundtable event

## But if you weren't there...

By Vince Holton

In the months preceding the 2012 Consumer Electronics Show, Incisor publicised an event that we were staging alongside the annual Las Vegas tech-fest. This was the Incisor.TV Ultra Low Power Wireless Roundtable. The idea was to achieve the seemingly impossible and bring together the key players in this hotly-contested wireless sector, and to get them to thrash out the most important issues, without too much cussing and, ideally, without bloodshed.

Incisor has history when it comes to attempting to get these, apparently sparring, contenders together. We previously staged the Incisor Wireless Symposium in London. That featured the Bluetooth Special Interest Group, the Wi-Fi Alliance, The WiMedia Alliance, the DECT Forum, Artimi, CSR, Motorola and Siemens. We also invited the press to that event, too. You can see the movie that we made at the Incisor.TV site. [Here is a link](#) that will take you direct to the movie.

We sent the invite out to all of the major players this time, and we were very pleased at the response we received. In strict alphabetical order (they'll always be listed this way as it avoids any accusations of favouritism – though Dynastream must be pleased that it decided to call its technology ANT!), the ANT+ Alliance, the Bluetooth SIG, Incisor sponsor Cambridge Consultants, the EnOcean Alliance, the DECT Forum and Nordic Semiconductor all booked places.

We talked to several other organisations. Some eventually said no, some simply – in the fashion that seems to be regarded as acceptable these days – stopped responding to emails and phone calls (you know who you are, grrrrr.....). We were apparently too late contacting the Wi-Fi Alliance, whose CES agenda was already mapped out. And, despite discussions continuing for some time, both the ZigBee



Alliance and the Z-Wave Alliance eventually became no-shows. The cost of entry for this event was low, so we don't believe that that was a factor.

All of those last three organisations were missed at the event, but it did give the six powerhouses that did come along the opportunity to take a bit of a pop at them! Only gently, though, as you will see.

So, this is the opportunity for Incisor's readers to witness a very rare occurrence, which is the coming together of tech-

nologies that go head to head in the Ultra Low Power wireless space, and to hear some of the most knowledgeable people in the industry debating issues that each and every one of them has to address on a daily basis.

But here is a word of caution: this is a full-scale presentation. If you click the link here and expect to find a 2 minute, disappointed dog YouTube clip, you are looking in the wrong place. No, this movie is

for people in the industry that really want to see what happens when the ULP-industry titans go head to head. It runs for just less than 30 minutes, so, wait until you have a bit of time, crack a beer or pour a glass of wine, sit back and enjoy what turned out to be not only a very informative session, but also an entertaining event, too.

And remember, Messrs Wi-Fi Alliance and ZigBee Alliance – the views expressed by the participants are not the views of the – impartial – event organisers.

And, that you were invited to be there...



Or watch at YouTube



Tim Fowler,  
Cambridge  
Consultants.

# Roundup of CES

By Tim Fowler, Commercial Director,  
Cambridge Consultants

With the Jetlag only just starting to subside (or at least I think its jetlag), we're providing our wireless takeaway from CES 2012, the consumer electronics industry's largest annual shindig. Understood to be the largest ever turnout, wireless technologies were, once again, showing a growing influence at the show.

One noticeable shift is that CES is becoming much more of a mobile show than was the case just a few years ago. As an example, Microsoft, which has provided the opening keynote speech for the last 14 years, is not coming back to keynote or run a stand after 2012. The presence of mobile devices and tablets is growing and wireless technology has had, and will continue to have, a significantly higher profile as a consequence. In the Smartphone space, all the buzz and comment we heard seemed to reinforce the view that Apple and Samsung have cemented their position at the top tier while ZTE and Huawei provide solid options at the lower-end. The result is that the remaining players, and there are a few, now find themselves fighting it out somewhere in the squeezed-middle ground. Many of the Smartphones on show had multi-core processors running faster than 1GHz and a Gigabyte of RAM; very powerful pocket computers. As a departure from the pack, Samsung launched the Note; a new device that sits somewhere between a tablet and a smartphone – we'll have to wait to see how well this is received.

There were many new products that utilise short-range wireless technologies. One area with visible growth since last year was Wi-Fi-enabled consumer products. New high-definition TVs not only have to be paper-thin but also have to include Wi-Fi for the now essential on-demand experience and streamed services from media centres. In-home distribution of both music and video, while a relatively mature Wi-Fi market in technology terms at the high-end, appears to have received a boost from Apple's AirPlay offering across the product spectrum. We saw examples of new products and technology in this growing space.

And while Apple don't actually attend the show, it certainly continues to influence what happens



in all things consumer. Another area receiving a boost from Apple is Bluetooth 4.0, AKA Bluetooth Low Energy, which as you will know is included in the iPhone4s. We saw (and we even demonstrated) products using BT4.0 that worked seamlessly with the iPhone 4s, with some neat Apps, but without the aid of a dongle that traditionally would have had to be used with other low-power wireless technologies like Ant+. In the digital health zone, the ability for Bluetooth 4.0 to efficiently interconnect with Smartphones proved very interesting to many of the visitors to the show.

Ant+ impressed with its growing ecosystem of fitness products. The challenge that we heard from many people was, "how do you design systems that approach the same power efficiency of ANT+ ?" A clear recognition of the ANT+ USP.

The ZigBee Tech Zone showcased a range of new products in the energy management and home automation space. Consumers who use these systems can now expect to see real savings in their energy usage from simply being able to understand what energy they are consuming in real time, while the energy utilities get better efficiency from the ability to deliver load management.

The digital health zone and summit were even more popular than last year. The arrival of a

major healthcare player in United Health gave the whole zone an enormous boost in size, exhibitors and visitors. The process of joining up devices and services through the Continua Alliance and the creation of valuable health services continues to move to the point where mHealth / remote health is now much more compelling. While we saw some services that were moving this space forward, this market is definitely still in the early stages of what is probably going to be a very important sector over the next decade. This conclusion reflects our own findings from the leading consumer and wireless companies looking at the space of health and wellness, which is being enabled through wireless capability. To read more about our findings, see our report '[The Business of Health & Wellness: Engaging Consumers and Making Money](#)'.

Overall, the short range wireless industry was well represented at CES2012 and its technology brands and capabilities are becoming part of the language and fabric of what buyers are looking for – the understanding of what is possible using short-range wireless technology continues to grow positively. In many ways, the theme of what was on show for 2012 appeared to be consolidation of many of the big innovations seen in recent years; there were certainly no 4D flat panel TVs. But we did see real progress in adoption of wireless technologies in valuable and useable consumer applications.



# Who took Best Bluetooth of CES 2012?

## Incisor.TV covers Bluetooth SIG award ceremony

**Continuing a happy tradition that has run for many years now, Incisor.TV partnered with the Bluetooth Special Interest Group to cover the SIG's 7th annual Best of CES competition. After a one year break, the SIG had reinstated its popular member party at the prestigious TAO nightclub at the Venetian Hotel. We didn't see any celebs there that night - well, apart from Mike Foley (groan....), but we did see the winners of this year's competition announced. The party is very popular with SIG members. The room used at the club has a maximum capacity of 250 people, and the SIG had more than 700 RSVPs for the event!**

The SIG groups the finalist products into three categories – Now, New and Next. Each of these categories eventually produces its own winner. There is then a Fan Favourite award, which is voted for by visitor's to the Bluetooth SIG web sites. And then there is the most coveted award – the overall winner.

The Plantronics M115 headset, the fox Lv2 portable speaker and Ford Motor Company's SYNC AppLink were the three finalists in the Now category, while Motorola's MOTOACTV, the Voxland BeeWi helicopter, iHealth Lab's digital scale and Samsung's active 3D glasses

headed up the New category. The finalists in the Next category, which highlighted products that were a little further down the line, were the Siemens miniTek automatic audio streamer, Casio's GB6900 watch and Polar's H7 heart rate sensor.

For those of you that weren't able to get to CES – which, let's face it, is most of the

people in the SRW wireless industry, the Incisor.TV crew filmed all of these products prior to CES, and then filmed the winner announcements being made at the Bluetooth SIG party.

So, if you want to know the answer to our headline above, watch the movie we made by clicking on the link on this page.



Or watch at YouTube

## Snippets

### Installed base of connected devices to reach 1.34 billion in 2016

In 2011, the global market for household consumer electronics (CE) continued its rapid shift toward "connected devices,"

which are devices that have the ability to connect directly to the Internet or to a home network and can deliver IP-based video content. This according to researchers at NPD In-Stat, anyway. Driven primarily by the success of digital

TVs, satellite STBs, video game consoles, and Blu-ray disc players and recorders, NPD In-Stat research forecasts that the connected device installed base will grow from 256.8 million units in 2011 to 1.34 billion units in 2016.

# Forecasting a Wireless-enabled 2012



by Dean Anthony Gratton

## **IT'S 2012, ALREADY!**

I JUST WANT TO START BY APPEASING THOSE WHO WERE GRAVELY CONCERNED LAST YEAR REGARDING MY APPARENT MEDICAL CONDITION; THAT IS, 'PROCRASTINATOR'S PANIC'. FOR THOSE WHO NAIVELY GOOGLED THE CONDITION (I WON'T BE NAMING NAMES) WOULD HAVE DISCOVERED THAT IT WAS JUST SARAH'S WAY OF SAYING THAT I WASN'T ACHIEVING MY DAILY WORD COUNT DUE TO AN UNRELENTING DESIRE TO DO SOMETHING ELSE – DAMN TWITTER!

Needless to say, I'm on track to complete the Cambridge book and I'm so pleased to see the project finally come together. So, all symptoms that I was experiencing at the latter part of 2011 have gracefully abated and I'm back to normal (for now).

So, I'm returning to my monthly routine of reviewing the latest wireless technology trends, news and gossip whilst listening to a new album from Florence and the Machines, ceremonials accompanied with a glass of beer on this Sunday morning only because I simply can't justify red wine at 10:00am.

### **No crystal ball required**

And, in my first feature for 2012, I want to forecast the wireless outlook – well, actually I'll be taking out the guesswork and making some steadfast predictions that should come as no surprise to anyone. Let's be honest, the wireless industry isn't known for delivering technology and associated standards at lightning speed, so we can confidently ponder 2011's murmurs as we trace the footsteps of the overall industry and review the headlines that captured our attention. I've discarded my crystal ball and tarot cards, along with ruffling my Mystic Meg



hairdo, as I can certainly deliver some educated guesses and likewise reflect on the "nice to haves" in 2012.

So, what can we expect over the year?

### **The psychological barrier with NFC**

I'm going to start with an obvious technology that has bubbled to the surface and has longed to become the centre of attention. Near Field Communications (NFC) may just have its moment in 2012. This is borderline "nice to have" as I fear the technology has one large obstacle to overcome, which may be responsible for



stalling its inevitable pandemic. One significant application is the ability to purchase items using your mobile phone, simply with a swipe. It's not that NFC won't succeed, it's simply down to consumers' psychological association with using a mobile phone as a payment mechanism, as opposed to opening up a wallet and using cash or a card. – this psychological shift needs to happen for NFC to become widely adopted and accepted for wireless payment. The technology already appears in Google Wallet, BarclayCard and I predict we'll see it in the new iPhone 5, which should be announced this summer.

NFC has the ability to become a technology enabler when combined with Bluetooth technology in terms of providing a simpler pairing mechanism, which could possibly benefit Wi-Fi configuration and set-up too, yet I have been talking about these types of applications for a number of years now, so it's about time NFC delivered!

### Can the real Super-WiFi please stand-up?

Okay. I'm going to stand on my soap-box for a moment, so, please just indulge me. I often see marketers hyping technology that's far from ready and certainly far from being officially signed off by regulatory government agencies and, moreover, these same marketers are also guilty of consistently using analogies in an attempt to convey a common understanding which, in turn, inevitably confuses everyday consumers.

White space radio should not be likened to Wi-Fi – it's wireless broadband. Let's not forget that white space radio and Wi-Fi are two very distinct technologies despite their initially perceived application overlap. I've seen white space radio on many occasions being likened to 'Super-WiFi', which is a grave concern, as it will ultimately confuse 'Joe Public'. What's more, with Broadcom releasing silicon for 802.11ac, which can more accurately be likened to 'Super-WiFi', everyday consumers don't stand a chance when industry pundits frivolously use terminology to grapple (themselves) with upcoming technology.

### Or is it Wi-Fi 5G?

Incidentally, Broadcom are tenuously calling 802.11ac 'fifth generation Wi-Fi' that is 802.11, 802.11a/g, 802.11b and 802.11n – I'm guessing they're taking a leaf out of Apple's naming convention.

Anyway, I think it all leads me very neatly to my next prediction – Super-WiFi or Wi-Fi 5G and, as I have already intimated, Broadcom is planning to release 802.11ac silicon by the end of the year. I admit, this is not a prediction as such, as the introduction of the new technology, whether it's at the latter part of 2012 or the first quarter of 2013, Super-Wi-Fi will definitely happen.

For those who are not aware, 802.11ac will again improve on the recently introduced 802.11n standard, offering improved speeds and range. In a recent announcement O2 (o2.co.uk) has partnered with several London boroughs to provide Europe's largest free Wi-Fi zone, presumably to coincide with the 2012 Olympics.

### Can we call it 4G, yet?

No.

Not until LTE Advanced has been delivered and supported within the cell infrastructure. Everyone, by which I mean all those cell operators primarily in the USA, is keen to start labelling their new smartphone 4G-capable – well stop it! 4G is LTE-Advanced and not LTE, although the International Telecommunication Union (ITU) has suggested that if a 3G cell network fulfils some of the compliances towards 4G (advanced), then such a network could be considered 4G or more accurately '4G-ready'! That's just wonderful; yet another 'almost ready' technology to grapple with.

Anyway, in Cornwall, England, BT is trialling a 4G network based on a 4G-ready infrastructure (3G with compliant 4G components) initially offering speeds of up to 10Mbps. LTE Advanced purports true mobile wireless broadband capability where data rates of up to 1Gbps for low mobility communication and around 100Mbps for high mobile communication for cars, trains and so on are expected when the technology becomes readily available.

### What about the usual suspects?

So, where does that leave Bluetooth low energy, EnOcean, ZigBee, Z-Wave and ANT+? Eeesh, this is a little more difficult to gauge, as these technologies are non-specific wireless technologies that target a very broad market. I don't mean to be flippant or dismissive about their capabilities, or indeed their future, but I think they have all settled and found their place, if you like.

It's akin to a long-term marriage. Contentment and familiarity seeps in while enduring the meandering daily task of keeping up the payments on your mortgage; feeding the kids three times a day whilst remembering the cat, dog and hamster; and concluding the day by tuning into Eastenders for a bit of TV with a glass of red or two.

They're all settled and happy, along with the occasional blip that gives them something to talk about.

### Until next month ...

Again, void of a crystal ball, I can confidently speculate that next month's column will be CES focused. Naturally, I wrote this copy in January and there's a CES excitement and buzz with many rumours emerging as to what we'll witness at the event. Alas, I won't be attending this year, but I'm sure I'll receive all the gossip nonetheless!

And finally, I'd like to thank all those who supported our new book, Zero to 100,000: Social Media Tips and Tricks for Small Businesses. Early indications suggest that's it's a success and, Sarah and I are receiving such positive feedback. Thank you again.

So, this is where Dr G signs off this month and I'll catch you for next month's Incisor issue with a CES flavoured theme.

### About the Author

*Dr Dean Anthony Gratton is a bestselling author and columnist, and has worked extensively within the wireless telecommunications R&D industry. He was an Editor of the Specification of the Bluetooth System: Profiles, v1.1, participated in defining the initial Bluetooth Personal Area Networking profiles, and was active in the Near Field Communication technology and marketing committees. His wireless research work has been patented.*

*You can contact Dean at [incisor@deangratton.com](mailto:incisor@deangratton.com) and follow him on Twitter (@grattonboy) to enjoy his witty shenanigans, social media and technology-related tweets. Dean is an influential social media persona and was listed in the 50 "Top Dogs" of Twitter ([bullsandbeavers.com](http://bullsandbeavers.com)). You can also read more about his work at [deangratton.com](http://deangratton.com).*



# Why call white space "Super Wi-Fi"?

The industry is getting itself into a bit of a spin over the increasingly frequent use of the phrase "Super Wi-Fi" to describe white space radio technology.

Incisor.TV has covered white space on a number of occasions, but if you want to know more about this technology, which uses spectrum vacated by analogue TV broadcasts, then you can watch the Incisor.TV movies – [Weightless SIG launched for white space industry](#) and [Cambridge Consultants talks white space in the telehealth market](#). White space also gets some airtime in the Incisor.TV Ultra Low Power Roundtable movie that is launched in this issue.

Understandably, the organisation with the most to lose – the Wi-Fi Alliance, which stands to have its established status quo upset by consumer confusion – is the one making the strongest noises. In a statement released on the 27th January, the Alliance said:

*The Wi-Fi Alliance supports efforts to use the unlicensed spectrum known as Television White Spaces to expand connectivity. However, Wi-Fi Alliance cautions that the use of terminology such as "Super Wi-Fi" or "Next Generation Wi-Fi" for the Television White Spaces implementations available today will lead to substantial user confusion. Consumers should be aware that recently-announced deployments using terms like "Super Wi-Fi" are not in fact Wi-Fi.*

- *The technology touted as "Super Wi-Fi" does not interoperate with the billions of Wi-Fi devices in use today*
- *Today's deployments in Television White Spaces do not deliver the same user experience as is available in Wi-Fi hotspots and home networks*
- *Wi-Fi is a registered trademark of the Wi-Fi Alliance and the term "Super Wi-Fi" is not an authorized extension of the brand*
- *Wi-Fi Alliance discourages the use of Wi-Fi in a manner that could confuse consumers*



*"The Wi-Fi Alliance supports efforts to use the unlicensed spectrum known as Television White Spaces to expand connectivity. However, there is currently no Wi-Fi technology that operates in this spectrum," said Wi-Fi Alliance Marketing Director Kelly Davis-Felner. "It is important that users not be misled into confusing any such technology with Wi-Fi."*

In other words, stop it, you naughty people!

The other side of the equation, i.e. the players in the white space industry, are – also understandably – in less of a 'panties in a bundle' state over this debate. They, unlike the Wi-Fi Alliance and its members, are at the stage in their growth process whereby more or less any publicity is a good thing.

However, life isn't quite that simple. Incisor

spoke to a couple of players in the white space sector and it seems that the evolving nature of the industry's management organisation, with new potential board member companies being courted, means that a desire not to offend is now the overlaying policy. Suddenly, otherwise vocal spokespersons are winding back their comments, so as not to upset the political appletart. If Incisor is allowed to invent such a thing as a political appletart, that is.

There is no doubt that this debate will continue for some time. Sadly, the super white cat is out of the bag, and too many people are already content using the phrase Super Wi-Fi when they are talking about white space. Quite what both sides can do to fix the problem remains to be seen, but, here at Incisor, we can see this word muddle continuing to furrow brows for some time to come.

## Snippets

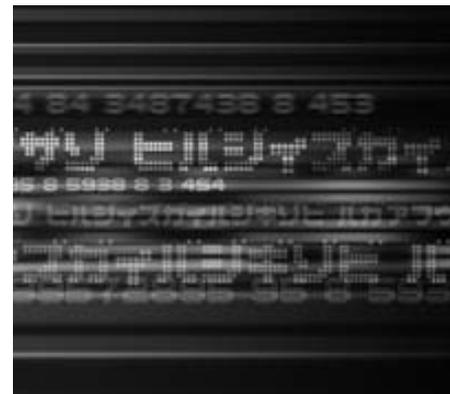
### Smart ticketing, smart partnership

NXP Semiconductors and Magnadata International recently celebrated the 10th

anniversary of their relationship in the smart paper ticketing market. Over 300 million MIFARE Ultralight based tickets from Magnadata are being used by

travellers around the globe. More than two billion MIFARE Ultralight ICs have apparently been sold to date.

# white space/4G/m2m news



## TV white space - the way to a Smart Grid?

Cambridge-based TTP believes that new TV white space technology could help to fill the communications gap and realise the vision of a global smart grid. TTP suggests that white space has the potential to deliver information at high data rates over long distances, with low latency and at low cost, making it ideal for applications ranging from smart metering to distribution network automation and demand response signalling.

Like the white spaces between words on a page, spaces that carry no information also exist in radio spectrum across frequency, time and space domains for the same reason – to minimise interference. In particular, empty channels and guard bands in the television spectrum offer sufficient bandwidth to carry rich information with excellent signal propagation - as long as there is no interference.

TTP told Incisor that it has already been achieving speeds of greater than 8Mbps over a 5.5km white space link using a single TV channel, compared to wired ADSL broadband that can struggle to achieve 2Mbps with less than half the range. White space devices with real-time intelligence communicate with a central database in order to tell them which frequencies and powers they must use to prevent interference with the broadcast TV signals.

Mathew Palmer, business development manager for Communications at TTP told us, "Currently, data backhauled from some smart meters might use three or even four different communications technologies en route, from powerline and fixed ADSL to cellular radio and long range point-to-multipoint radio. White space offers an exciting alternative that takes advantage of unused spectrum and meets the future smart grid communications challenges at low cost."

Regulators have indicated a preference for the use of white space without the need for licensing; so in effect the use of the spectrum costs nothing in the same way as for Wi-Fi, Bluetooth and ZigBee.

## More than just femtocells, small cells proliferate

Analysts at NPD In-Stat (that's what In-Stat is called in this latest iteration of the business) have told Incisor that mobile data usage is increasing by a factor of 70%-100% annually. To meet this demand, cellular infrastructure architectures have to fundamentally change as networks must deal with coverage, cell density, and resistance to new macro cell base station deployments ("not in my backyard"). Increasingly, small cell deployments are being used to enhance coverage. Femtocells will be used in residences and enterprises alike, it's predicted, and picocells will be used to provide coverage indoors and outdoors with microcells employed to cover areas where macrocells would be overkill. New NPD In-Stat research predicts the retail value of small cell shipments will reach \$14 billion in 2015.

"The potential that true mobile broadband offers in personal communications, commerce, and social networking becomes a curse for mobile operators," said Chris Kissel, Senior Analyst. "Use case determines the form factor." Studies indicate that 75% of mobile broadband connections are made indoors. This means that mobile operators have to ensure QoS for subscribers in their homes, at their jobs, and at their leisure."

Recent research found that by 2015, the retail value of femtocells in Eastern Europe is estimated to have reached \$265 million, and roughly 30.7 million WCDMA/HSPA residential femtocells are predicted to be shipped in 2015. NPD In-Stat also told us

that worldwide outdoor metropolitan picocell unit shipments will have a CAGR of 248% over the five-year forecast period.

## Growth in M2M connectivity led by automotive, telematics and smart energy

The M2M market has become a fully mainstream segment of the cellular industry, according to ABI Research. Analysts at the company told Incisor that by the end of 2011, most major mobile operators in North America, Europe, and the Asia-Pacific region had established M2M business units to focus their efforts in this fast growing market.

They predict that the market for cumulative cellular M2M connections will rise from about 110 million connections in 2011 to approximately 365 million connections by 2016. This represents a compounded annual growth rate of roughly 27% by 2016 and translates to about \$35 billion in connectivity services revenue.

The two largest cellular M2M market segments over the forecast period, by revenue, will be automotive telematics and smart energy. Automotive telematics, including factory-installed systems such as GM's OnStar service, aftermarket services such as usage-based insurance, and fleet management systems, will together represent more than \$15.5 billion in 2016. Meanwhile, smart energy, specifically cellular connectivity to smart meters and data concentrators, will represent more than \$7.5 billion in 2016.

Sam Lucero, practice director, M2M connectivity, told us, "As mobile operators further develop their M2M service offerings, software platforms and M2M application developer support will feature as increasingly larger components of the operators' services."

# high speed wireless news



## 2012 – the year of 802.11ac, says IMS research

IMS Research tells Incisor that the long awaited 802.11ac has finally hit the market in a big way, observing that this year's CES showcased new products from Broadcom, Buffalo, D-Link, Trendnet and many others.

IMS believes it's now full steam ahead for the standard, and forecasts that it will be widely adopted, since the performance of the 802.11ac standard is a huge leap from its 802.11n predecessor. The benefits of 802.11ac over 802.11n include: channel bandwidths of 80 MHz and 160 MHz (against 40 MHz maximum in 802.11n); support for up to 8 spatial streams (against 4 in 802.11n); 1.3 Gbps transmission rate (three times faster than 802.11n); and its ability to operate in the 5-GHz spectral band, which will mean that devices are less likely to suffer from interference.

While products are already hitting the market, the Wi-Fi Alliance has not yet approved 802.11ac (*Ed: nothing new there then!*). However, IMS suggests that this is expected in mid-2012; with retail products anticipated for release in 4Q 2012. In spite of the lack of a formal standard, IMS believes that over 3 million 802.11ac-enabled devices will be shipped in the first year alone; and predicts that over 400 million devices will be shipped in 2016.

Filomena Berardi, Senior Market Analyst and lead analyst for 802.11 and WLAN gave Incisor her thoughts on 802.11ac: "Uptake of the new standard is forecast to be extremely high. IMS Research believes that penetration in portable computing devices will be very aggressive and that it won't be long before more will be shipped with 802.11ac than 802.11n."

"As for use in smartphones, although 802.11ac is an interesting proposition, we

believe it might be 2014 before we see the first 802.11ac-enabled smartphone. This is mainly as a result of its higher cost and also footprint issues. However, with users demanding higher throughput and wider bandwidths for specific applications, 802.11ac will eventually have a huge impact on this market and many others!"

## 6LoWPAN connectivity comes home

It wasn't the first time that the question 'what if every device in your home had its own Internet IP address?' had been asked, but neither the answer to the question, nor the opportunity to test out the theory, have presented themselves just yet. However, NXP Semiconductors and Belkin International demonstrated a smart home network at CES that allowed you to control light bulbs – each with its own IPv6 address – using a smartphone or tablet. The network features a WeMo device from Belkin that enables mobile devices using Wi-Fi to interact securely with smart home appliances using JenNet-IP – NXP's ultra-low-power wireless connectivity software based on 6LoWPAN and IEEE 802.15.4. You can watch a demo [here at YouTube](#).

Sean McGrath, general manager, smart home and energy product line, NXP Semiconductors told Incisor, "At CES, you saw a number of solutions, including an easy-to-use WeMo device from Belkin that you can attach to your home router, enabling it to serve as a secure gateway between your smartphone and the Internet-enabled appliances in your network using JenNet-IP."

Belkin's Kevin Ashton added, "Our WeMo Home Automation platform makes it easy for Belkin partners to develop appliances for the Intelligent Home. Wi-Fi is everywhere and will play an important role, but at the same time, we need low-power

networking options to connect smart appliances and smart meters monitoring energy usage. Using only one-tenth of the power required by Wi-Fi, JenNet-IP offers robust, ultra-low-power connectivity which can support dozens or even hundreds of devices in a smart home network."

## TI aims to expand "Internet of Things" with easy Wi-Fi

Texas Instruments (TI) has unveiled the SimpleLink product family of wireless connectivity technologies for low-power, low-cost embedded applications. The SimpleLink family includes self-contained wireless processors, aimed at enabling easy integration with any embedded system.

The SimpleLink Wi-Fi CC3000 is a self-contained 802.11 network processor, which, according to TI, is intended to enable simple and quick addition of Internet connectivity to any embedded application.

Eran Sandhaus, general manager, emerging connectivity solutions, TI, told Incisor, "the addition of Internet connectivity to everyday consumer, home and office devices creates new value propositions for our customers, introducing ways to better control these devices and share information through the cloud. The SimpleLink Wi-Fi CC3000 solution provides developers with the quickest and easiest avenue to meet these opportunities by adding best-in-class 802.11 Internet connectivity to their designs."

SimpleLink Wi-Fi CC3000 modules are apparently sampling now and released to production. There is also a SimpleLink Wi-Fi CC3000 FRAM evaluation module kit (EMK).

# low energy wireless news



## TRaC Global launches smart energy test harness

Testing and compliance consultancy TRaC Global officially launched its multi-profile ZigBee Tracer test harness suite at CES. The suite creates a complete protocol toolkit that is designed to accelerate product development. As part of the announcement, TRaC unveiled its first Tracer product focusing on the ZigBee Smart Energy (ZSE) profile.

The Tracer ZSE variant is a USB dongle that will allow manufacturers of ZigBee Smart Energy products to perform pre-testing of their designs at all stages of development, the aim being to provide the highest level of confidence that all test criteria have been met prior to the official certification test.

Tracer ZSE will emulate a device type within the smart energy ecosystem, sending programmed signals to the manufacturer's product verifying its functionality. It will also provide the user with an instant pass or fail verdict allowing for changes to be made where necessary.

Paul Russell, director of TRaC, told Incisor, "With the increased adoption and roll out of smart energy devices across the world, it was an obvious choice for us to focus our first Tracer product on addressing this popular technology."

Russell went on to explain that Tracer has a simple graphic user interface for ease of use and clarity across both in-lab and remote pre-testing. Two versions of the Tracer are available to suit the level of functionality required. The lite version allows the designer to perform test cases and determine compliance, providing a verdict assessment, while

the professional version allows for in-depth debugging analysis and development, and offers customised testing.

The Tracer ZSE supports all Zigbee Smart Energy device types including Energy Service Portals (ESI), In Home Displays (IHD) and Meters (MTR).

Nicholas Gommersall, MD of Telegesis, which provided the module for the new Tracer, commented, "We are very excited to be involved with TRaC's new Tracer test harness. Our module combined with TRaC's software and expertise creates a new and unique proposition for smart energy manufacturers."

Ember provides the chips for the Tracer, and Skip Ashton, Senior VP of Engineering told Incisor, "As the market leader in low power wireless networking solutions for the Connected Home including smart energy, we believe compliance testing and certification companies such as TRaC play a critical role helping OEMs develop their products."

As a ZigBee Alliance Recognised Test House, TRaC has a high level of protocol experience having contributed to the development of ZigBee's profile standards through its involvement in the ZigBee Qualification Group (ZQG) and ZigBee Smart Energy (ZSE) Working Group.

ZigBee Alliance members were able to pick up a free of charge demo unit at CES, which supports a limited number of test cases to provide an overview of the capabilities of the device. The demo could then be exchanged for a full product with a 20 per cent discount within six weeks of the CES event.

## GreenPeak powers new ZigBee RF remotes

Comcast Cable Communications, which, for our non-US readers is a video, high-speed Internet and phone provider to residential and business customers in the USA, has selected fabless semicon company GreenPeak's controller chips in conjunction with ZigBee RF4CE technology for use in television remote controls for its Xfinity TV service.

GreenPeak told Incisor that it has been working with Comcast to deliver an enhanced remote control experience that offers greater responsiveness than conventional remotes. Because this new technology uses RF, the set-top box no longer needs to be placed within a direct-line-of-sight of the remote control, giving consumers the option to place their set-top boxes in a range of locations within the home, including behind television sets or inside of cabinets. This new experience also greatly extends the battery life of the remote control, with GreenPeak claiming as much as 3 years.

The Comcast RF remote control uses GreenPeak ZigBee RF4CE communication controller chips and is a hybrid RF/IR solution that supports both legacy infrared (IR) equipment as well as new RF set-top box equipment that supports RF4CE technology. Comcast has deployed RF remotes with the first of its Xcalibur products, the next-generation Xfinity TV service currently available in Augusta, GA, and plans to expand availability in 2012 and beyond. Comcast also plans to use the new RF remote control to support legacy TVs and set-top boxes based on IR protocols currently used by its customers.

# low energy wireless news



## Stack for Android 4.0 makes “Ice Cream Sandwich” easy to adapt to NFC

Inside Secure is shipping the latest version of its open-source, NFC protocol stack for the new Google Android 4.0 release, aka Ice Cream Sandwich. The open NFC version 4.3.3 for Google Android 4.0 is compliant with the Ice Cream Sandwich release Compatibility Definition Document (CDD) for NFC, and provides the NFC ecosystem with an NFC Application Program Interface (API) and functionality to implement NFC independently of the underlying NFC hardware. It supports all the latest Android NFC features, including Android Beam and Wi-Fi direct pairing connection. In addition to these new Android services, open NFC provides access to features such as card emulation and access to multiple secure elements.

The open-source HAL for Inside’s MicroRead and SecuRead is also available for download. The HAL allows the open NFC protocol stack to be used immediately with Inside’s MicroRead and SecuRead NFC chip platforms. It brings consistency across multiple platforms and devices as well as improved interoperability.

Open NFC supports several levels of functionality, from low-level RF control to high-level NFC forum tag handling, peer-to-peer communications as well as Bluetooth and Wi-Fi pairing, interactions with single-wire protocol SIMs and other secure elements and compatibility with smart cards and RFID tags based on Felica, Mifare and ISO 14443 standards.

Inside Secure’s open NFC 4.3.3 for ICS can be downloaded free from the NFC web site – [www.open-nfc.org](http://www.open-nfc.org).



## “Printed silicon” tags enable interaction between consumers and brands

Inside Secure’s family of Near Field Communication (NFC) solutions can now be used to interact with the Kovio RF Barcode wireless tag, which uses printed silicon technology platform. Mobile devices that use Inside’s MicroRead and SecuRead NFC hardware and Open NFC protocol stack allow brands, retailers, advertisers, mobile operators and retail system integrators to provide personalized and contextual experiences to everyone who purchases, uses or interacts with everyday consumer goods.

By combining proprietary silicon inks with high throughput and low-cost graphics printing technologies, Kovio RF Barcode tags can apparently be printed in days on flexible substrates at what Inside calls ‘a fraction of the cost of conventional silicon technology’, making them practical and affordable enough to be used to extend real-time personalized permission marketing to mass-market consumer products.

Amir Mashkoori, president and CEO of Kovio told Incisor, “The affordability and service model enabled by the Kovio RF Barcode tag offers a breakthrough opportunity for retailers and brands to connect the online and physical worlds, creating a direct and instantaneous communication medium for them to interact with consumers at points of sale and use. Through our work with Inside, consumers, brands and retailers will soon have a broad range of smartphones and other mobile devices they can use to revolutionize the shopping experience.”



## TI introduces ZigBee RF4CE remote control solution

Texas Instruments Incorporated (TI) showed a ZigBee RF4CE remote control solution at CES that supports the upcoming ZigBee Input Device (ZID) profile. This enables mouse-like pointing functionality, keyboard and gesture- and touch-based input controls for consumer electronics such as TVs, set-top boxes and game consoles. TI’s ZigBee RF4CE solution includes the royalty-free RemoTI 1.3 protocol stack with sample application software, an ETSI-compliant and FCC-certified nano USB module, and an associated Advanced Remote Control development kit.

The CC253x offers pin-to-pin compatibility with TI’s Bluetooth low energy CC254x system-on-chips (SoC), enabling designs that implement both standards. Oyvind Birkenes, general manager, low-power RF, TI, told Incisor, “With our ZigBee RF4CE ZID profile based solution, manufacturers can quickly deliver remote control devices for more intuitive and enjoyable remote control user experiences.”

The RemoTI 1.3 software is available now from TI’s website, royalty free to anyone using TI’s ZigBee RF4CE hardware platforms. The Advanced Remote Control development kit is available on TI’s e-store.

## events



DATE	EVENT	LOCATION	NOTES	LINK
Feb 21 - 23 2012	Mobile World Asia 2012	Shanghai, China	-	<a href="http://www.szwgroup.com/2012/mobile/">http://www.szwgroup.com/2012/mobile/</a>
Feb 21 - March 1 2012	Mobile World Congress 2012	Barcelona, Spain	-	<a href="http://www.mobileworldcongress.com">http://www.mobileworldcongress.com</a>
March 20 - 22 2012	ecobuild	London., UK	EnOcean Alliance exhibiting energy harvesting wireless solutions	<a href="http://www.ecobuild.co.uk/">http://www.ecobuild.co.uk/</a>
April 15 - 20 2012	light+building	Messe Frankfurt, Frankfurt, Germany	World's biggest trade fair for lighting & intelligent buildings	<a href="http://light-building.messefrankfurt.com">http://light-building.messefrankfurt.com</a>
April 24 - 26 2012	Bluetooth Special Interest Group All Hands Meeting	Renaissance Vancouver Hotel, Vancouver, Canada	-	<a href="http://www.bluetooth.org">http://www.bluetooth.org</a>
June 12 - 14 2012	Wi-Fi Alliance member meeting	Toronto, Ontario, Canada	-	<a href="http://www.wi-fi.org/events_overview.php?id=351">http://www.wi-fi.org/events_overview.php?id=351</a>
June 27 - 28 2012	European ZigBee Developers Conference	Munich, Germany	-	<a href="http://www.zigbee-devcon-europe.de/">http://www.zigbee-devcon-europe.de/</a>

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