

It is rare for people to associate a specific item with the abbreviation used for a form of telecommunications. DECT is an exception: For most people, it means cordless telephones. There is more to it than that, however. In fact, one of the first uses was for a wireless LAN that could operate at a data rate of 552 kbit/s. This article shows why DECT is experiencing such popularity and the meaning behind the name.



DECT – Technology On The Road To Success

The beginnings

Digital Enhanced Cordless Telecommunication (DECT) is a digital communications method that was standardized in 1992 by the European Technical Standards Institute. At that time, a generally-applicable, comprehensive technical standard was badly needed because the regulatory authorities were practically unable to control the widely differing types of cordless telephone then being introduced to the market. Particular problems were caused by the low security against eavesdropping and the use of restricted frequency bands.

What's the advantage of DECT?

The most important innovations resulting from the DECT standard were:

- Improved transmission quality using digital techniques, interrupt-free handovers and ISDN voice quality
- Data encryption for high security against eavesdropping
- High data transmission speeds: Up to 2 Mbit/s available soon!
- Error detection and correction facilities such as CRC, ARQ and FEC provide high data security
- Comprehensive interworking facilities with other networks: ISDN, X.25, LAN, GSM
- Can be used for voice, data and multimedia in the private, business and public sectors
- Operation of picocellular networks with roaming and extremely high user densities: 10000 "talkers" per square kilometer possible
- Standardized radio interface
- Dynamic assignment of bandwidth
- Self-organizing: No frequency planning needed

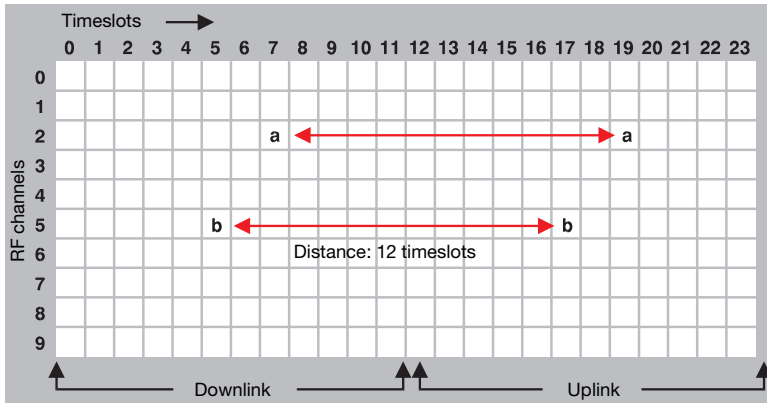
How is this realized?

The DECT standard (ETS 300 175-1 to 8) primarily defines the parameters for the air interface between the portable part (PP, mobile phone) and the fixed part (FP, base station). Below is a summary of the technical details:

Transmission type:	Digital
Multiplex procedure:	FDMA/TDMA (TDD)
Modulation procedure:	GFSK
Frequency range:	1880 to 1900 MHz (Europe)
Bearer spacing:	1.728 MHz
Duplex channels per bearer:	12
Number of bearers:	10
Total number of duplex channels:	120
Traffic density:	approx. 10.000 erl / km ²
Max. range:	300 m
Max. movement speed:	20 to 50 km/h

Where is DECT used?

Nowadays, most cordless phones operate using the DECT standard. Business use of DECT systems (Business Cordless Telephony, BCT) is enjoying growing popularity. Many companies have built up complete corporate networks using DECT technology. The main advantage of this is that one and the same portable phone can be used anywhere on a given site *and* on any other site, thanks to roaming. The high subscriber densities possible with DECT systems mean that they are also ideal for airports, hospitals and trade fairs, as demonstrated at CeBIT in Hannover every year. DECT is also capturing the public access network sector: Cordless Terminal Mobility (CTM) is the catchphrase for linking users to telecommunications networks via DECT portables. Such networks are already being introduced commercially; FIDO in Italy is just one example.



DECT transmission –
A combination of
FDMA and TDMA.
The total number of
120 channels is given
by the ten bearer
frequencies, each of
which provides twelve
channels per trans-
mission direction.

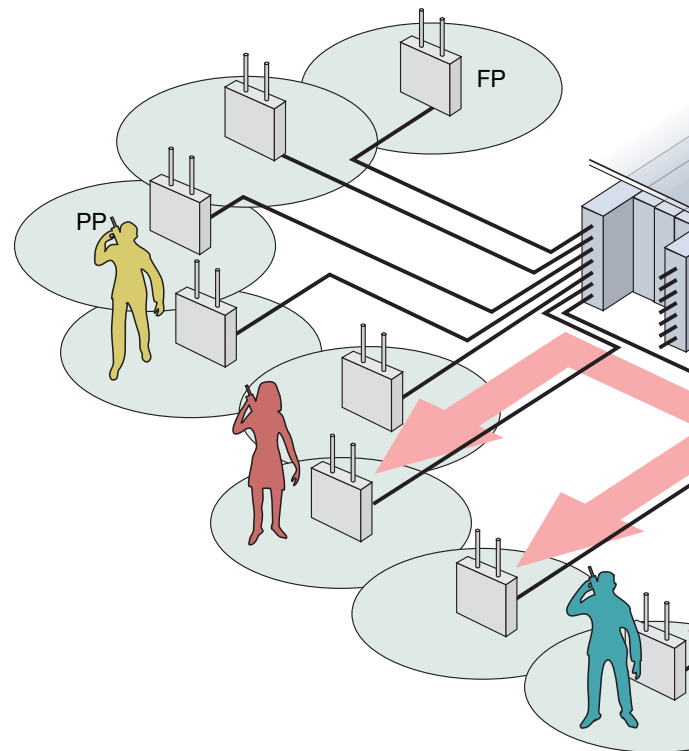
A further use of DECT technology that has made great gains in recent times is the setting up of wireless local loops (WLL). Here, the emphasis is on flexibility rather than mobility, and on the rapidity with which they can be set up, saving costly cabling. This is of particular advantage in inaccessible or difficult terrain. The proportion of the worldwide market assigned to DECT for WLL system contracts during 1997 was 31%. This puts DECT right at the front. Large numbers of these installations are for developing and emerging nations. Metropolitan network providers are also discovering DECT as a useful method of bridging the last mile from the customer to the fixed network. The low costs of operation and maintenance, resistance to environmental effects and simplicity of system expansion are the deciding factors here. DECT is well-suited to data transmission, and thus also provides an alternative to the analog loop in the plain old telephone system (POTS):

Payload data rate/channel, duplex:	
Voice (unprotected):	32 kbit/s (ADPCM coded)
Data, ARQ-protected:	25.6 kbit/s
FEC-protected:	24 kbit/s
ISDN interworking, double-slot format, unprotected:	80 kbit/s
protected:	64 kbit/s
Symmetrical channel grouping, duplex:	24 to 264 kbit/s per bearer
Asymmetrical channel grouping:	24 to 552 kbit/s per bearer

These possibilities mean that many applications for cordless data transmission can be covered:

- Fax (ISDN and analog)
- Internet access for PCs via DECT radio modem
- Wireless LANs
- “Datapoint”: Mobile Internet access at specific crowded centers, e.g. airports and trade fair sites
- Video telephony
- Industrial control, e.g. automated stock control
- Measurement applications for moving parts

**Typical scenario
for business cordless telephony (BCT)
or cordless terminal mobility (CTM)**

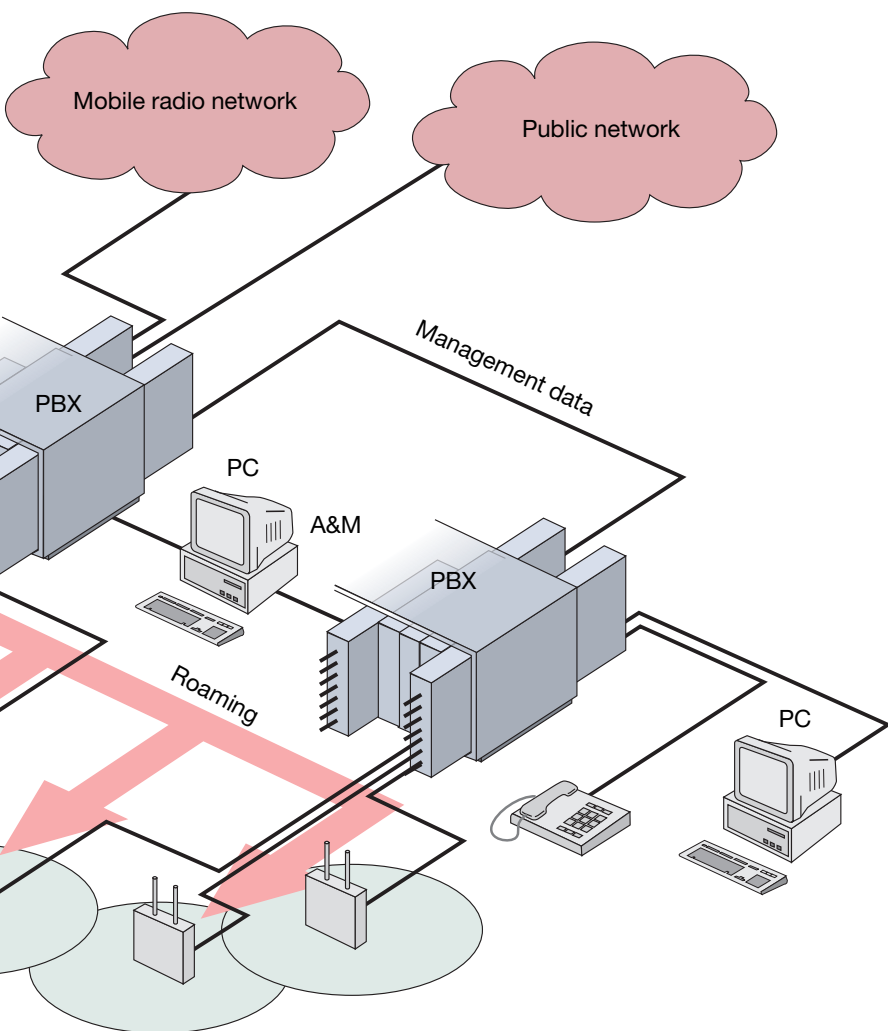


Last but not least, the combined use of DECT and GSM (dual mode) is a promising concept for CTM. DECT CTMs can increase the capacity of a mobile network in areas of high population density. The advantage to users is that the GSM-specific features such as SMS or call redirection can also be used from the DECT portable. A policy of reasonable pricing could provide additional impetus for this development.

What Wandel & Goltermann offers

As an active member of the DECT Forum, WG provides support in the form of professional test equipment for most fields of application. For example: The Wavetek ESP 4032 is for the physical layer (TBR-6/TBR-10). The WG CPM-10 with Fixed Part and Portable Part Monitor and Simulator performs protocol analysis at the air interface. WG also supplies a complete range of test equipment for testing the links between DECT and fixed networks such as ISDN or 2 Mbit/s PCM. You can obtain more information from your local WG sales partner or from our DECT webpage under www.dect.wg.com.

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ADPCM	Adaptive Differential Pulse Code Modulation – PCM with data compression
ARQ	Automatic Repeat Request
BCT	Business Cordless Telephony
CRC	Cyclic Redundancy Check
CTM	Cordless Terminal Mobility – Special type of WLL with roaming facilities
DECT	Digital Enhanced Cordless Telecommunication
erl	erlang; traffic unit. 0.5 erl means that a channel is occupied for 0.5 hours at peak periods.
ETSI	European Telecommunications Standards Institute
FDMA	Frequency Division Multiple Access
FEC	Forward Error Correction
FP	Fixed Part
GFSK	Gaussian Frequency Shift Keying – digital modulation procedure
PBX	Private Branch Exchange
POTS	Plain Old Telephone Service
PP	Portable Part
Roaming	Movement of the PP to another cell (or another exchange) without interruption of the connection
SMS	Short Message Service
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
WLL	Wireless Local Loop