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## The Market Status

# Bluetooth and Wi-Fi

**"Bluetooth shipments have now overtaken 802.11b shipments. The time has come for the two standards to stop fighting and agree that both are successful and complementary." "The reality is that by the end of 2006, Bluetooth will ship as many products in one week as Wi-Fi ships in the entire year." Two messages, telling a story about a battle going on in the IT-society.**

**D**uring the course of 2001 there was much contentious comment about the relative merits of Bluetooth and 802.11b wireless LAN's. In general the proponents of 802.11b (or Wi-Fi) took the high ground, telling the

trate on turning them both into solutions for endusers.

## Bluetooth and wireless LAN

An assessment of the actual number of final solutions to ship has been notoriously difficult to calculate. During the past three years of the phoney war between Bluetooth and 802.11b analysts and semiconductor companies have been anxious to secure their positions with impressive announcements of silicon shipments (table 1).

The problem with many of these figures is that the bulk of real solutions requires more than one chip. In our view many public announcements of the market size have been the result of double or triple counting. Although the industry promotes the future vision of "single chip wireless" the reality is very different. During 2001 the only volume exception has been the Cambridge Silicon Radio Bluetooth solution which integrates the entire Bluetooth product onto a single chip (with the exception of memory). Every other shipment has required be-

tween two and six individual chips, which can come from a variety of different vendors.

Ubiquitous single chip solutions will not dominate the Bluetooth market for at least another two years. At that point the situation will be further complicated by the split within the handset industry where the Bluetooth baseband will be incorporated into the phone's primary microcontroller, requiring just an RF front end to accomplish Bluetooth. The availability of a single chip 802.11b solution is still largely a pipedream.

Taking this into account, our headline figures show that at the start of March 2002, 11.0 million complete Bluetooth chipsets have been shipped, compared to a total of 10.8 million 802.11b chipsets (fig. 1).

There is still some debate about how many of these chipsets have resulted in products. Some of the early Bluetooth shipments prior to the Version 1.1 release may never have reached the market, but this represents only a very small percentage of the total shipments. There is also a greater lag between chipset shipment for Bluetooth and final product, as a large percentage of the chips are first assembled into modules, which are then incorporated into end products, introducing an average of 30 days into the production cycle. Bluetooth will continue to

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world that Bluetooth would never succeed and even prophesying that Bluetooth was dead. The Bluetooth SIG was noticeably quiet, concentrating on moving Bluetooth forward rather than engaging in a PR battle. Our latest research figures show just how spurious that argument was. We estimate that at the beginning of March 2002 Bluetooth will have shipped more chipsets than 802.11b. Both are growing. Both are successful. Furthermore the speed of growth of Bluetooth will vastly exceed that of 802.11b. Now is the time for both industries to put aside the spurious threats and counter-threats and concen-

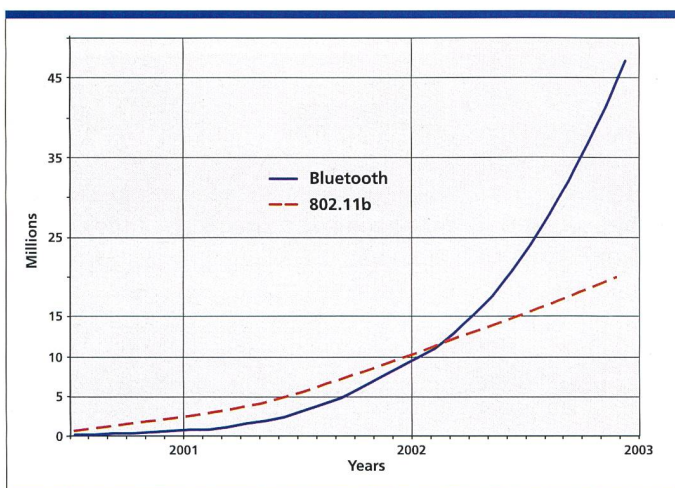


Fig. 1. Bluetooth versus 802.11b.

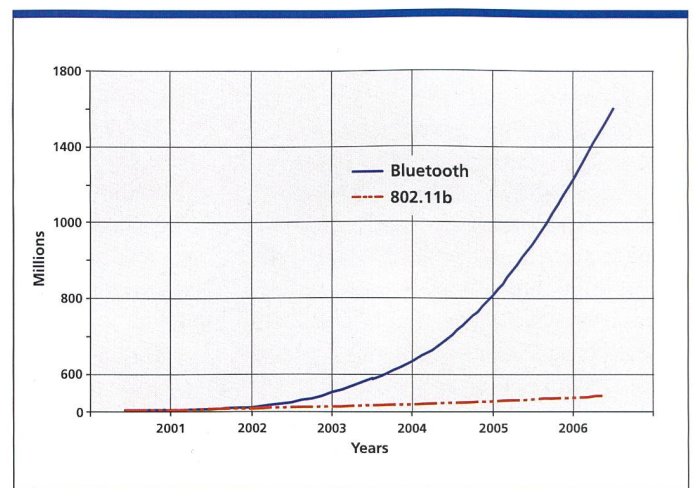


Fig. 2. Installed Base of Bluetooth and 802.11b.



grow as it is driven by the mobile handset industry. One of the strongest causes of growth will be impending legislation relating to the use of mobile phones within the car. Already laws have been passed prohibiting the use of handheld phones in Germany, The Netherlands, Australia and New York. Almost every other European country and US state has similar legislation pending on its statute books. This is a serious problem for network operators, who have reported that in parts of the US over 35% of call revenue comes from car based calls. Sales of car kits are limited both by the proprietary connections to handsets and the different life cycles of handset and car. The industry sees Bluetooth as the salvation and the automotive sector is moving at amazing speed to integrate Bluetooth into the dashboard.

Taking a realistic view of the speed of incorporation of Bluetooth into handsets as the primary driver and continuing popularity of 802.11b as the dominant wireless networking standard we can project the figures forward. The sheer volume of handsets rapidly dwarfs the successful roll-out of 802.11b.

Figure 2 shows the installed base of each technology. The Bluetooth figure is lower than some analysts have predicted, as we have assumed an 18 month life for Bluetooth handsets, as opposed to 30 months for 802.11b adaptors before the user discards and replaces their product.

### The handset market

During 2001 the handset market for Bluetooth was dominated by Ericsson with their R520, T39 and T68 models

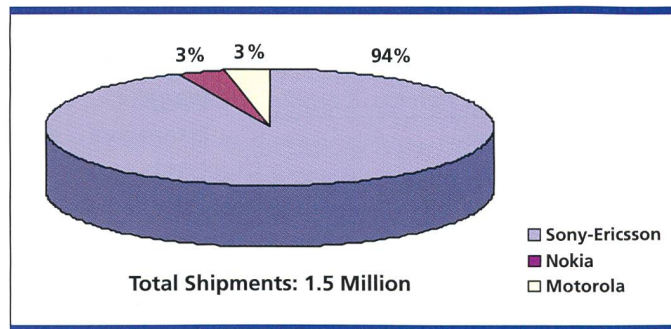


Fig. 3. Bluetooth Handset Shipments in 2001.

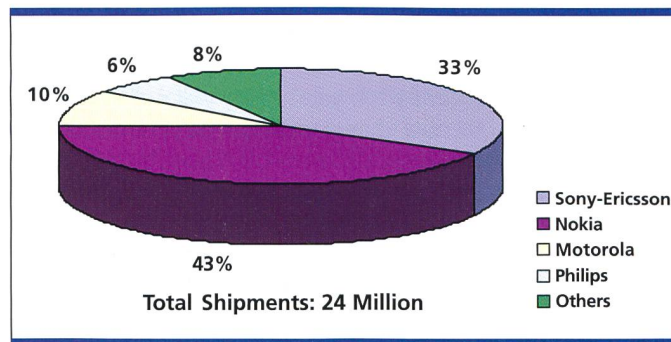


Fig. 4. Bluetooth Handset Shipments in 2002.

for the GSM market. Nokia provided a Bluetooth battery for its existing 6210 handset, whilst Sony launched the C413 for KDDI in Japan and Motorola shipped the Motorola 270c for US CDMA networks.

2002 has already seen Nokia add the 6310 to its portfolio, and a tranche of new handsets is expected to appear. A driving force for these will be pressure from the network operators to start gaining revenue from their GPRS networks. Over 100 GSM networks around the world have now announced the availability of GPRS. They have a quandary that without an ability to link GPRS handsets to mobile computing device there is no immediately obvious

method of increasing ARPU (Average Revenue Per User). GPRS allows the networks to trial many of the applications that they hope will be revenue sources for future 3G business, and Bluetooth is the route to make this happen. Philips has already announced new handsets that hope to capitalise on MMS as well as GPRS and we expect other manufacturers to follow.

The arrival of more players results in a dramatic growth of Bluetooth enabled handsets to around 24 million at the end of 2002, compared to just over a million the previous year (fig. 3). The exponential rise continues throughout 2003 as Bluetooth moves into middle and low end handsets.

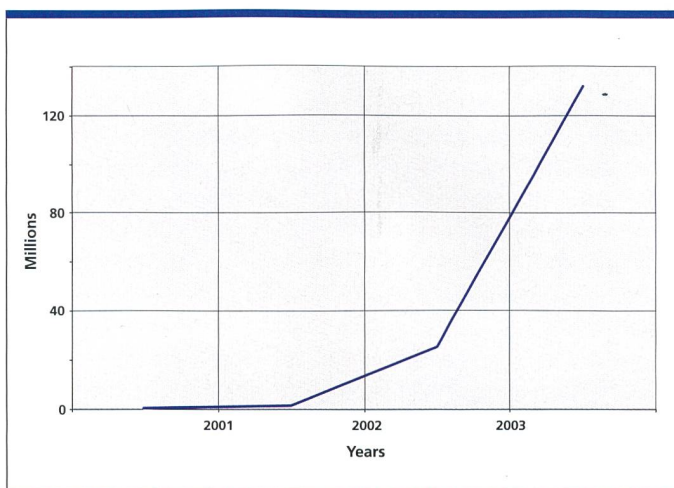


Fig. 5. Bluetooth enabled Handsets.

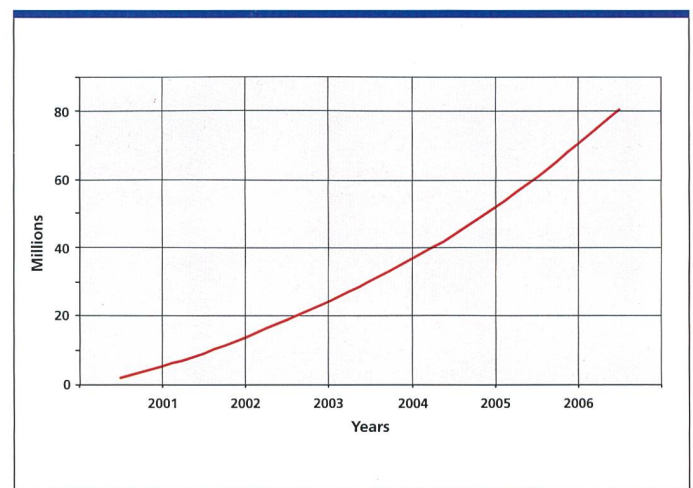


Fig. 6. Installed Base of 802.11b.



**Recent publicly announced "chip" shipments**

More than one chip is typically required for each product

	Bluetooth	802.11b
<b>Philips</b>	3 million	6 million
<b>TI</b>	1.5 million	
<b>Ericsson</b>	500 000 per month	

**Companies providing roaming services for operators**

<b>Nokia</b>	Infrastructure
<b>IPASS</b>	Roaming Services
<b>Interwave</b>	Infrastructure
<b>t-net</b>	Roaming Management and Billing
<b>Transat</b>	Cellular Consultancy

**Wireless hotspots**

As Bluetooth becomes better recognised from its handset penetration the range of uses in PCs, consumer and vertical applications will also rise. However, in terms of base numbers, the growth will be determined by handsets and headsets. Despite its popularity and enormous numbers, it is our belief that 802.11b will be showing year on year growth. This is despite the advent of the higher speed 802.11a and the appearance of 802.11g, which we do not expect to be successful. (A more detailed analysis of these standards is available in our report "The evolution of the Wireless LAN".)

The continued dominance of 802.11b is mandated by the evolution of wireless hotspots for the mobile traveller. The charging regimes for GPRS over the coming years will be seen as prohibitive for ubiquitous access and open up opportunities for wireless hotspots. After some initial abortive attempts at business models for these during 2001 there is an increasing consensus amongst network operators and roaming WISPs that these could provide significant revenue. Today there are over 1,100 commercial hotspots in the US and 500 in Europe. Analysts have forecast that by 2006 there will be 90,000 wireless hotspots within Europe alone, accessed by up to 20 million users. This market does not need the higher data rates of 802.11a; moreover a migration to alternative standards will remove the advantage of ubiquitous access and thwart the market. Now that the first steps to wireless hotspots have been taken a number of players have come to the fore providing infrastructure to integrate 802.11b access into the network model (table 2).

There is a potential upside to 802.11b if a hotspot model takes off. Mobile users will expect to find basic Internet access available within companies they visit to allow constant access to their home networks via VPN. This scenario does not appear to have been included in most analyses of the market growth,

but will further ensure the dominance of 802.11b. Those promoting other wireless standards should remember that the corporate market has only changed wired network standards once every ten years. They will not make annual changes to a wireless infrastructure.

**Conclusion**

Despite the words of doom, Bluetooth is well on the road to being a major success. Much time and energy has been wasted by pundits claiming that one technology was better than the other. The reality is that both are well suited to their individual tasks – wireless network access in the case of 802.11b and Cable Replacement and ad-hoc personal networking for Bluetooth. Now that Bluetooth has outshipped 802.11b it should be obvious that both are success stories in a wireless future. The time has come for proponents of each to stop arguing about supremacy, but start working to

turn the two respective technologies into real applications for users. 6

**Nick Hunn**, Managing Director,  
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**References:**

- "The evolution of the wireless LAN", Nick Hunn, TDK Systems, March 2002, Homepage: [www.tdksys.com/whitepapers](http://www.tdksys.com/whitepapers)
- Sources consulted: Analysis, Cahners, Forrester, Frost & Sullivan, IMS, MicroLogic
- numerous inputs from Industry experts, Silicon Vendors, Manufacturers and Customers

**Summary****Die Situation am Markt: Bluetooth und Wi-Fi**

Misst man die beiden Techniken an der Zahl der Auslieferungen, so hat Bluetooth 802.11b überholt. Damit ist für die beiden Standards der Zeitpunkt gekommen, ihre Fehde zu beenden und sich einzugestehen, dass beide ebenso erfolgreich sind, wie sie sich ergänzen. Allen Prognosen zum Trotz ist Bluetooth drauf und dran, eine neue Erfolgsgeschichte zu werden. In der Vergangenheit haben die Gurus der beiden Lager viel Zeit und Energie darauf verwendet, ihre Technik als die Überlegene darzustellen. Umsonst, denn heute zeigt sich, dass beide sehr wohl geeignet sind, die ihnen zugedachte Rolle zu spielen. Im Falle von 802.11b heisst sie drahtloser Zugang zum Netz, im Falle von Bluetooth Kabelersatz und Personal Area Networking. Jetzt, wo Bluetooth 802.11b eingeholt hat, müsste allen klar sein, dass die drahtlose Zukunft beiden gehört. Ihre Verfechter sollten aufhören, die Überlegenheit ihrer Technik beweisen zu wollen, und zusehen, wie sie daraus echte, für jedermann nutzbare Anwendungen machen können.



### Sony lässt Plasmadisplays fallen

Vor etwa zwei Jahren hatte Sony angekündigt, sich als Partner in einem geplanten Joint Venture für grosse Plasmadisplays zu engagieren. Seither ist es still geworden um diese Absicht, bis Sony Anfang Juni mitteilte, dass man diese Pläne wieder in die Schublade gelegt habe. Flache Bildschirme haben zwar derzeit Konjunktur, aber mit den Plasmabildschirmen für Fernsehgeräte läuft es nicht so wie in der ersten Euphorie mal erwartet. Der Endverbraucher hält angesichts der weltweiten Wirtschaftsflaute seine Taschen zu und lässt die (teuren) flachen Plasmabildschirme derzeit links liegen.

Sony Corporation  
6-7-35 Kitashinagawa  
Shinagawa-ku  
Tokyo 141  
Japan  
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### Enterprise Wireless Technology 2002

2-3 October 2002, Olympia 2, London

Enterprise Wireless Technology is the UK's first dedicated wireless exhibition for business, featuring the World's leading wireless vendors and a cutting edge free conference programme focused on hot topics such as creating real business value from wireless, security, emerging standards, and key implementation issues. Enterprise Wireless Technology 2002 (EWT) exhibitors will demonstrate in a "hands on" environment the latest wireless solutions that will deliver benefit to "the bottom line" by reducing costs, improving efficiency and even increasing sales. They will showcase the architecture, products and services behind real world wireless solutions and the technology needed to develop successful mobile strategies. The event will encompass all wireless networking technology and specifically looks at how they will interface with network based GSM / GPRS / 3G / WLAN services to deliver mainstream applications across generic PC/phone/PDA based platforms. Exhibitors include PDA and device manufacturers, network hardware vendors, software and application providers, service companies, the major networks and implementation or integration specialists.

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