**Wibree Technology**

1.INTRODUCTION:

1.1.Objective:

Wibree is a short-range wireless protocol optimized for low power consumption.Developed primarily by Nokia, the company has submitted Wibree as an open standard to promote adoption and interoperability.Wibree technology complements close range communication with[Bluetooth](http://news.softpedia.com/news/iPod-Bluetooth-Adaptor-Coming-Soon-34007.shtml)like performance within 0-10 m range and data rate of 1 Mbps. Wibree is optimized for applicationsrequiring extremely low power consumption, small size and low cost.Wibree is the first wireless technology to solve the following needs in a single solution.

* Ultra low peak, average & idle mode power consumption
* Ultra low cost & small size for accessories & human interface devices
* Minimal cost & size addition to mobile phones & PCs

Global, intuitive & secure multi-vendor interoperability.

1.2.Wibree Technology:

Wibree is an innovative digital radio technology that can soon become a benchmark for the open wireless communication. Working almost equivalent to the Bluetooth technology, thismodern technology functions within an ISM band of 2.4 GHz and amid a physical layer bit rateof 1 Mbps.Widely used in may appliances like the wrist watches, wireless keyboards, toys andsports sensors due to its key feature of very low consumption of power within the prescribedranges of 10 meters or 30 feet using the low cost transceiver microchips, it can generate anoutput power ofm-6 dBm.Conceived by the Nokia Company in 10-03-2006, it is today licensed and further researched by some of the major corporates that includes Nordic Semiconductor, BroadcomCorporation, CSR, Epson, Suunto and Taiyo Yuden

According to Bob lannucci, the head of Nokia s research centre, this groundbreakingtechnology that is 10 times more capable than the Bluetooth technology will soon replace it.

Wibree radio specification enables dual-mode implementations to reuse Bluetooth RF part but also to guarantee ultra low power consumption for devices with embedded stand-aloneimplementation of the Wibree specification. Wibree operates in 2.4 GHz ISM band with physicallayer bit rate of 1 Mbps and provides link distance of 5-10 meters.Wibree link layer provides ultra low power idle mode operation, simple device discoveryand reliable point-to-multipoint data transfer with advanced power-save and encryptionfunctionalities. The link layer provides means to schedule Wibree traffic in between Bluetoothtransmissions.



1.3.

Evolution of WIBREE:

In 2001, Nokia researchers determined that there were various scenarios thatcontemporary wireless technologies did not address. To address the problem, Nokia ResearchCenter started the development of a wireless technology adapted from the Bluetooth standardwhich would provide lower power usage and price while minimizing difference betweenBluetooth and the new technology. The results were published in 2004 using the name BluetoothLow End Extension. After further development with partners, e.g., within EU FP6 projectMIMOSA, the technology was released to public in October 2006 with brand name Wibree.After negotiations with Bluetooth SIG members, in June 2007, an agreement was reached toinclude Wibree in future Bluetooth specification as an Bluetooth ultra-low-power technology,now known as Bluetooth low energy technology.Bluetooth enabled devices will benefit from a dual-mode chip solution, allowingBluetooth users to connect with Wibree-enabled devices. The technology was announced on thethird of October, 2006. It is a digital radio technology, powered by button cells. It works over arange of ten meters.Wibree devices also make use of a standalone chip (for devices designed around theWibree standard alone). It is going to be a means of wireless communication between mobiledevices, between PCs and mobile devices, and also between PCs and other wireless enabled PCdevices that incorporate the technology. These devices will probably include printers, key boards, and mice. Also included will be a range of other smaller devices such as watches, sensorsand toys. It is these smaller devices which make the Wibree unique, and therefore a technologyto watch. Nokia is aiming to have the technology available commercially by the second quarter of next year. They have begun partnering with large companies such as Broadcom Corporation,CSR, Epson and Nordic Semiconductor. They project that the devices for which the Wibree isdesigned will become high growth sectors because of the new features that the devices willexhibit, due to the devices' ability to communicate with other devices

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2.SYSTEM OVERVIEW:

2.1.The Wibree standard:

The Wibree is a wireless technology. It’s open standard based on the Bluetooth. TheWibree technology must have the same debit (1Mb/s) than the Bluetooth technology. All thespecifications of Bluetooth and Wibree technologies are the same expect the power consumptionof Wibree must be ten time inferior to the power consumption of Bluetooth. The frequency bandis between 2.4 GHz and 2.4835 GHz. The channel bandwidth is 2 MHz. The modulation isGFSK (Gaussian frequency shift keying). This technology doesn’t replace the Bluetoothtechnology. The Wibree will use in the new type of object like sport sensors or toys.

2.2.Wireless communication with wibree:

Wireless has already transformed the things we carry and the way we work in the wider area, most notably with our eager acceptance of the mobile phone, both as an extension of our  personal communication and also as an object of desire. The question is which wirelesstechnologies will appear in the plethora of electronics devices we currently buy.There is no easy answer – despite the claims that their marketing machines may make, no onewireless technology is the universal panacea – each has its specific niche within the brave newwireless world. Most have specific areas of excellence and many overlap. To choose which suitsyour need, you need to consider carefully what you want to achieve and the environment inwhich you wish to deploy it. Every application has its own, unique requirements, but the generallist of these remains constant across most wireless applications.

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Range

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Data Rate

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Battery Life

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Security

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Cost

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Quality of Service

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Interoperability

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Qualification and ApprovalThe first two, range and data rate generally provide the first selection points regardingwhich are the likely contenders. Although most radio standards are capable of transmitting smallamounts of data, those that are designed for higher data rates are usually inefficient if you onlyneed to transfer a small number of bits of information. However, if you already have aninfrastructure for a higher data rate standard, it may be more cost effective to continue to usethat for your local M2M connections.

2.3.Overview:

Many other technologies like WiMaX, Wireless USB, Radio Frequency Identificationetc. are also in race with Wibree. It will become the world’s fastest growing technology.The recent announcement of the Wibree standard by Nokia seems to have caught theindustry unawares. The initial response of many analysts and much of the media has been tocategorise it as yet another competitor in the 2.4 GHz space. One of the most important aspects

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of Wibree is that it envisages dual-mode chips that can support both Bluetooth and Wibree. Thissymbiotic existence is key to Wibree’s success. There will also be single-mode Wibree chips thatoffer low power operation, which will enable a wide range of devices to talk to these dual modechips. The bulk of Bluetooth chips shipped by 2008 will include Wibree dual-modefunctionality, effectively for free, it means that by the end of 2009 there could be over 100million Wibree enabled handsets in existence

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It is a strategy that means Wibree will redefine the speed at which a new wirelesstechnology can be rolled out into the market. All existing records, both in consumer goods andwireless technologies are set to be overturned when Wibree leaves the starting blocks . Becauseof the fact that it will be integrated inside Bluetooth chips, it is likely to reach that one millionshipment milestone in just one week.That combination of Wibree within a Bluetooth chip is vitally important in understandingits place and the role that it can fulfill . Because low power, personal Wibree devices will be ableto communicate with handsets, it means that in time every mobile phone becomes a Wibreegateway to the mobile network. So every Wibree device can communicate with the internet,allowing information to be sent backwards and forwards. And because the data rates are low, thecost of this data transfer will be a negligible portion of the user’s monthly phone contract. That paradigm change will enable a wide range of additional services that today are just too expensivefor widespread deployment.A new short-range wireless technology, called Wibree, is designed to communicate withwrist watches, wireless keyboards, toys, and other devices that have low power consumption.It’s been more than a decade since Bluetooth was developed and deployed, serving as awireless link between two compatible devices. But has the short-range radio technology lived upto its potential or is it more-or-less limited to hands-free headsets for cell phones?Wibree was developed by Nokia as an alternative -- and later, complimentary -- solutionto Bluetooth. Wibree is also a low-power, short-range wireless technology, but it promises to filla gap left by Bluetooth.“Wibree can be built into products such as watches, toys, wireless keyboards, gaming,healthcare and entertainment devices, and sports sensors,” says Nokia spokesman CharlesChopp. “These devices can then connect to host devices such as mobile phones and personal

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computers -- it is essentially the missing link between small devices and mobile phones and personal computers.”For small and mid-size businesses, the advent of Wibree poses great potential, fromchanging how employees communicate with each other inside the office to enabling moreapplications for low-cost voice over Internet protocol (VoIP) to potentially allowing a businessto communicate to the wrist watches, gaming devices, or pedometers of potential customers.

2.4.Wibree Devices:Nordic Semiconductor is key player in Wibree:

Perhaps the most significant but unheralded member of Nokia's recently premieredWibree initiative has a history of building 2.4 GHz ultra-low power transceivers and ageographic proximity to the Finnish cell phone maker to boot. Norway-based Nordic Semiconductor has expressed little reluctance to provide atimeframe for delivering Wibree chips—it will sample second half of 2007. It has licensedWibree technology in advance from Nokia. Nordic already has a 2.4 GHz transceiver product line based on a proprietary architecturefor many of the key applications targeted by Wibree. It is also a member of the Wibreespecification group where it has contributed its core expertise in ultra-low power RF design tothe technology.A description of Nordic's technology architecture can be found at[Streaming audio: How](http://www.wirelessnetdesignline.com/showArticle.jhtml?articleID=188702145) [to optimize battery life and music quality](http://www.wirelessnetdesignline.com/showArticle.jhtml?articleID=188702145).Wibree is the first open wireless technology to specifically target connectivity betweenmobile devices such as smartphones or PCs and small, battery-powered devices such as watches,wireless keyboards, toys and sports sensors.The Wibree technology was introduced earlier this week during at a Nokia press andanalysts briefing.[Nokia launches Bluetooth follow-on wireless LAN](http://www.eetimes.com/news/latest/showArticle.jhtml?articleID=193101397).At the briefing, Nordic Semiconductor Product Manger Thomas Embla Bonnerud said:"The technical challenge is to ensure minimal power consumption under heavy, daily usage."Wibree is the first technology that combines interoperability and a lightweight protocolstack specifically designed for ultra-low power implementation.

"This is a field in which Nordic Semiconductor is now generally regarded as a globalleader and is why we as a company are a totally committed partner in enabling this new excitingmarket for wireless communication and to playing our part in making Wibree happen."

Key advantages:

Wibree is said to be up to 10 times more energy-efficient than Bluetooth, but can easily be integrated with the existing technology. In fact, in June 2007 the Bluetooth Special InterestGroup(SIG) announced that Nokia’s Wibree specification will be merged with the Bluetooth SIGand become part of the Bluetooth specification as an ultra lower power Bluetooth technology.“Because Wibree addresses devices with very low battery capacity and can be easilyintegrated with Bluetooth technology, it will round out Bluetooth technology’s wireless PersonalArea Networking (PAN) offering and strengthen the technology’s ability to provide wirelessconnectivity for smaller devices,” explains Chopp.“You can think of Wibree as basically low-power Bluetooth,” confirms Gary Chen,senior analyst for Small and Medium Enterprise IT Infrastructure and Applications at the YankeeGroup , the Boston-based IT research house. “Because it’s more power efficient, you'll getlonger battery life and it can be put into smaller devices, like a pen or watch.”Chopp says in many cases Wibree makes it possible to operate these devices for morethan a year without recharging.“It also looks promising for healthcare,” adds Chen, “as it is able to send body sensor information wirelessly to a monitoring device.”

Inherent challenges

There are likely going to be adoption challenges for Wibree, as with many newtechnologies. Chen says it may be “very difficult.” “There are a lot of wireless standards and not-quite-standards already, however, acceptance by the Bluetooth SIG and inclusion in a futureBluetooth spec will help a lot,” says Chen.Others are optimistic that businesses and consumers will embrace Wibree-enableddevices because of their ease of use. “There is always an adoption curve for new industry

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standards," Chopp says. He adds that this is why Nokia and the Bluetooth SIG both agreed thatthe Wibree standard would be best served under the auspices of the Bluetooth SIG, whichalready has participation and support from more than 8,000 companies that are advancingBluetooth wireless technology.To date, a handful of companies have contributed to the interoperability specification of Wibree, says Chopp, including Broadcom, Casio, CSR, Epson, ItoM, Logitech, NordicSemiconductor, ST Microelectronics, Suunto, Taiyo Yuden Co., Ltd. and Texas Instruments.“Several new companies -- including device, watch and access systems manufacturers -- will jointhe finalization of the specification, and once the specification is finalized, the technology will bemade broadly available to the industry via the Bluetooth SIG,” Chopp says.

Coming to a business near you

 Nokia expects the first commercial version of the Wibree/Bluetooth interoperabilityspecification to be available during the first half of 2008. According to internal estimates, Nokia believes they will begin to see the first stand-alone products from a few vendors in the secondhalf of 2008. These are likely to be “small button cell battery powered devices,” says Chopp.Host devices and other dual-mode devices should emerge in first half of 2009.On its initial adoption, Chopp cites an ABI Research report published in March 2007. Init, director Stuart Carlaw predicts Wibree to be a $432 million, 809 million device industry by2012.

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3.WIBREE:

3.1.Where wibree came from:

In 2001 two industry groups put forward proposals for the form of this radio. Nokiaheaded one of the groups and proposed a development that was handset centric. A major tenet of their design was that “it can be deployed with minor effort into devices already havingBluetooth, e.g. cellphones” with the added requirement that a “common RF section withBluetooth must be possible”. Their vision was also broader that that of the competing camp inthat it envisaged a world of a trillion wireless, web connected devices. A key slide showsmillions of connected laptops, billions of mobile phones and trillions of what could beinterpreted as Wibree enabled devices.In the event, the IEEE committee chose to adopt the alternative proposal for the 802.15.4standard. However, Nokia didn’t stop work on their proposal. Over the intervening years it hasdeveloped and matured into what has now been announced to the world as Wibree.The original proposals are still available for public viewing on the IEEE site.The name has also raised eyebrows. Like Bluetooth, it is a new word that tells us little of the technology. The “Wi” is the now obligatory prefix for “wireless”, with Nokia claiming thatthe “bree” comes from the Old English word for a ‘crossroad’. So we have “Wireless at theCrossroad”, Whichever takes your fancy; one thing is certain - Wibree will certainly herald anew era of personal wireless connectivity. And the engagement of the major Bluetooth siliconvendors will ensure that it will quickly appear in hundreds of millions of handsets.

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3.2.Wibree device architecture

:Wibree specification has been created by having two equally important implementationalternatives in mind, namely dual-mode and stand-alone. In the dual mode implementation theWibree functionality is an add-on feature inside Bluetooth circuitry sharing a great deal of existing functionality resulting in a minimal cost increase compared to existing products. Thedual modes are targeted at mobile phones, multimedia computers and PCs. The stand aloneimplementations are power and cost optimized designs targeted at, for example, sport, wellness,and human HID product categories.example’s for dualmode implementation and device which is standalone application

Wibree radio specification:

Band with physical layer bit rate of 1 Mbps and provides link distance of 5-10 meters.Wibree radio specification enables dual-mode implementations to reuse Bluetooth RF part butalso to guarantee ultra low power consumption for devices with embedded stand-aloneimplementation of the Wibree specification. Wibree operates in 2.4 GHz ISM.

Wibree link layer specification:

Wibree link layer provides ultra low power idle mode operation, simple device discoveryand reliable point-to-multipoint data transfer with advanced power-save and encryptionfunctionalities. The link layer provides means to schedule Wibree traffic in between Bluetoothtransmissions.

Wibree host & profile specifications:

Wibree is adopting the principle of profiles to define its most common application areas.In its initial release, these cover the watch, sensors and Human Interface Devices (HID). Thereceiving device doesn’t need to be static for this scenario. A feature of the short time required tocomplete a data transfer means this profile can be used with moving receivers. If we consider atransmitter with a 100 metre range, a vehicle moving at 100 km/hr will be within range of thetransmitter for around 4 seconds – more than enough time to pick up traffic information from a beacon. An increasing number of vehicles already have a driver display that is Bluetooth enabled – it’s called their satellite navigation system. There’s only a minimal incremental cost to Wibreeenable it to receive additional messages from roadside transmitters. It makes Wibree a veryinteresting proposition to those developing ITS (Integrated Traffic System) applications.

Wibree – wireless PAN with long battery life:

8th December 2006 - Chips for Wibree, the new short-range wireless data link proposed by[Nokia](http://www.nokia.com/), will be available in sample volumes as soon as late 2007, according to low-power radio specialists[Nordic Semiconductor](http://www.wibree.nordicsemi.no/). Nokia announced the Wibree concept in late 2006,leading some industry observers to speculate that Wibree was intended to be competitive with[Bluetooth](http://www.bluetooth.org/)or [ZigBee.](http://www.zigbee.org/)It’s neither, says Nokia, but is intended to bring standardised wirelesscommunications to a particular niche and range of products where wireless connections are notcurrently used or, if they are used, they are proprietary solutions that do not have interoperability.Wibree is defined by very low power, with the objective that a device should run from a battery for, typically, over a year: the battery being an AA or AAA cell for high-duty-cycleoperation, and “coin” cell for low-duty-cycle applications. Applications centre on the personal-

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area-network (PAN) space and include human-interface devices such as keyboards and mice,sensors, and wearable devices such as watches. One of Nokia’s objectives is that as a wireless-connected personal-product “ecosystem” emerges, the cellphone should be at its centre. NordicSemiconductor already supplies proprietary radio chips into this market sector, and has aninterest in providing chips that meet a standardised specification.

3.3.Wibree chips:

Wibree chips will come in two main types – standalone and dual-mode. Standalone chipswill be for use in “slave” products (sensors, watches and the like) while the Wibree function indual-mode will co-exist with Bluetooth and will be used in a host device such as a cellphone.The radio link has much in common with Bluetooth but the protocol is simpler, and the power demand much smaller. A dual-mode chipset will re-use the Bluetooth RF section with nochanges: there will be some additional functions in the Bluetooth baseband section, and aseparate protocol stack.Therefore, the RF link will be at 2.4 GHz as, for Bluetooth: it will have the Bluetooth RF power level of 0 dBm, similar range of around 10m (Nokia says “5 to 15m”), and modulationwill be GMSK (a small change from the Bluetooth case). While transmitting or receiving, thecurrent drawn by a slave single-chip solution will be under 15 mA. Nordic expects to supply that part in a 4x4 mm QFN package. Over-the-air data rate will be 1 Mbit/sec – in the interests of low power, Wibree will not use the more complex modulation that (in the same 1 MHz channel bandwidth) extends the upgraded Bluetooth’s data rate. While typical applications for Wibreewill send only small data payloads, Nordic says there are advantages in having a 1 Mbit/seccapacity: using a very low duty cycle, the radio will turn on, send a short data burst then power-down again, reducing demands on battery power. The protocol is also simplified for the samereason – communications can be peer-peer between stand-alone devices, or in a star configuration with a host – there is no “piconet” facility as Bluetooth has (which is hardly ever used) and no mesh networking as in ZigBee. As with Bluetooth, scenarios exist to support thehigher level parts of the protocol stack in an on-chip microcontroller core – which would haveheadroom to also run simple applications – or to divide the stack at HMI (host machine interface)level and run the top layers in a host processor. Nokia will not yet comment on how large theprotocol stack will be: for the present there will be just three profiles – sensor, HID and watch.Ultimate cost objectives are that a stand-alone chip should be in the region of €1, while for adual-mode chip or chipset, adding Wibree should cost a cell-phone maker under 10 cents. Nordic and Nokia sketch out some possible use examples. The HID case (keyboards andmice) is obvious and Nordic says that battery life should be extended (over, say, a Bluetoothsolution) to a similar extent to that already offered in its proprietary solutions using chips fromits nRF24 range. Similarly, Nordic already sells chips into the sports-watch sector – sensors suchas heart-rate monitors and running-shoe step-counters communicate with a watch that computesand displays (human) performance data. With Wibree, the interface could include the mobile phone. With your phone in your pocket, you can talk on a Bluetooth headset while controllingthe call on a WiBree watch – the dual-mode chipset will interleave Bluetooth and Wibree traffic.Bluetooth watches already exist (for example, from[Sony-Ericsson](http://www.sonyericsson.com/)

) – Nordic says that withWibree, it will do much better on battery life. In health-care, a cardiac monitor might use Wibreeto talk to the cellphone, which could pass on real-time data to a central patient monitoring systemusing GPRS. It follows that Wibree will have to be secure: AES128 encryption will be standard:devices will pair on either an open-discovery basis, or users will be able to set them to be hiddenuntil explicitly addressed.At present, Wibree has the status of an industry initiative: Nokia has gathered a coregroup that comprises Nordic (for its very-low-power radio expertise),[Epson,](http://www.epson.com/) [Suunto](http://www.suunto.com/)(maker of sports watches),[CSR](http://www.csr.com/),[Broadcom](http://www.broadcom.com/), and[Taiyo Yuden](http://www.taiyoyuden.com/)(who will contribute to testing andcertification, and ensuring a viable test specification). Nokia retains control of the specificationfor the time being; in the second quarter of 2007 it plans to pass it to an independent industryforum at which point membership will be opened to any interested parties. Just another wirelessinterface standard? No, says a Nokia spokesman, “if we could have done this with an existingstandard, we would have, but none of them achieve the power and performance profile we needto open up this market segment.”

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What Wibree does:

Wibree’s main application is to provide an ultra low power radio within the2.4GHz band.Low power is always determined in large part by the application the longer a device is active,and the more data it transmits, the shorter itsbattery life will be.Wibree is aiming to produce a radio that can transmit a small packet of dataapproximately every second for a year using a small button cell, such as aCR2430, with acapacity of around 280mAH. If the duty cycle is reduced to onetransmission every 15 to 30seconds, then the battery life effectively becomes the leakage life of the battery. This low power drain is achieved by designing a radio and protocol that lets the radio stay asleep for most of itslife. It can wake up quickly, when it will broadcast its requirement to transfer data on a number of advertising channels across the spectrum. The receiving device, which is likely to contain alarger battery as it will be on for more of the time, will acknowledge the message and tell thefirst device which channel to send its data on. It will then acknowledge receipt of this data, atwhich point both can go back to sleep.The whole process will take less than three or four milliseconds. Cost is a key advantagein Wibree existing within a Bluetooth chipset. But it’s not the only advantage of that symbioticexistence. Major concerns abut radio deployment in the 2.4GHz band is the growing level of interference that is likely to exist. That’s already resulting in a resurgence of interest in Bluetoothfor industrial applications because of its resilience to interference. Wibree provides the answer.Because the conversation between devices allows the responding device to select theradio channel to use, it introduces the concept of frequency agility, where the two radios canmove to undisturbed parts of the spectrum for their data transmissions. In most cases, thisreceiving device will be a mobile phone, which is acting as a gateway. The same Bluetooth chipthat contains the Wibree radio within the phone will be constantly scanning the radio spectrum as part of its adaptive frequency hopping requirement to see what spectrum is free. It makes perfectsense to share this information with the Wibree radio to give it the frequency agility that it needsto meet high reliability applications.In that sense it’s probably the same type of understatement that has haunted Bluetooth;although Bluetooth is normally referred to as a short range technology for less than ten meters,the reality is that it is successfully used for many applications over hundreds of meters. Looking

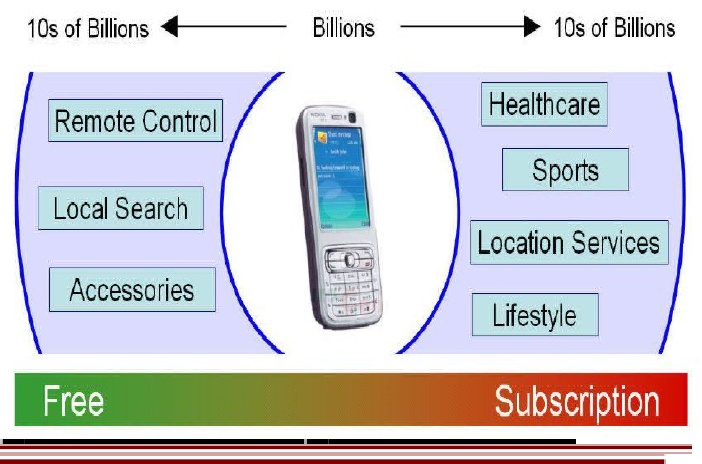
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more closely at what we know about the parameters that will determine Wibree range, the first point is that it will share the radio and receiver of Bluetooth chips. The most recent generation of Bluetooth chips have receive sensitivities around -85dBm and can directly output at transmit powers of around +4dBm. With careful RF design that gives an open field range better than 200metres.

Wibree - the marvelous world of wireless microdata:

The announcement by the Bluetooth SIG that they are embracing Wibree as an additionalstrand of the Bluetooth family of wireless specifications is a major step in its evolution. At itsannouncement, some commentators asked why we needed yet another wireless standard, particularly as its key feature is low power. The argument being that we already have low power radio standards, such as 802.15.4, ZigBee and Z-Wave.Wibree offers low power – as low as any of the other contenders, but it does it in a waythat sets itself apart from them. Its unique feature is that it cohabits with a Bluetooth radio in anew generation of wireless chips. To reduce cost it uses the same radio circuitry that’s alreadythere for Bluetooth and squeezes in a small, complementary protocol stack. These dual modechips will cost at most a few cents more than today’s Bluetooth only chips. That means Wibreewill quickly achieve a high penetration in mobile phones because it is riding on the back of anestablished technology.There are two important things to realise about that symbiosis: firstly, Wibreedeployment will happen quickly and happen in volume. Secondly, it means that every Wibreeenabled mobile phone becomes a ready built, wide area gateway capable of transferring datafrom a peripheral Wibree device to a remote network or service. The sheer speed and scale of Wibree deployment in mobile phones in the next few years is the first step to its goal. It will provide the critical mass that product designers need to justify incorporating wirelessconnectivity into a new generation of products.Low cost, Wibree only chips will find their way into a whole new range of accessories,such as watches and lifestyle devices. Dual-mode Wibree + Bluetooth chips will give addedfunctionality to the phones themselves, which will become usable for location specific datasearching and remote control. Most importantly, Wibree opens up a raft of new opportunities for

mobile network operators. As each Wibree equipped handset is a mobile gateway for Wibreedevices, operators will be able to offer new services, such as health monitoring. Such services provide a route to new revenue streams, as well as being a powerful tool for operators to increasecustomer loyalty and reduce churn. The important point to understand about Wibree is that it isgoing to build upon the volumes of mobile phones.Unlike other low power standards it’s not starting from scratch, but will ride on anindustry that already sells a billion devices every year. Wibree has the goal of enabling amultitude of products to connect to each and every one of these handsets. That adds up to a potential that is an order of magnitude greater than mobile phone sales. Unlike other short rangestandards, Wibree’s goal is not to ship mere millions, but tens of billions.



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3.4.TECHNICAL INFORMATION:

Wibree is designed to work side-by-side with and complement Bluetooth. It operates in2.4 GHz ISM band with physical layer bit rate of 1 Mbit/s. Main applications include devicessuch as wrist watches, wireless keyboards, toys and sports sensors where low power consumption is a key design requirement. The technology was announced on 3 October 2006 by Nokia. Partners that currently license the technology and cooperate in defining the specificationare Nordic Semiconductor, Broadcom Corporation, CSR and Epson. Other contributors areSuunto and Taiyo Yuden.Wibree is not designed to replace Bluetooth, but rather to complement the technology insupported devices. Wibree-enabled devices will be smaller and more energy-efficient than their Bluetooth counterparts. This is especially important in devices such as wristwatches, whereBluetooth models may be too large and heavy to be comfortable. Replacing Bluetooth withWibree will make the devices closer in dimensions and weight to current standard wristwatches.

POWER CONSUMPTION:

Chip manufacturers do not disclose power consumption data on data sheets. Thisspecification item depends on the operational duty cycles. Therefore the authentic data may beobtained just with experimental board set-ups and respective firmware test environment.Respective test environment specifications to normalize and directly compare the offeredalternatives are not available (2008-10-19).

BLUETOOTH:

The name Bluetooth comes from the name of a king, King Harald Blatand (translatedHarold Bluetooth) of Denmark and Norway from 935-940 A.D. He is known for his unificationof previously warring tribes from Denmark (including Scania, present-day Sweden, where theBluetooth technology was invented) and Norway. Bluetooth is a proprietary open wireless protocol for exchanging data over short distances(using short length radio waves) from fixed and mobile devices, creating personal area networks(PANs). It was originally conceived as a wireless alternative to RS-232 data cables. It canconnect several devices, overcoming problems of synchronization.Bluetooth was intended to unify different technologies like computers and mobile phones. The name is inspired by the historical King Bluetooth, who united the Scandinaviancountries. The Bluetooth logo merges the Nordic runes analogous to the modern Latin H and B:(Haglaz) and (Berkanan).

ZIGBEE:

ZigBee is a specification for a suite of high level communication protocols using small,low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal areanetworks (WPANs), such as wireless headphones connecting with cell phones via short-rangeradio. The technology defined by the ZigBee specification is intended to be simpler and lessexpensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF)applications that require a low data rate, long battery life, and secure networking.The ZigBee Alliance is a group of companies that maintain and publish the ZigBeestandard. ZigBee is a low-cost, low-power, wireless mesh networking proprietary standard. Thelow cost allows the technology to be widely deployed in wireless control and monitoringapplications, the low power-usage allows longer life with smaller batteries, and the meshnetworking provides high reliability and larger range.

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The ZigBee Alliance, the standards body that defines ZigBee, also publishes application profiles that allow multiple OEM vendors to create interoperable products

Wibree hardware in a wristwatch no larger than a standard quartz watch, with acomparable weight. In contrast, Bluetooth watches are heavy and bulky, making theminappropriate and even uncomfortable for everyday use.

Differences between Zigbee, Wibree and Bluetooth:

3.5.WIBREE APPLICATIONS:

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Small scale

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Big opportunityWibree is all about small data transfers. These are the applications that send smallamounts of information occasionally. That might be a TV remote control, a glucose monitor,flight information at an airport or a room thermostat. All in all, each application may only

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transfer a few tens or hundreds of bytes of data each day. It’s what I’ve termed microdata. It’snot a new concept, but prior to Wibree nothing has had the architecture to make it simple or thecritical mass to make it happen. Instead most wireless technologies have been bogged down incomplexity by trying to be good at the difficult things, such as meshes or video streaming or concurrent audio and data. Wibree is all about doing the little things simply. Looking at itanthropomorphically, Wibree’s not the technology for long term wireless relationships betweendevices, but rather the everyday “hellos” “how are you”s, “how much is that” and ”I’ll have twoof those, please”. In terms of the wireless day, Bluetooth and Wi-Fi will cover the deep,meaningful conversations between loved devices; Wibree will be all of those other snippets of conversation that oil our everyday existence.

The Long and Short of it:

Don’t make the mistake of thinking that low power and long battery life mean thatWibree will be limited to short range applications. Wibree can transmit at powers up to 100mW.In mobile phones, where it shares the same transmitter and receiver with the Bluetooth chip itreside in, Wibree will typically transmit at around 2mW with a receive sensitivity of better than-86dBm. If the RF circuitry is well designed, that will give it an open field range in excess of 100metres with very low battery consumption. Sensor applications that add a power amplifier oughtto be able to exceed 1 km of open field range. While many Wibree applications will extend nofurther than the range of personal transactions within a room, there will be numerousapplications that need to cover the house or office. The ability to deliver that range will helpWibree enable a very wide range of applications.

What’s microdata all about?

The best way to understand its versatility is to look at some applications that Wibree canenable. The first of these to come to market will almost certainly be phone-centric, least becauseWibree is being championed by Nokia and other phone vendors. These headline applicationsinclude sending caller information to your watch display and collecting data from health andlifestyle sensors. They’ll start to deliver the first stage of that promise of tens of billions of devices. An important part of the design of the Wibree standard has been in making itinexpensive to manufacture and integrate – potentially half the cost of Bluetooth or a stand-aloneWibree chip. That low cost opens up a whole raft of opportunities. It only needs a little thoughtto see how wide the potential from wireless microdata can be.

 Microdata means Location

How many times have you gone somewhere and wanted some basic piece of information? It might be the time and gate for your flight, where the goat’s cheese is in thesupermarket, or where to find your mummy at the British Museum. Some of these can beanswered by search engines and a mobile data subscription. Wibree enables the concept of freelocal searches.The way it works is to install Wibree “servers” at each relevant location, with a simpleinformation database in each. That database is typically going to be small and local as it onlyconcerns itself with information about its search location. At the train station it will be the timesand platforms of trains for that station and their destinations. In the supermarket it will be theaisle in which goods are located. At the museum it will be details of where the exhibits are ondisplay.Each Wibree location server will broadcast its presence, and any Wibree device with asuitable search application can choose to show all of the servers within range. It’s never likely to be a big list, but it will be information relevant to where you are.The process doesn’t touch the mobile network, so there’s no charge. The phone onlyneeds to accept minimal data and display downloaded text, so it’s fast. The database in the server is small and simple to structure as it only has limited, local information.

 Microdata means Health - The Ubiquitous Gateway

Caring for an ageing population with an increasing incidence of long-term, chronic healthissues is a problem facing most countries. There is a clear perception that electronic monitoringof health is a key part of any solution. That’s been recognized within the industry with theformation of specialist groups such as the Bluetooth Medical Devices Group, the ContinuaAlliance and the IEEE 11073 standards group

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Wibree is widely seen as a key enabler for these services. Where it scores over any other low power radio is in its unique ability to use the mobile phone as a gateway that can pass datafrom a personal medical device to a service provider. Some of the first Wibree devices beingtalked about are sports accessories, such as simple pedometers built into sports footwear. Thetechnology will quickly migrate to personal health monitors, including weighing scales, blood pressure monitors and glucosimeters. These aren’t devices that need to send large amounts of data, but their usage model requires low power so that they can be small, battery powered andwearable.The prospect of offering health related services is an exciting prospect for network operators. It’s one of the reasons that the GSM Association is welcoming Wibree as an evolutionof the existing Bluetooth standard. It’s not yet clear where the services will reside – with mobilenetworks, insurers, national healthcare services, gyms or private medical companies. What isclear is that Wibree provides a wireless implementation with the accessibility that will enable alarge- scale deployment of eHealth devices.

 Microdata means Control

The concept of Home Automation has been around for over sixty years, yet still has nottaken off. There are many reasons for that, including proprietary systems that won’t work witheach other, cost and the fact that most of them are too complicated to set up.As Wibree appears in these devices, the scope for remote control of other devices willappear. Gateway devices will also open up the possibility of remote access. Whether a largenumber of people will ever want to control their heating or white goods remotely is open todebate, but Wibree will be sneaking into the infrastructure of household goods for other reasons.Increasing concerns about energy and resource usage will require smarter washing machines anddishwashers that can talk to each other about how and when they’re working. The driver is likelyto be flexible tariffs and government legislation, rather than consumer demand for the automatedhome. The day is coming when your utility company will decide when you can do your washing

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Wibree and Bluetooth :

There is one area which Wibree will revolutionise more than any other, which is wirelesshealthcare. wireless devices will drive things like telemedicine, helping a global aging populationstay fitter. That reflects a widespread understanding that healthcare needs to encompass remotemonitoring in order to service the aging population. Depending on the application this goes by avariety of names, including eHealth, telecare, assisted living and wireless wellbeing. Itencompasses everything from personal fitness plans to disease control and dementia monitoring.

Advantages:

1.Integrate with Blutooth Chips2. operates on 2.4Gh Band3. low power consumption4. Less cost5. packets are transmitted with differential length6. (M)Any device can contact with any device

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 Applications:

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Sports

:Many of us enjoy an active lifestyle. Wibree enabled products can provide a multitude of appealing applications, ranging from the measurement and consequent optimization of a professional athlete’s performance during a work out session to the automatic selection of suitable music from your mp3 player to match your heart rate while bicycling to work.

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Healthcare

:A healthy living is important to all of us. Whether monitoring your heart rate and blood pressure at home to improve your personal diet or being connected over-the-air to your  physician while rehabilitating out of hospital, Wibree makes being healthy easier.

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Entertainment

Kids love toys, and so do many of their parents. Steer your little racing car clear of obstacles with your mobile phone, watch your little robot interact with that of your friendwhen they come close and tune up the volume to your favorite beat with your tiny mp3 player remote control. Wibree enabled toys and gadgets take play to the next level.

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Office

A growing number of us use a personal computer in our daily work or at home, andexpect the best performance and ergonomics from the devices we use to interact with thecomputer. Moreover, work often travels with us and so it is important that we can set up aconvenient working environment while on the move. Wibree ensures that your wirelesskeyboard, mouse and digital pen will work when you work

4.CONCLUSION:

Taking all of these factors together, Wibree has the potential to transform consumer Devices. It will solve the technology and monitoring issues that are currently hindering Theadoption of wireless healthcare services and enable a whole new generation of lifestyle,monitoring and safety products. By making the mobile handset the gateway, it brings thenetwork operators into the equation. And they have the resources to aggregate and enable service provision. Today Wibree is a Nokia solution. However, it is being supported by the major Bluetooth chip vendors including Cambridge Silicon Radio and Broadcom. That means it willreside within the chips in almost every brand of handset. It is unlikely that other phone vendorswill not take advantage of its presence, not least because it offers the network operators anadditional revenue stream. Its presence will make it very difficult for any other short range, low power wireless technology to gain traction in the handset, ensuring that Wibree is placed to ownthe wireless healthcare market. It may not become the accepted acronym, but Wibree will enableC2M - “Consumer to Machine” or “Consumer to Middleware” applications at a price point thatmakes them mass market. M2M is only just beginning to deliver against its promises. Wibreemay result in C2M delivering an even larger promise in a shorter timescale.By the end of 2007 EZURiO expects to be able to provide the first modular products toallow developers to start work on Wibree designs for wireless healthcare. In the meantime wealso expect to see networks engage in investigating the infrastructure requirements to provide thedata services to support these applications.

5.FUTURE SCOPE:

With its energy smart feature and small size, it can extend the role mobile devices play inthe consumers' lives, increasing revenue potential in the small devices market segments. WithBluetooth technology already having a following of more than 2,500 companies, Wibree's stand-alone implementation will add to wider adoption in the small digital device space in India andworldwide. On the office and mobile accessories front, its expanded battery life feature willsatisfy Bluetooth users. In sports and healthcare segment, sensors with Wibree technologyimplanted in human body, shoes, and other fitness tools can collect data and transmit informationto mobile phones or PCs. Wibree built into entertainment devices provides wireless interaction possibilities, offering enhanced user experience. Given its immense utility in various segments,Wibree will benefit products that make the technology as in-built. And it has a great future.

6.BIBILOGRAPHY:

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