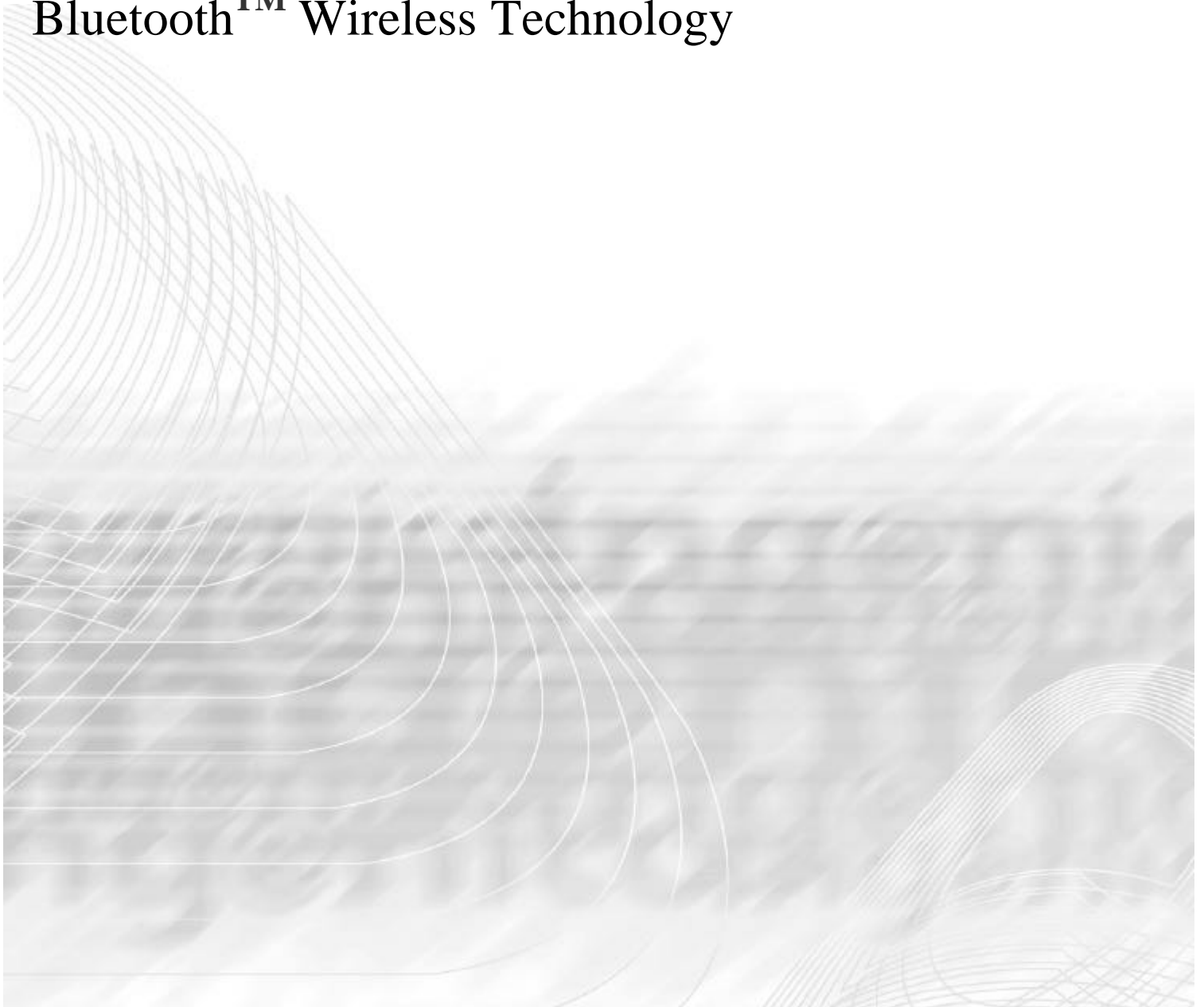


White Paper

Bluetooth™ Wireless Technology



World leader in secure financial transaction solutions

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Bluetooth Wireless Technology

WHY BLUETOOTH ?	3
WHAT IS BLUETOOTH ?	3
WHAT ARE THE BENEFITS ?	4
BLUETOOTH AND 802.11 ?	5
CONCLUSION	6



This white paper is designed to provide information on Bluetooth, its benefits and associated payment solutions.

Bluetooth communication has been stirring up peoples imagination in the telecommunications arena for some time. Excitement is growing regarding the possibilities for this revolutionary new 'wireless' technology and this is now filtering down to terminal developers. Naturally, Ingenico is pioneering this communications revolution within the payments market.

WHY BLUETOOTH ?

In 1994, Ericsson initiated a study to investigate the feasibility of a low-power, low-cost radio interface between mobile phones and their accessories. The aim was to eliminate cables between mobile phones and PC cards, headsets and desktop devices...

In 1998, The Bluetooth Special Interest Group (SIG) was formed. Inaugural members include:



The Bluetooth SIG defines and promotes the technology and its market adoption. About 3000 companies joined the SIG - Ingenico has been a member since early 1999.

WHAT IS BLUETOOTH ?

The theory is simple: Bluetooth wireless technology will eliminate the confusion of cables, connectors, and protocols which confound communications between today's high tech products. Essentially, it is a short range RF transmission standard that provides a common structure for communicating across product platforms. It uses the license-free 2.4 GHz band and is a universal, royalty free, open standard and worldwide available.

Bluetooth overcomes standard RF limitations by employing spread-spectrum encoding that uses multiple carrier frequencies to transmit data. More precisely it uses **frequency hopping**, a specific form of spread spectrum that goes through a sequence of frequencies, transmitting parts of the message on each frequency.

→ Bluetooth brings radio performance and security

The Bluetooth standard uses different profiles, which together with the basic protocols, make up the guidelines for developers. These **profiles** currently cover applications such as file transfer, cordless telephones, headsets, and LAN access. A specific profile **SRFT** (short range financial transactions) will allow in a near future easy automatic and secured connections between different Bluetooth devices.

Any Bluetooth product must be qualified and pass interoperability testing by the Bluetooth Special Interest Group before it is released.

→ Bluetooth ensures interoperability across different platform products

WHAT ARE THE BENEFITS ?

The potential uses of the technology are diverse. Because Bluetooth solutions enable mobile connectivity and the possibility to link a myriad of devices, the standard has gained widespread acceptance for applications including sharing data among cellular handsets, portable computers, personal digital assistants, consumer electronics and home networking.

Because it uses radio transmission, transfer of both voice and data is in real-time. Major features are:

- Enhanced security of Bluetooth wireless technology compared with current wireless offerings
- High data rates of up to 432.6 Kbit/sec full-duplex is provided. This is at least ten times faster than a typical modem link to the Internet.
- The Bluetooth technology is designed to be fully functional, even in very busy radio environments
- All data are protected by advanced error-correction methods
- It operates in a globally available 2.4 GHz frequency band ensuring communication compatibility worldwide.
- The Bluetooth specification has two defined power levels; a lower power level (0 dBm) that covers smaller areas within a room (10m), and a higher power level (20 dBm) that can cover a medium range, such as within a restaurant (200m).
- The Bluetooth wireless technology is particularly adapted to personal area networks, allowing up to eight devices to communicate together. The devices can be linked into a "piconet." To regulate traffic on the channel, one of the participating devices becomes the "master", while all other units become "slaves." With the current Bluetooth specification, up to seven slaves can simultaneously communicate with one master.

→ **Bluetooth is an optimised radio solution**

BLUETOOTH AND 802.11 ?

Both technologies operate in the 2.4GHz band.

As a result, many people are worried that the two systems would clash when used in close proximity or compete each other.

In reality, Bluetooth and 802.11b are different types of wireless connectivity products that serve different needs and markets. WLAN 802.11 technology is ideally suited for campus area private networks or for high speed public access in "hot spots" for professional users needing fast access to corporate networks from their laptops. Bluetooth is more suited to supporting personal networks of portable devices such as payment terminal, bare code reader, mobile phone...

WHY THE PAYMENTS INDUSTRY BELIEVES IN BLUETOOTH ?

Bluetooth is a **highly secure** radio technology, well suited to transmit confidential data:

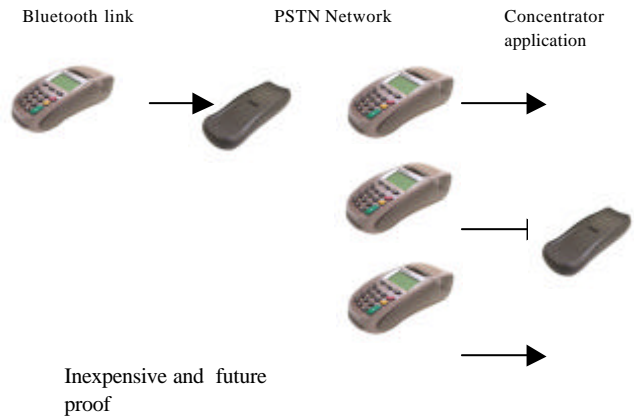
- Each Bluetooth address is unique
- Changing 'channel' 1600 times a second makes eavesdropping difficult.
- You can choose the remote device you want to connect to
- You can request authentication through a remote device (exchange of secured link keys) using PIN verification (up to 16 bytes)
- All transmitted data is encrypted.
- With a Security Manager system, access can be limited to authorised devices only
- The security can be increased at the application level

The benefits of using Bluetooth in the payments industry are huge . In some businesses, advantages of Bluetooth technology are clearly identified . Below are mentioned some examples.

Restaurants:

- With Bluetooth, one single phone line can be used for up to 7 terminals, thus saving money for the merchant.
- When different terminals are connected to the same base, Bluetooth limits bottle necks as all devices can communicate simultaneously to the base.

- Bluetooth broadens the scope of applications. It allows for example the waiter to take menu order directly on the terminal and transmit the information in real time to the kitchen on a Bluetooth printer or device.

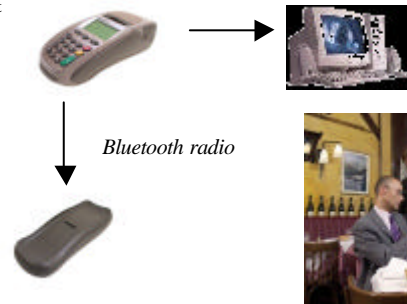


Taking orders

Bluetooth radio Link

Menu ordering

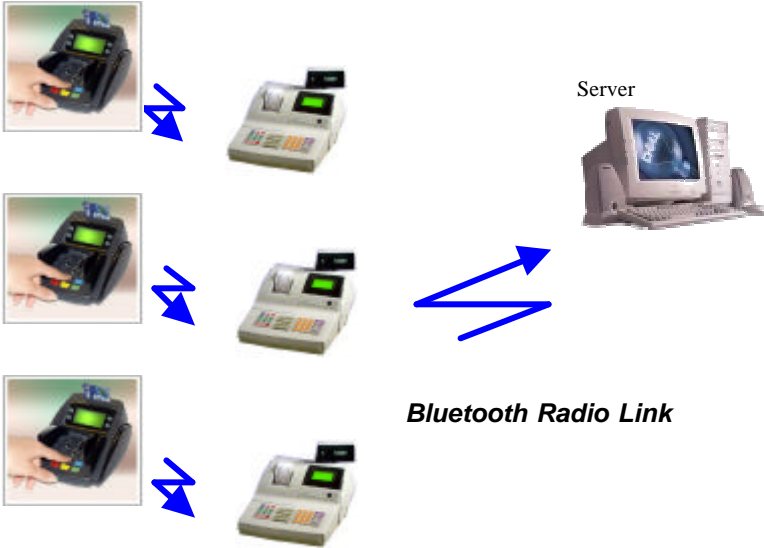
Payment



Retail:

Cables are no longer required. Very high flexibility in location of points of sale.

- Bluetooth will enable users to connect to a wide range of devices such as PIN Pads and cash registers
- Service is simple and easy, with no more wires to connect or buy – installation and maintenance couldn't be easier.
- It allows very quick installation of additional points of sale as well as a high flexibility in location of existing ones
- It is a low cost solution compared with other RF transmission solutions.



Merchant on the move:

- On-line transactions can be made through a Bluetooth mobile phone thus providing a flexible and inexpensive solution for merchants on the move (one SIM, one subscription, one bill)

Virtual Card Payments



Soon, you will be able to use your Palm or mobile phone to make (secure point of sale) transactions as you would with a standard credit or debit card. Typical application for SRFT profile.

CONCLUSION

By allowing different types of devices to communicate easily and instantly together, Bluetooth broadens widely the scope of applications and opens up new markets to the payment industry.

It will also help reduce approval costs, development costs and costs of use whilst improving the performance of portable devices.

For more information on this technology, contact:

Yann Levenez
Wireless Technology Manager
Ingenico Group



Ingenico Group

9, quai de Dion Bouton

92816 PUTEAUX cedex – France

Tel : 33 (0)1 46 25 82 00 - Fax : 33 (0)1 47 72 56 95

www.ingenico.com



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