**ABSTRACT:**

Now a day the wireless technologies are more in use and are widely evolving. Some of the technologies now in use are Wi-Fi, Wi-max, Zigbee, and Bluetooth. Out of which Bluetooth is most popular. These technologies are widely used to connect the large devices like mobile phones or personal computers. No other existing wireless technologies will connect with small button cell battery devices so effectively. So the Nokia introduced the new radio technology called Wibree.

 Wibree is the first open technology offering connectivity between mobile devices or personal computers, and small, button cell battery power devices such as watches, wireless keyboards, toys and sports & health care sensors. Wibree is a short range (10 meters/30 feet), wireless technology featuring ultra-low power consumption, a lightweight protocol stack and simple integration with Bluetooth.

**1. INTRODUCTION:**

 Wibree is a digital radio technology (intended to become an open standard of wireless communications) designed for ultra low power consumption (button cell batteries) within a short range (10 meters/30ft) based around low-cost transceiver microchips in each device.

 As of June, 2007 Wibree is known as Bluetooth ultra low power, in 2008 renamed Bluetooth energy .Wibree is a new radio technology developed by Nokia .It consumes only a fraction of the power compared to other such radio technologies, enabling smaller and less costly implementations and it is easy to integrate with Bluetooth solutions. In 2001, Nokia Researchers determined that there were various scenarios that contemporary wireless technologies did not address. To address the problem, Nokia Research Center started the development of a wireless technology adapted from the Bluetooth standard which would provide lower power usage and price while minimizing difference between Bluetooth and the new technology. The results were published in2004 using the name Bluetooth low End Extension. After further development with partners, e.g., within EU FP6 project MIMOSA the technology was released to public in October 2006 with brand name Wibree. After negotiations with [Bluetooth SIG](http://en.wikipedia.org/wiki/Bluetooth_SIG) members, in June[2007,](http://en.wikipedia.org/wiki/2007) an agreement was reached to include Wibree in future Bluetooth specification as a Bluetooth ultra-low-power technology, now known as [Bluetooth low energy technology](http://en.wikipedia.org/wiki/Bluetooth#Bluetooth_low_energy).

**2. HISTORY:**

Around 2001, the Nokia Research Center was looking at options for future personal wireless networking. The company realized that there was room for developing an ultra-low power, wireless technology that could interface cost-effectively with a large variety of existing and future devices, which, until now had not been effectively served by available existing technologies. Towards this end, Nokia decided to create a new open wireless protocol, and now, along with its partners Broadcom Corporation, CSR, Epson, and Nordic Semiconductor, is working to bring it to market.

Wibree would use only a fraction of the power consumed by today's Bluetooth chips, resulting in a much longer battery life and more compact devices. While Bluetooth can be used to transmit audio and media files, Wibree is designed to extend this network by serving applications that transmit only small amounts of data and where size and cost are priorities. Many applications that were not cost-effective using existing Bluetooth technology, such as wirelessly controlled toys, watches, medical and sports sensors, and a range of other applications that have not been conceived yet, might be developed using Wibree technology.



Figure1: Nokia aeon phone concept - future mobile phones will include Wibree (Credit: nokia).

There will be two types of Wibree implementations – one based on the Wibree stand-alone chip, and another based on the Wibree-Bluetooth dual-mode chip - which will serve different purposes and be installed on different devices. Stand-alone Wibree chips would be implemented in small, low cost devices such as wireless mouse and keyboards, sensors, and toys. The Wibree-Bluetooth dual-mode chips would probably be implemented in future mobile phones, allowing users to benefit from both worlds – Bluetooth 2.0 high speed and Wibree's low power and extended ability to communicate with a new generation of smaller wireless devices.

Media Access Controller (MAC) for the 802.15.4 standard, which is now the basis of ZigBee and other short range radio networks. Back in 2001 two industry groups put forward proposals for the form of this radio. Nokia headed 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 having Bluetooth, e.g. cell phones” with the added requirement that a “common RF section with Bluetooth must be possible”. In the event, the IEEE committee chose to adopt the alternative proposal for the 802.15.4 Standard it has developed and into what has now been announced to the world as Wibree. It derivation shows some of the same interest in northern European history and mythology that generated Bluetooth. The “wi” is the now obligatory prefix for “wireless’, with Nokia claiming that “bree” comes fron the Old English word for a crossroad. So we have “Wireless at the Crossroad”, “Wireless to be scared of” or Wireless eyebrows”.

**2.1. WHAT IS WIBREE?**

Wibree - which is now known as Ultra Low Power (ULP) Bluetooth, or evenBluetooth low energy - is radio technology for small, button cell battery-powered devices, such as watches, wireless keyboards, and gaming and sports sensors. These objects can then connect to Bluetooth-enabled host devices, whether computers or mobile phones Potentially, it could play a part in Bluetooth becoming the de facto wireless technology for [o](http://www.electronicsweekly.com/Articles/2007/07/12/41798/bluetooth%2Bbites%2Bfor%2Bthe%2Blast%2B25%2Bmetres%2Bof%2Bthe%2Bwireless.htm)f the wireless Internet. As its name suggests the ultra low power lower power consumption. To complete the mix of RF technologies, there is also ZigBee. This is a low-power networking technology supporting thousands of nodes, whereas ULP Bluetooth would link a small number of nodes to a host device, such as computer or phone.

 Nordic Semiconductor has become one of the first members joining the Wibree open initiative and is member of the Wibree specification group. Other members include CSR, Broadcom, Epson, Suunto, and Taiyo Yuden. Specification work for Wibree is currently under way. The technology will be made broadly available to the industry through an open and preferably existing forum. The specification details a short-range RF communication technology featuring ultra low power consumption, a lightweight protocol stack and integration with Bluetooth. Wibree operates in the globally accepted 2.4 GHz ISM (Industrial, Scientific & Medical) band.

Wibree, also called "Baby Bluetooth," is a low-power [wireless](http://searchmobilecomputing.techtarget.com/sDefinition/0%2C%2Csid40_gci213380%2C00.html) local area network (WLAN) technology that facilitates interoperability among mobile and portable consumer devices such as [pager](http://searchmobilecomputing.techtarget.com/sDefinition/0%2C%2Csid40_gci212739%2C00.html)s, personal digital assistants (PDAs), wireless computer peripherals, entertainment devices.

**3. TECHNICAL INFORMATION:**

Wibree is designed to work side-by-side with and complement [Bluetooth](http://en.wikipedia.org/wiki/Bluetooth). It operates in 2.4 [GHz](http://en.wikipedia.org/wiki/GHz) [ISM band](http://en.wikipedia.org/wiki/ISM_band) with [physical layer](http://en.wikipedia.org/wiki/Physical_layer) [bit rate](http://en.wikipedia.org/wiki/Bit_rate) of 1[Mbit/s](http://en.wikipedia.org/wiki/Mbit/s). Main applications include devices such as wrist watches, wireless keyboards, toys and sports sensors where low power consumption is a key design requirement. Wibree is not designed to replace Bluetooth, but rather to complement the technology in supported devices. Bob Iannucci, head of Nokia’s Research Center, claims the technology is up to ten times more efficient than Bluetooth. Reportedly, it will have an output power around -6dBm.Respective test environment specifications to normalize and directly compare the offered alternatives are not available.

**4. THE WIBREE SPECIFICATION GROUP:**

The Wibree specification group is an association of companies working together on the Wibree interoperability specification. This specification describes the protocol stack from the physical layer up to a set of profiles that supports specific usage models along withcompliance and interoperability test procedures. Initiated and headed by Nokia, the group currently includes Nordic Semiconductor, CSR, Broadcom, Epson, Suunto and Taiyo Yuden. All of these companies are contributing to the specification in their respective areas of expertise. There is an irony in the fact that the origins of Wibree were the alternative proposal for the radio and Media Access Controller (MAC) for the 802.15.4 standard, which is now the basis of ZigBee and other short range radio networks.

**5. NORDIC SEMICONDUCTOR AND WIBREE:**

As a pioneer and global leader in ultra-low power 2.4 GHz wireless communications, Nordic Semiconductor is an established transceiver supplier for many of the key applications targeted by Wibree. Wibree’s adoption into PC accessories enabling the next wireless mice and keyboards.

Nordic is also a member of the Wibree specification group, and has contributed core expertise in ultra-low power RF design to the technology.

**6. WIBREE AND BLUETOOTH:**

Bluetooth is a great technology and brand, adopted worldwide. Bluetooth is widely used in mobile devices like PC’s and phones, as well as in wireless headsets. However, other products relying on button cell batteries as a source of power, e.g. watches, toys and human interface devices, are not served effectively by Bluetooth.

**6.1 Similarities:-**

Wibree and Bluetooth use the 2.45 GHz band to transfer data and have a 1Mbps transfer rate and a rage of about 10 meters (m). In Wibree-Bluetooth dual-mode they share the components like antenna. Wibree is ultra low power technology.

The maximum transmitted output power of Bluetooth class 2 is 4dBm,(~ 2.5 mW). The total power consumption is much higher. The output power of Wibree standard will be around-6dBm. Each manufacturer will determine its own transmit power.

With several other formats for short-range wireless already on the market or in development, tech pundits questioned what niche Wibree would fill, or even if there was room for it at all.

 While the long-term success of Wibree remains to be seen, it does have several advantages over the competition, and it has been positioned as a compliment to [Bluetooth](http://electronics.howstuffworks.com/bluetooth.htm) technology rather than as a competitor.

Wibree, it turns out, will use the same radio frequency as Bluetooth, a major advantage over competitors. Using the same basic mechanism for wireless communication will make it much easier for devices to build in both Wibree and Bluetooth compatibility

So why is Wibree a compliment to Bluetooth? It performs many of the same functions that Bluetooth does while using far less power. Wibree would allow for the use of wireless technology in many devices that require long [battery](http://electronics.howstuffworks.com/battery.htm) life. People don't want to change the battery in their [wireless keyboard](http://electronics.howstuffworks.com/keyboard.htm) or wireless-enabled watch every week, and with Wibree they wouldn't need to. Wibree chips are also smaller than Bluetooth chips, which would make it easier to use them in certain applications where space is at a premium.

However, Wibree transmits data more slowly than Bluetooth -- up to 1 megabit per second, compared to Bluetooth's 3 megabits per second. It's easy to see that Wibree can't go head to head with Bluetooth in applications in which more bandwidth is needed.

 The future of Wibree is complicated by the fact that existing wireless technologies are still evolving. While Nokia is likely hoping that Wibree will be completely integrated into Bluetooth at some point, developers are working to reduce the power draw of Bluetooth devices.

Specific details on Wibree's power consumption are not yet available -- Wibree-enabled devices should hit the market in the next few years.

By the way, if you're wondering where they got the name Wibree, Nokia hasn't offered any information, but it could be related to the name of another wireless technology that is indirect competition with Wibree: Zigbee.

**6.2 Radio chips:**

Wibree radio chips - which operate over a distance of 30ft (10m) - are also smaller than Bluetooth chips and will suit devices which up to now do not typically have wireless technology built-in. Watches, health monitors and sport sensors are three of the uses touted by Nokia. The technology is also likely to be used in mobile phones to help prolong battery power. The new wireless system can transfer data at speeds of up to 1Mbps, about a third of the speed of current Bluetooth technology. Bluetooth technology was invented by Ericsson in the 1990s and was given away to the market as an open standard.

**7. WIBREE V/S BLUETOOTH:**

Wibree differs from Bluetooth in several fundamental ways.

1. Recent Bluetooth specifications, notably 2.0, are designed with an emphasis on [throughput](http://what-is-what.com/what_is/throughput.html), or [data](http://what-is-what.com/what_is/data.html) transfer speed. Bluetooth 2.0 devices can exceed speeds of 350kb/s under ideal conditions. This is about three times the maximum speed of planned Wibree devices, which transfer data no faster than.128 kbps. The tradeoff comes to light in terms of power, space and weight savings. Current Bluetooth- enabled wrist watches must replace their large, specialty batteries on a monthly basis. Planned Wibree models, with comparable features, can last over a year on a single standard button battery. Bluetooth uses a [frequency hopping technology](http://www.bluetoothonline.org/blog/spread-spectrum-frequency-hopping-in-bluetooth/) to avoid interference from other devices operating in the same frequency. Wibree does not use frequency hopping.

2. Bluetooth uses fixed packet length. This increases power usage as unnecessary transmission occurs. Wibree has a variable packet length and transmits only when necessary

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3. Bluetooth drains your cell phone battery as it needs quite a lot of power to remain active. Wibree aims to survive for a full year on a button sized battery. In contrast to Bluetooth, wibree goes into sleep mode when not transmitting. In sleep mode the radio will be off and will save a lot of power. Wibree devices wake up only when they want to transmit.

4. The major usage difference between wibree and Bluetooth is the traffic characteristics. Bluetooth is useful when transferring files, using the hands free etc where the volume of data that needs to to transfered is considerable.

5. Wibree is used in areas where an only short burst of data needs to be transmitted. Remotes, sensor data etc.

**8. WIBREE V/S ZIGBEE:**

• Wibree is a PAN (Personal Area Networking) technology

• Zigbee is a mesh networking technology

• Wibree is more power efficient

• Zigbee has got more range

• Wibree’s data transfer rate is 1 Mbps

• Zigbee Data transfer rate is 250 Kbps

• Wibree has got a star topology

• Zigbee has got a mesh topology

• Wibree uses Bluetooth radio and can co-exist with Bluetooth

• Zigbee needs its own special radio and has got no relationship with Bluetooth.

**9. WIBREE WORK AND ITS ADVANTAGES OVER EXISTING TECHNOLOGIES:**

Wibree is complementary to existing technologies; it does not replace them. As anexample, Nokia remains committed to Bluetooth technology and working with the Bluetooth SIG (the Bluetooth Special Interest Group).. Thus, Nokia believes that Bluetooth, as we today understand it, serves some use cases very well, but is not well equipped to serve others. The same will apply to Wibree, meaning that there will be room for both technologies. As a rule of thumb, as the communication becomes more data-intensive, the power consumption benefits of Wibree will diminish compared to Bluetooth

**10. WIBREE APPLICATIONS:**

Imagine a wireless keyboard and mouse with battery lifetimes exceeding one year communicating with a PC without using a fragile dongle. Imagine a watch equipped with a wireless link communicating with both a tiny sports sensor embedded within the user’s shoe and mobile phone. Imagine a range of personal devices communicating with mobile phones or PCs, but without the inconvenience of changing or charging batteries every week. Imagine no longer, because Wibree will make all of these applications – and many more – a reality.

**Mobile Phone Accessories**

Mobile phones equipped with Wibree technology will enable arrange of new accessories such as call control/input devices, sports and health sensors, security and payment devices. These devices will benefit from the ultra-low power consumption of Wibree making possible compact, coin cell battery operated devices with battery lifetimes up to 3 years (depending on the actual application).

**PC Accessories**

Wibree is designed to offer wireless connectivity to high performance PC accessories such as mice, keyboards and multimedia remote controls. The ultra-low power consumption of Wibree extends battery lifetimes to over a year. Nordic will build on its position as a leading provider of ultra-low power 2.4 GHz technology to encourage Wibree’s adoption into PC accessories enabling the next generation of wireless mice and keyboards.

**Watches**

Imagine your watch equipped with a wireless link communicating with both a tiny sports sensor embedded in your shoe and your mobile phone. Wibree’s ultra-low power consumption will bring connectivity power consumption will bring wireless connectivity to watches compromising battery life time.

**Sports and health sensors**

Imagine a tiny sports or health sensor embedded in your shoe equipped with a wireless link communicating with your watch. Wibree’s ultra-low power consumption will bring wireless connectivity to sports and health sensors without compromising battery lifetime.

 wibree will have sports applications.

**Wibree wrist watch, mobile phone and hands free**

  A cool new [wibree](http://www.kenneyjacob.com/category/articles/technical/wibree/) product will be released with the launch of wibree devices. It will be a wibree enabled wrist watch, Bluetooth and wibree enabled mobile phone and Bluetooth hands free.

[**Wibree is best suited for my TV remote**](http://www.kenneyjacob.com/2007/08/06/wibree-is-best-suited-for-my-tv-remote/)

Wibree technology has got special features to decrease the battery usage. The benchmark is to run a wibree device on coin sized battery for an year without any recharge. The technology is such that the device will go in to sleep mode when not in use to save battery. The usage matches a remote as it is not used continuously. The handset powers up only when a button is pressed.

 The technology will be made broadly available to the industry through an open and preferably existing forum enabling wide adoption of the technology. Wibree in our press release: “Consumers don’t like wires and they love compact, portable electronics devices that they can carry with them everywhere without fear of running short on battery power. The mobile phone is the perfect example. But to extend its functionality and allow it to interface wirelessly to a huge range of peripherals, the technical challenge is to ensure minimal power consumption under heavy, daily usage. This is Wibree and it is what consumers have been crying out for.



 **TABLE 1-EFFECTIVE APPLICATION OF WIBREE**

|  |  |  |  |
| --- | --- | --- | --- |
|  **CHARACTERISTICS** | **ZIGBEE** | **WIBREE** | **BLUETOOTH** |
| FIRST SPECIFICATION | 2004 | 2008 | 1994 |
| RANGE | 10-75mts | 10mts | 10mts |
| THROUGHPUT | 20-250kbps | Less than 1mbps | Maximum 3mbps |
| POWER CONSUMPTION | 1 year | Years | Few days |
| FREQUENCY | 2.4GHZ | 2.4GHZ | 2.4GHZ |

 **TABLE-2 ZIGBEE V/S WIBREE V/S BLUETOOTH**

**11. ADVANTAGES:**

•Wibree is the first wireless technology to solve the following needs in a single solution. Ultra low peak and average power consumption in both active and idle modes.

•Ultra low cost and small size for accessories and human interface devices (HID).

•Minimal cost and size addition to mobile phones and pcs.

•Global, intuitive and secure multi-vendor interoperability.

**12. DISADVANTAGES:**

•Data transmission is very slow, i.e., only 1 megabit per second.

•Cannot be used in high bandwidth required applications.

**13. FUTURE WITH WIBREE:**



* We can have every device connected to each other and thus have a network all around us with wibree.
* Anything and everything can be shared and may hope that emotions can be shared in wireless.

**12. CONCLUSION:**

 Wibree will also dramatically extend the battery lifetime of existing wireless device such as keyboards, mice and remote controls. It’s up to 10 times more energy efficient then Bluetooth. Nokia said it expected the first commercial version of the standard to be available during the second quarter of 2007. The firm said it expected dual Bluetooth-wibree devices such as mobile phones to hit the market within two years