

The International Publication for DECT Markets, Applications, and Technology

The DECT Forum Mission

DECT Forum is an international organization formed by leading telecom operators and manufacturers. DECT Forum has representatives in all the major geographical regions.

DECT Forum provides a unique platform for the exchange of experience between users, operators, regulation and standardization bodies to ensure the sustained growth and acceptance of DECT worldwide.

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EDITORIAL BY PETER BERWING, DECT FORUM CHAIRMAN

DECT – Well positioned for the future

Mobile communication is rapidly moving forward. More than 500 million users are expected to use mobile devices by the year 2000. The demand for mobile data and multimedia communication is tremendously growing. Third generation mobile systems are in the final definition phase for release 1 and intended to provide new capabilities and services to cover the increasing needs on a global level.

What is the role and future of DECT in this field of competing solutions?

DECT has proven its competitiveness in a variety of applications (e. g. WLL, Multicellular Business Systems, Residential Cordless, Data Links...) with nearly 40 million terminals in use today. The recently introduced Onephone service gives evidence of the DECT value in real Fixed Mobile Environments. This all keeps DECT in the position of the most successful digital cordless technology.

To ensure continuous growth for DECT and to secure coexistence with upcoming 3G technologies and systems, DECT Forum and ETSI Project DECT decided jointly to submit DECT as a candidate for ITU's 3G radio technologies contest. It was no surprise that it turned out after several steps in the evaluation process, that DECT fulfils all requirements for the 3G radio specification. As a consequence DECT is now considered as one out of five options for 3G systems.

In parallel DECT has been accepted as a bearer for WAP (Wireless Application Protocol), included as a basic technology for Voice over IP applications (TIPHON) and introduced as suitable technology for the 2.4 GHz ISM band (WDCT, USA). The definition of a flexible and powerful packet radio data profile (DPRS), providing interoperability based on a set of essential functions is in the final development process. Based on this progress DECT is now well positioned to serve today's and future needs in the area of Wireless Internet Access, Multimedia Communication and new applications like e-Commerce. Investing in DECT creates the opportunity to benefit immediately from a successful and future proof technology.

To see and hear more about all these developments you are invited to meet the DECT Forum representatives during Telecom 99 (ETSI booth 7142 Hall 7).



THE GROWING IMPORTANCE OF DATA APPLICATIONS IN OUR WORLD

DECT Is Data Driven

As the telecommunications world becomes more competitive, it is clear that data is having an increasingly higher profile in our lives. All the telecom operators already see that the level of data traffic on their networks is increasing, to the point that in some countries, data traffic exceeds the level of voice traffic in the network.

At the same time, wireless access to communication networks is becoming more and more important, to cater for the need for mobile communication anytime and anywhere, and/or to provide a cost efficient alternative to installing a cable network.

DECT Data Applications for the Home/SO-HO Environment

The home market is very diverse, with an ever-increasing set of requirements and applications. The most fundamental of these is convenient con-

nection of the PC and modem to a telephone line without running cables. The most sophisticated is a fully cordless communications system linking together many devices in the home.

For the home environment, the main data applications that are foreseen are

1. Cable replacement, either between telephone and modem, modem and PC or between any piece of communication and/or data equipment.
2. Mobile Internet Access (mainly through PSTN or ISDN, but also other Public Networks, like CATV).
3. Networking to exchange information between electronic devices without additional cabling. Some example devices: (Video-)telephones, PCs or Laptops, PDAs, Security devices, Printers, Fax, Cameras, etc.

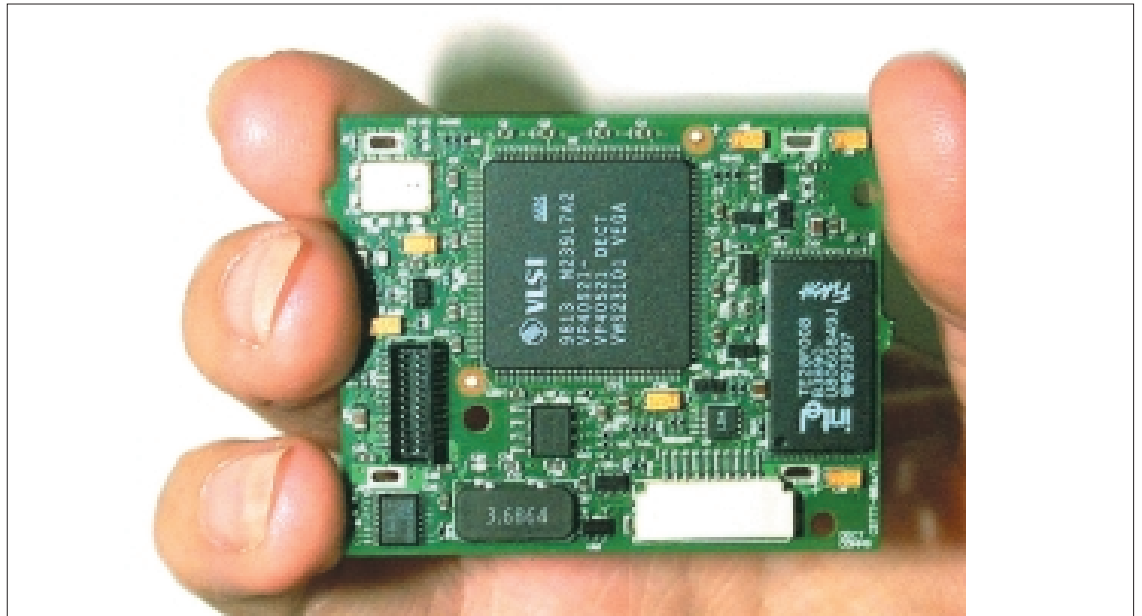
In the home environment, the main selling points are avoidance of cable installation, and the convenience of not being attached to a cable for mobile devices (personal mobility). The offered solution must

be easy to install and easy to use. The interface to the public environment (Internet Access) is very important. The maximum possible bit rate is also a relevant factor; the user wants to get the same performance as with a cable. A major requirement for the home environment is low cost, especially for consumer (non-SOHO) products.

DECT Data Applications for the Business Environment

In the enterprise environment, those applications are relevant where access to information or communication is required for on-site mobile employees. The attainable bit rate is often less important in this case. Reduction of cabling costs is another selling point for wireless solutions in the enterprise environment. Additionally, Mobility functions allow the users to roam over multiple locations using one single handset. In this case, cost and performance are the relevant factors in the decision making process when comparing with wired alternatives.

- Short Messaging Services, to send notifications or reminders to mobile employees
- Web Browsing (Internet/Intranet Access), to provide for example access to corporate information sources
- Synchronisation (agenda, e-mail, etc on for example a PDA)
- Access to (electronic) mail while on the move
- Hospital Applications. Patient information can be retrieved or entered at bed side.
- Hospitality Applications (order entry, access to guest information, access to tasks that need to be carried out). Hotel employees are by nature of their jobs highly mobile – by providing electronic access while mobile, many jobs can be streamlined or carried out more efficiently.
- Point-of-sale (POS) Applications (order entry, credit card processing, checking available stock). Examples are the restaurant business, where by reducing the distance and time that employees need to walk, employees can work more efficiently.



Data Module as being implemented in current product

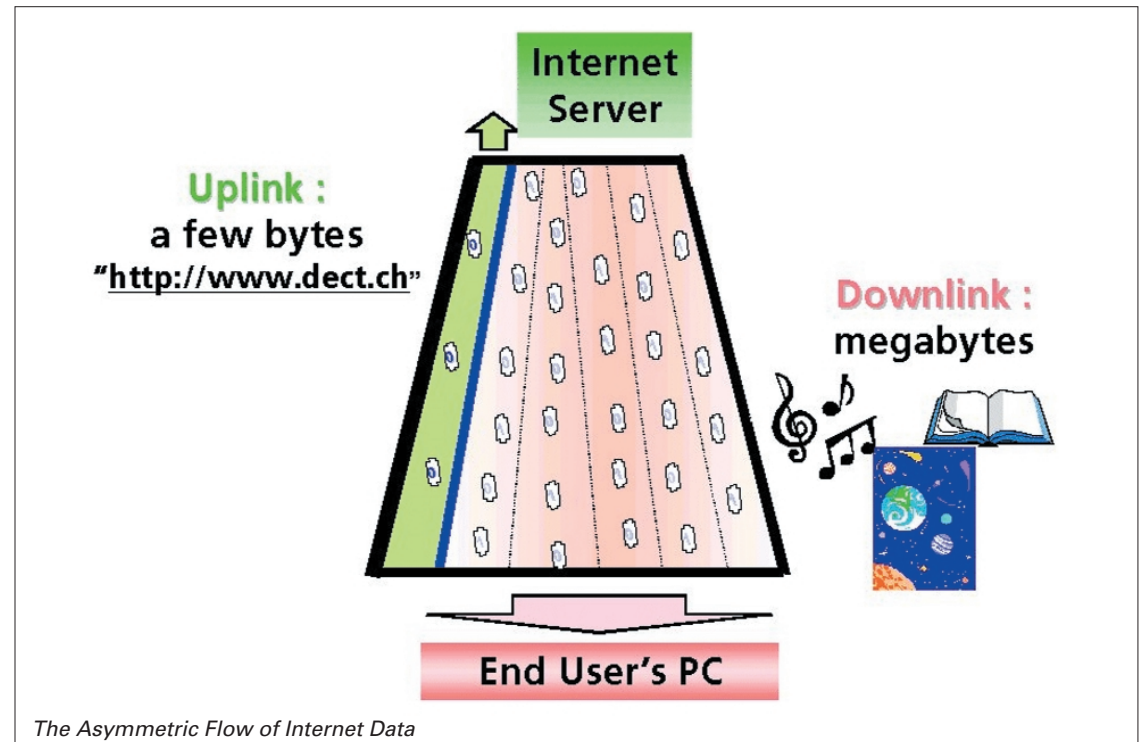
Since there are a number of alternative wireless data technologies available (like IEEE 802.11 WLAN), one of the main selling points for DECT data services will be to re-use the DECT voice infrastructure for offering (additional) data services at a low marginal cost.

The DECT infrastructure provides excellent indoor coverage, also for very large areas due to the large coverage of a single cell and the large amount of cells that can be supported in a system.

In general, the main applications revolve around access to corporate IT resources while on the move and/or (temporary) stationary on the company premises. The applications are less cost sensitive as compared to the home/SOHO environment, since improving the main business processes in the enterprise usually drives them.

For the enterprise, a wide range of potential data applications exists. Some example data applications are:

- Inventory Applications (bar-code reading, etc). By updating stock information real-time, significant savings can be achieved by reducing the inventory. Other examples are dispatch display on forklift trucks, order picking information, etc. For order picking applications, voice assistance can be useful so that the employees can keep their hands-free for handling the goods.
- Production Process Information Retrieval Applications For example, a service engineer in a factory needs to get access to the central control application to retrieve some process parameters.
- Security Applications. For example for transmission of alarm messages (fire alarm, machine break-down, etc) to mobile employees.
- To provide a data communication service between data equipment (for example, to connect a temperature controller in a factory to a PC)
- To set-up a temporary workplace with access to the corporate intranet



Security of the wireless connection has to be achieved, since a lot of these applications transmit sensitive business information. Important for DECT market development of these applications is that the terminal equipment providers for these markets can easily integrate DECT technology in their terminals, or use standard modules like PC-Cards. Physical interfaces and software drivers therefore have to adhere as much as possible to what is used in this industry.

Although there are differences in the applications importance for the Enterprise Environment, and some of the above applications are only relevant for specific market segments, there is no single 'killer' application for data in this environment, and for all enterprise applications a certain market demand exists. Furthermore, for the more 'specialised' data applications, terminal vendors do not want to make separate products for different manufacturers cordless networks, and air-interface interoperability is critical for market success. As a consequence, interoperability based on a limited set of features is needed to achieve sufficient economies of scale, and an acceptable cost level.

DECT Data Applications for the WLL Environment

The massive adoption of the Internet worldwide places new demands upon access networks, both wired and wireless, which must now transport both voice and an increasing volume of data.

In the WLL world, only the most advanced digital technologies will be able to take up this challenge, and DECT's present and future data transmission capabilities position this technology as a prime choice for operators.

Much of DECT's success in WLL has been because operators have perceived DECT as a technology capable of fulfilling their subscribers' requirements

with the appropriate services, at the appropriate time, and at an attractive price.

As data continues to play an increasingly important role in our lives, primarily through the Internet and its key applications, e-mail and the World Wide Web, populations worldwide are demanding fast and inexpensive access methods.

Today over 90% of Internet users worldwide employ dial-up connections and analogue modems (designed to offer between 28.8 – 56 kbit/s) to go online. In many areas, the transmission speed is well below these levels, because of the poor quality of the copper lines, and here, DECT WLL systems enable operators to offer their subscribers a higher level of service over a wireless interface.

For those subscribers requesting even faster transmission rates, DECT offers 64 kbit/s or 128 kbit/s ISDN services. These services are of particular interest to SMEs (Small Medium Enterprises) and SOHOs. (Small Offices or Home Offices).



**DECT FORUM
Communiqué**

Convinced of the value and suitability of the DECT standard for the WLL application, and given the huge market potential world-wide (over 100 million lines needed as per ITU March 98 estimates), leading companies are investing in this new technology despite the competition of other radio technologies existing in this market.

With more than 3 million lines contracted in the last two years, and DECT technology being accepted in over 100 countries throughout the world, DECT has rapidly conquered over 30% of the WLL market, thus becoming the WLL leading technology adopted and deployed worldwide.

In some cases, however, for some suppliers, the sales did not take off quickly enough to generate the revenues necessary for further developments and led them to recently restrict their DECT offer.

Nevertheless, as a result of major contracts developed and commissioned at an early stage, other suppliers can offer field-proven DECT solutions for WLL application, and with the ongoing development of new products, DECT WLL will continue to expand.

Suppliers are developing enhanced DECT based systems to meet the new services required by the end-users such as access to the Internet, ISDN transmission, etc. In particular, the latest developments of the ETSI DECT Standard on data handling capabilities (up to 2 Mbit/s packet data) have led many manufacturers and DECT Forum members to launch innovative services suitable for 3G applications.

This has resulted in a proposal to ITU-R to accept DECT as one of the technologies for the terrestrial IMT-2000 air interface.

The requirement to support continually higher data rates suggests that the introduction of packet technologies over WLL radio interfaces will become commonplace in the next few years. Instead of connecting only to traditional circuit switches, we are likely to see WLL systems directly interface to IP routers as well. It is the ability of DECT's packet technology to increase the sharing of radio resources, particularly useful in handling bursty data, which drives the interest in applying this technology to WLL. With increasing deregulation, incumbent as well as new operators may seek to provide both circuit switched telephony services as well as packet switching for services such as Internet access.

With the Internet as a major instigator of the requirement for high-speed data access, it is interesting to note the asymmetric nature of most Internet data exchanges. Today an Internet web user typically sends a relatively small amount of data in the uplink (PC to ISP) direction. This might consist of a

few mouse clicks or the typed entry of a web address such as <http://www.dect.ch>. The response in the downlink direction (ISP to PC) is often a large amount of text, graphic, audio or video data, such as the display of a web page with complex graphics. Thus the flow of information in user access to the Internet is commonly quite asymmetric in nature.

Radio technologies that can dynamically adapt to asymmetry have a distinct advantage over those that do not. In particular, if the duplexing of two-way communications is achieved by means of time division duplex (TDD), it is significantly easier to adjust to asymmetry in real time than with frequency division duplex (FDD). Using TDD, DECT offers a large degree of flexibility.

DECT WLL is currently able to offer bitrates of up to 512 kbit/s, and with the developments in the ETSI Project-DECT standards activity, 2 Mbit/s will soon be possible.

NEW PACKET RADIO PROFILE ALLOWS FOR INTEROPERABILITY

Standardizing For DECT Data

One main argument for interoperability is the wide variety of vendors in the data world (e.g. for Computers, Personal Digital Assistants and Computer Peripherals today).

Air-Interface Interoperability

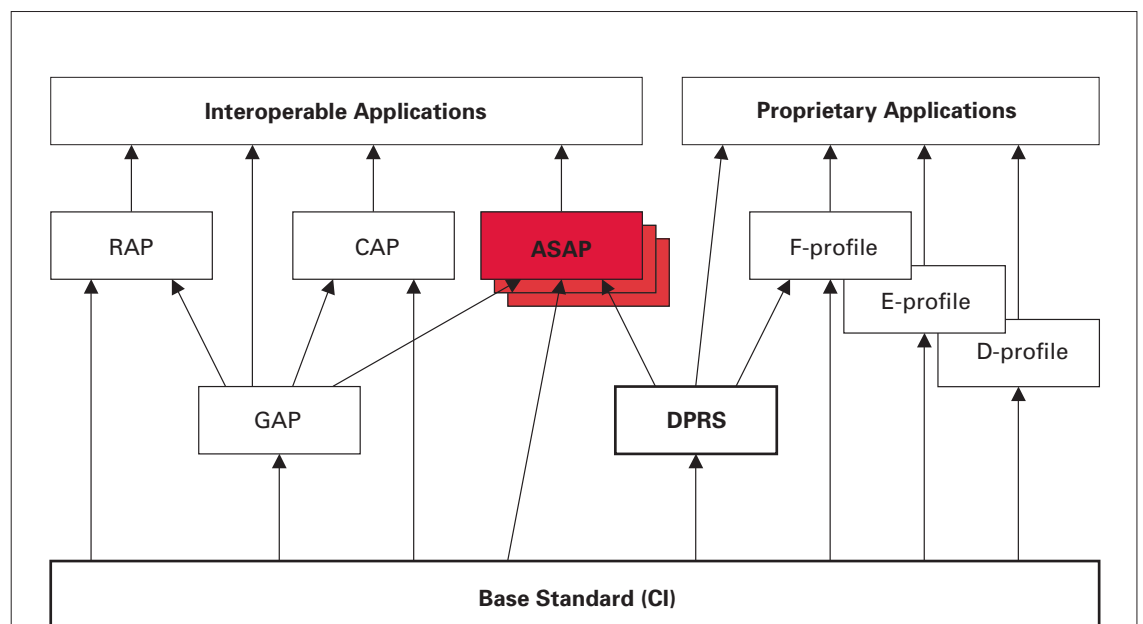
The customer wants to have free choice between different applications, functionality's or even designs, therefore he wants to select and combine equipment from different vendors, which is only possible if air-interface interoperability is given.

Another main argument for interoperability is for applications where two (or more) equipment vendors with a different competence are needed to provide the complete solution, and where it is impos-

sible or not desirable to use an alternative (wired) interface based on open standards. For example, for Point-of-sale terminals, where the DECT portable part needs to be integrated with the terminal, there are no vendors on the market today that can provide both the complete terminal/POS application and the DECT multi-cell infrastructure – for this type of applications, air-interface interoperability is a strong must for market take-off of DECT data products.

Other arguments for interoperability are that open standards create confidence with the customer that their investments are future proof and it allows for a platform for joint promotional activities.

For all the above data applications, interoperability is seen as an important factor, to gain sufficient



DECT Data Standards Structure

industry support from both the DECT-voice application vendors, and data terminal vendors, to build confidence with the customer, and to reach sufficient economies of scales. To create the largest economies of scales, it is required that products can be used in both the home and the enterprise environment, and can be used for multiple applications. Without interoperability, there will be almost a limited market for DECT data applications.

DECT Data Standards

To cater for the different requirements that the above data applications impose, a range of data standards has been devised by ETSI. They can be divided into three categories:

1. Packet oriented radio standards, like the DECT Packet Radio Services (DPRS), and DECT Multimedia Access Profile (DMAP). In this case data is transmitted in packets over the air-interface. Packet radio has the advantage that in case of multiple users or multiple services, the information can be transmitted more efficient over the air-interface. Since air-interface resources are scarce, and most of the data communication (like the Internet) is packet oriented, these standards are seen as the most important candidates to provide above data services. With the DPRS, DECT cordless is able to offer data speeds currently up to 552 kbit/s, and with the developments in the ETSI EP-DECT standards activity, 2 Mbit/s will soon be possible.
2. Connection oriented radio standards, like the D2 profile. The D2 profile offers a 32 kbit/s unrestricted connection oriented isochronous data communication service. The D2 profile has the advantage that it resembles very much the (connection oriented) voice services of DECT, and is easy to construct, but is less efficient in a multi-user / multi-service environment than a packet radio service.
3. Low speed radio standards, like the E2 profile and CTM Feature Package 2. These profiles have been designed to provide a low-speed data service. They can for example be used to transmit text messages to a cordless phone.

The EP DECT activity within ETSI is currently completing the DPRS and DMAP standards. These standards have attracted recently a lot of attention from the industry, since they are seen as key to provide interoperable packet radio services with DECT.

The DPRS standard is intended to replace all existing A, B & C packet data standards, and to provide the full set of packet data services offered by the current standards with simplified and better aligned description and CI features usage.

The DPRS is designed to form the basis for all interoperable packet radio services that can be offered over the DECT air-interface, regardless in which application area (home/SOHO, enterprise, public) the product is used, and therefore will contribute significantly to the required product synergies to make the DECT data market a success.

The DPRS offers a minimum mandatory interoperable service, so that low-cost devices can be constructed where needed, and yet also provides possibilities to construct more expensive (high band-

width and fast response time) devices with the same standard.

The DPRS provides basic interoperability for a number of packet data radio services or interworking scenario's, which are all based on the same frame relay service. The two most prominent in these are Ethernet interworking, for connecting to an Ethernet or IP networking, and V.24 interworking. DPRS devices that work with the same interworking scenario will be interoperable and able to communicate with each other, regardless of which manufacturer constructed the device.

The DMAP standard that builds on top of the DPRS, GAP, and the DECT Common Interface, and which describes a more specific set of multi-media services for the Home/SOHO environment. It is the intention that the DMAP will be the first of a new category Application Specific Access Profiles (ASAP), based on GAP and DPRS, with the objective of developing application orientated standards, guaranteeing interoperability of equipment offering multiple DECT services.

In addition to the DPRS and DMAP, EP DECT is working on an update of the D2 profile, which provides a connection oriented data service.

For low bandwidth messaging applications, the E2 profile (which provides a low bandwidth bearer service) has been available for some time now. EP DECT has also recently created a new standard, CTM Feature Package 2, which describes how to build SMS services for transmission of short text messages on top of E2.

Conclusion

Beside the pure voice telephony application offered by DECT, which dominates the cordless access markets today, data applications are seen as an evolving market segment.

The DECT market continues to grow, and with the finalisation of important standards such as the DPRS (DECT Packet Radio Services) and the DMAP (DECT Multimedia Access Profile) future integration of interoperable packet data services will be supported. In a world that increasingly uses the Internet as a basic tool, and where wireless connectivity is a common feature of many electronic devices, cordless technologies are able to deliver many of the expectations of the emerging wireless data communication market, including interoperability between devices of different manufacturers.

FORUM MEMBERS

New Full Members

Binatone, Hong Kong
 Canon Research, Cesson, France
 Dosch&Amand, Munich, Germany
 Symbionics, Cambridge, U.K.

New Associated Members

Silicon&Software Systems, Dublin, Ireland

See <http://www.dect.ch> for a complete list of DECT Forum Members

News on Standards

ITU

IMT 2000: TG 8/1 meeting in Beijing June 99 confirmed DECT Radio Interface for IMT 2000 (IMT.RSPC)

ETSI – EP DECT

DECT standardization to provide new data capabilities:

- New edition of DECT Packet Radio Service (DPRS) using a higher modulation level
- New standard for Multimedia in Radio Local Loop Access (MRAP)

ETSI – WG TM4 (Transmission & Multiplexing)

TM4 ETSI standards relate to Fixed Service Radio Systems both Point-to-Point (PP) and Point-to-Multipoint (PMP): studies on systems sharing conditions in compliance with FDD and TDD duplex arrangements are initiated in the frame of 3G.

DECT AND IMT-2000

DECT Is Future Proof

Following a joint decision between DECT Forum and ETSI EP DECT Digital Enhanced Cordless Telecommunications (DECT) has been proposed as family member of International Mobile Telecommunications 2000 (IMT-2000). The proposal was evaluated by the International Telecommunications Union (ITU) together with external bodies and it has been confirmed by the ITU-R Task Group 8/1, that DECT fulfils the service requirements of IMT-2000. Therefore DECT has been included as one of the air interfaces of IMT-2000.

IMT-2000

IMT-2000 is an initiative of the ITU. It will provide wireless access to the global telecommunication infrastructure through both satellite and terrestrial systems, serving fixed and mobile users in public and private networks. The goal is to have the IMT-2000 radio specifications approved at the end of 1999.

Why Has DECT Been Proposed as Family Member?

When looking at the wide scope of IMT-2000 and the different required operating environments, it quite early became clear, that it will not be possible to cover everything with one single air interface. Secondly backward compatibility to existing systems was requested, in order to be able to reuse part of the huge investments that have been made for the systems, which are operating today. Therefore

in spring 1998 ITU adopted the family concept, defined as a federation of systems providing IMT-2000 service capabilities to users of all family members in a global roaming offering.

At the World Radio Conference in 1992 the frequency bands for IMT-2000 have been identified as summarised in the table below:

Frequency band [MHz]	Radio interface type
1885 – 1980	Terrestrial
1980 – 2010	Satellite
2010 – 2025	Terrestrial
2110 – 2170	Terrestrial
2170 – 2200	Satellite

As can be seen from the frequency table, 75% of the basic DECT band of 1880 - 1900 MHz falls within the IMT-2000 frequency allocation.

When reviewing the IMT-2000 service requirements it became obvious that they can be fulfilled by DECT. Especially the high degree of flexibility and adaptability requested for IMT-2000 has always been a design goal for DECT. With the introduction of the additional modulation schemas in 1998, DECT can now also support a bit rate of more than 2 Mbit/s on one single carrier.

To summarise, as DECT is already operating in the IMT-2000 frequency band and supports the requirements of IMT-2000, DECT has been proposed and accepted as a family member of the IMT-2000.



What does DECT add to IMT-2000?

DECT is especially designed to support license exempt operation of uncoordinated systems. The instant dynamic channel selection avoids the need for frequency planning and guarantees together with fast and seamless handover optimum quality of the radio connection. The TDMA operation avoids the near-far problem and intra-cell interference, resulting in increased capacity. One prime objective of DECT is to allow for very low cost implementations and products with very low power consumption.

All the other air interface proposals for IMT-2000 are mainly targeting public systems operating in a frequency band that is licensed for one specific system. The DECT interface is complementary to the other air interfaces and forms one building block of the IMT-2000 family that helps to completely cover the wide scope of IMT-2000.

The next steps

ITU-R is now completing the recommendation for the detailed IMT-2000 radio interface specifications. ETSI Project DECT is supporting this effort by providing the relevant DECT information to TG 8/1. The latest revision of the DECT base standard EN 300 175, which contains the high bit rate option for DECT has successfully passed the public enquiry process and should be published in the third quarter of 1999, well ahead of the ITU-R target date. The approval of the recommendation for the detailed IMT-2000 radio interface specifications is planned for November 1999.

In parallel to ITU-R, ITU-T is working on the network-related standards. ITU-T plans to approve the requirement specifications end of 1999 and the protocol specifications end of 2000.

A more detailed version of this article is available at <http://www.dect.ch>

BENEFITS OF DECT IN BUSINESS

DECT Is Customer Driven

Companies considering a new internal communications system today increasingly look at the possibilities of DECT business communication to improve their daily operations. Where in the early days of DECT only the truly mobile employees were considered to get a mobile telephone, today the benefits of cordless telephony are recognised for large groups of employees.

The following case study represents a large PBX installation over multiple sites and making extensive usage of DECT telephones.

The customer imposed the highest possible quality demands on the communication.

"Service is the key objective. This is being achieved with the shortest possible waiting times and the highest possible answer rates. And this communications system is helping them to realise these objectives." The company has been using the DECT installation for just over a year now with 850 users on three different locations.

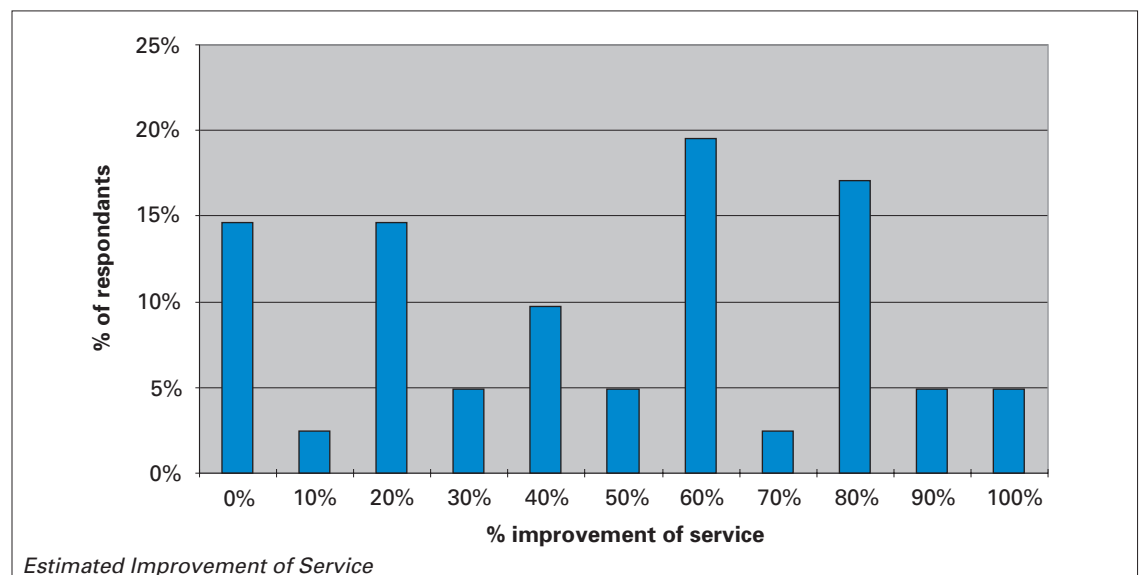
The DECT network covers all the buildings and the entire grounds around each site including parking areas with a total of more than 350 basestations.

The DECT telephones are used by all kinds of staff, especially managers, engineers, secretaries, technicians, service staff and others who are mobile during their daily work.

The reasons for selecting a DECT network were many:

- Improve service level
- Improve accessibility
- Reliable cordless technology
- Capable for multi site operation

The customer has recently evaluated these criteria with the users of the DECT telephones, and the results of one of these evaluations is shown in the following picture:



The graph shows that the majority of users experience that they provide (and receive) much better telephony service with the DECT system today compared to the previous wired telephone system.

All together the DECT installation has proven to make up its promise.

DECT/GSM INTEGRATION

BT-Cellnet's Onephone

A GSM/DECT dual mode phone allows people to be reachable anywhere, anytime, with a single phone. It provides excellent speech quality, whatever the location. The dual mode phone can automatically connect to the nearest DECT network it is subscribed to, saving money on mobile phone calls and increasing talk/standby time. And when out of range of a DECT system, the dual mode phone switches automatically to the GSM network giving all the advantages of mobile communications.

BT is the first operator that has launched both a consumer and a business solution based on the GSM/DECT dual mode phone.

BT Cellnet's Onephone, launched mid-May, offers a single handset that is a cordless digital phone at home and a mobile phone when you are out and about - all through a single number. Not only does Onephone switch automatically between home and mobile mode but also calls to the BT Flexinumber are automatically directed to the Onephone handset in either mode.

Onephone means that you only need have one phone with you - around the house or out and about - and a BT Flexinumber means that everyone only needs to remember one number. The Onephone handset is easy to use in either home or mobile mode and you always have the enhanced functionality of a mobile handset.

Mid-June BT launched another innovative new communications service in the UK called Corporate Onephone. BT describes the new communications service as the world's first combined DECT and GSM solution for larger organisations. It is intended for companies with one or more sites, and 120 or more staff requiring mobile communications.

The Corporate Onephone concept combines the advantages of wide-area GSM coverage and on-site DECT coverage to deliver calls to users via a single handset and a single number.

On site, a single mode (DECT) or dual mode (DECT/GSM) handset acts as a wireless extension to the company PBX. An on-site DECT wireless office network allows users to move freely about the company premises, with all incoming and outgoing calls passing via the company PBX. Users can roam anywhere in the site, while maintaining communications contact. All main PBX functions, such as call transfer and abbreviated dialling, are available.

Only when staff move off the site do the dual mode handsets switch to GSM mode, and incoming calls to the user's personal number are automatically routed to the handset via the GSM network.

This development is of special interest to companies with staff who spend a lot of time away from their desk, on or off site. It is also a service that meets

the more flexible working practices that are emerging: for example staff who spend part of their week working from home. Another benefit is that calls made on-site are free as they go via the DECT cordless network.



"Companies introducing this Corporate Onephone communications concept will get a range of benefits. Communications efficiency will be improved because calls will reach staff even when they are not at their desks. This means there is less time spent playing 'telephone tag', less need to return calls, and less need for voicemails," said Peter Richardson, Director of BT's Corporate Mobile Solutions division. "In addition, there are significant savings on the costs associated with any moves or changes within the company."

BT was first to introduce this product but now other operators are investigating to offer similar service (e.g. Deutsche Telekom).