

DECT

Wireless Technology and DECT Density

WHITE PAPER



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Introduction – a summary of DECT

DECT technology has become a popular standard for wireless voice communication. DECT cordless phones and headsets are not likely to be affected by other electronic devices and signals because they operate in a separate frequency-band.

In an office environment, DECT devices can be used alongside Bluetooth devices and WiFi due to the different frequency. Furthermore, DECT technology provides the user with good voice quality and superior mobility with a potential range of up to 100 metres/55 feet or more.

DECT phones and headsets can be used for traditional PBX telephone systems and VoIP-systems. They are preferred by small, medium and large businesses when it comes to achieving a comfortable voice quality and ease of use for employees.

Before deployment various factors should be taken into account. For instance the number of simultaneous users, ways of working, the layout and design of the building, the type of technology in use and the number of devices using the same technology. These variables all influence the range and density of the devices.

About DECT – facts about the technology

When it was launched in the late 1980s DECT was an acronym for Digital European Cordless Telephone. However, with the spread of DECT to new regions and devices the definition was changed to Digital Enhanced Cordless Telecommunications.

DECT is one of the most commonly used technologies for wireless communication and is capable of wirelessly connecting two or more devices over a distance of up to 100 metres/55 feet or more. Due to regulations, the dedicated DECT frequency band in the United States and Canada is slightly different from the rest of the world.

On the European market the maximum is 120 channels whereas it is 60 on the North American market. The total number of devices can be a lot higher than these figures because they depend on the number of simultaneous DECT users.



Advantages

– a comfortable, mobile solution

Mobility, comfort and communication are major factors for staff efficiency and important tools for improving productivity. The ability to use both hands for other tasks and to answer calls when away from a desk can boost job satisfaction and helps to create a pleasant working environment.

Right from the beginning, DECT technology was aimed at voice communication. It has become an industry standard with dedicated frequency allocation and a very low risk of interference from other signals and devices. Furthermore, the audio quality of DECT can be transmitted over distances of up to 100 metres/55 feet or more.

In other words, DECT is tailor-made for a modern office environment and supports the need for a flexible staff that can use the whole office space and meet with colleagues without compromising customer service.

Density

– communication without interference

Density is a keyword when you are planning the deployment and the use of wireless communication technology in the office space. Wireless DECT headsets, for instance, share the radio spectrum available when they are used close to each other. Too many headsets used in close proximity can result in interference.

Because headsets use more transmission power the further they are away from their respective base units, roaming range influences the number of simultaneous users. When roaming range decreases, density increases and vice versa.

Considerations

– regarding the quantity of units

Each system has a fixed number of channels available for DECT devices. Each headset is paired with a base station and the communication is encrypted in order to prevent “listen in” from externals.

The number of channels does not mean that you can always deploy the same number of units in your business. Various factors influence whether you can deploy more or less – the density – and what the range will be. The most important factors are:

- Simultaneous users
- Ways of working
- The office layout
- The environment
- Products deployed

SD Series



DW Series



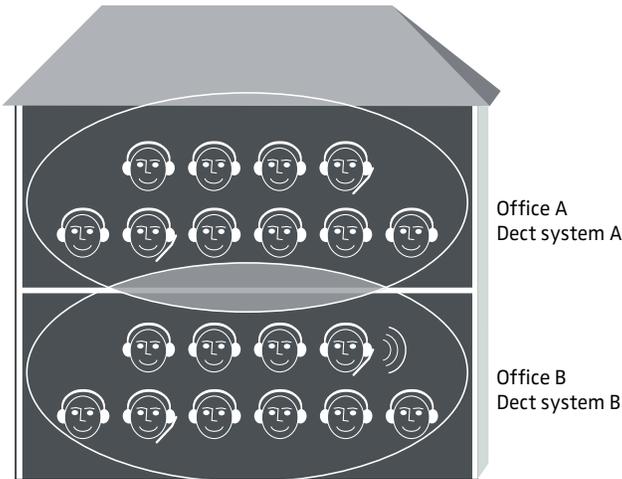
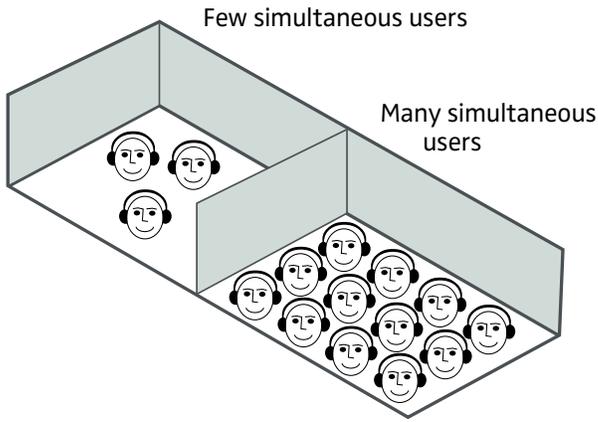
Sennheiser DECT wireless headsets DW Series and SD Series*

Iconic design - crafted for best comfort

Sennheiser professional wireless headsets are the ultimate DECT communication tools. With the focus on ergonomic perfection in wearing style and the well-being of users, DW Series and SD Series* headsets have been specially designed to meet the needs of all-day users and experienced professionals working in noisy environments, where the productivity benefits of switching from wired to wireless can really be appreciated.

The long distance wireless range for Sennheiser DECT headsets is up to 55 metres/180 feet in typical office buildings and up to 180 metres/591 feet in line of sight. Based on the user's preference for wearing style and phone connectivity, there is a wide range of variants to choose from.

**Americas' markets only*



The DECT system in office A can be influenced by the DECT system in office B and the opposite.

Simultaneous users

There is a huge difference from company to company when it comes to call utilization. In some companies only a few employees use the phone at a time whereas the staff of busy contact centres are constantly on the phone. The number of concurrent users plays a large role in determining the number of possible DECT units at one location.

Ways of working

DECT headsets are “intelligent” because they adapt to the usage by deploying different channels and increasing the transmission power the further away they are from their base units. In other words: Office work routines have an effect on the density of DECT devices. The more desk workers who mainly stay at their desks, the more devices can be used simultaneously.

The office layout

Open office space allows radio frequencies to travel more freely than office space with angles, hallways, conference rooms and other obstacles. The physical barriers do not necessarily stop radio signals but they can limit the range and decrease the possible density of DECT units in the company.

The same applies to the types of building materials used. A solid, big concrete wall limits the radio signals significantly more than glass windows, for instance. On the other hand this can make it possible to use more than one DECT system and increase the number of users.

The environment

No company is an island. Often there will be other companies or organizations on the floors above or below. If these neighbours also use DECT technology this may limit the number of units and decrease the range for each user in your company.

Products deployed

DECT is an industry standard and all DECT-products must comply with the relevant regulations and standards. However, there are differences between the actual products like headsets, and this will also have an effect on the maximum number of units deployed and their user range.

A guideline

At Sennheiser we have made a rough guideline for the maximum number of DECT units that can be deployed at one location. However, as mentioned above, certain considerations need to be taken into account when planning the deployment of DECT technology.

ESTIMATED MAX. NUMBER OF UNITS PER LOCATION*		
Large office environment	EU DW Series	Americas DW & SD Series
Contact Centre When 90 % of the users spend most of the time on calls	200 units	100 units
Offices When up to 40 % of the users call at the same time	360 units	180 units
*Location is defined as an open office environment which is not interfering with another area using a DECT system. Above mentioned numbers are estimates only. In practice many factors can influence the real number of units per location e.g. wideband versus narrowband etc. Please refer to page 7 for instructions on how to increase DECT density.		



At large sites with optimal conditions and a relatively few simultaneous users, the number of DECT units deployed can be much higher than shown on page 6. Learn more about a large deployment of Sennheiser DW Series headsets at a EE contact center at www.sennheiser.com/eecase. For inspiration please see the EE case story movie which goes into detail about the deployment process and the performance benefits of a wireless solution.

How to increase DECT density?

Typically, the number of employees increases when a company expands. This will often lead to the use of more headsets in the office and thereby increase the density. In many cases, this is not a problem but if the number of simultaneous users increases dramatically it may be necessary to address the issue.

Today, it is possible to boost density in order to deploy a larger number of DECT units at one site by making a few choices regarding the DECT devices.

Choose low power mode

This means that you choose a shorter range for each device. The employee will not be able to use the full range, but in reality this is not a problem. If, on rare occasions, an employee has to communicate more than 80-120 meters away from the desk then he or she simply switches to high power mode.

Choose narrowband mode

Wideband mode (150 - 6.800 Hz) delivers a better voice quality but it also occupies two of the available DECT channels. The number of channels cannot be increased which makes narrowband mode (300 - 3.500 Hz) a good option. The voice quality is still acceptable and each device only occupies one DECT channel. Sennheiser DECT headsets can switch to narrowband even in PC mode compared to similar products.

Close the audio connection when you are not in a call

The auto link function of the Sennheiser DECT headset automatically links the headset with the base station when taken the headset out of the charging cradle. Make sure that the users close the auto link when they are not in a call by inserting the headset to the magnetic charging cradle again. Otherwise the device will block channels in the DECT bandwidth. In this way more capacity is available thus making it possible to deploy more units in the same office environment.

Enjoy music via headphones

It is very convenient to use a DECT headset when listening to music but it makes a lot of sense to switch to wired headphones instead. Otherwise the music takes up two DECT channels on its own and limits the total number of devices. Encourage the users only to use headsets for communication and to enjoy music via headphones.



Experience Sennheiser

Perfection is always relative: Users have different expectations from their headsets depending on their needs. For professional users, that need is to communicate as effectively as possible.

With Sennheiser's range of headsets, the combination of exceptional HD sound, quality design and build – and a focus on real life usability - give the best performance possible in busy offices, contact centers and Unified Communications environments.

Please visit us at: www.sennheiser.com/cco



Sennheiser is one of the world's leading manufacturers of headphones, microphones, wireless transmission systems and high-quality headsets for both business and entertainment.

Drawing on the electro acoustics expertise of Sennheiser and the leading hearing healthcare specialist William Demant, Sennheiser Communications' wireless and wired headsets for contact centers, offices and Unified Communications professionals are the result of Sennheiser's and William Demant's joint leadership in sound quality, design, wearing comfort and hearing protection.

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