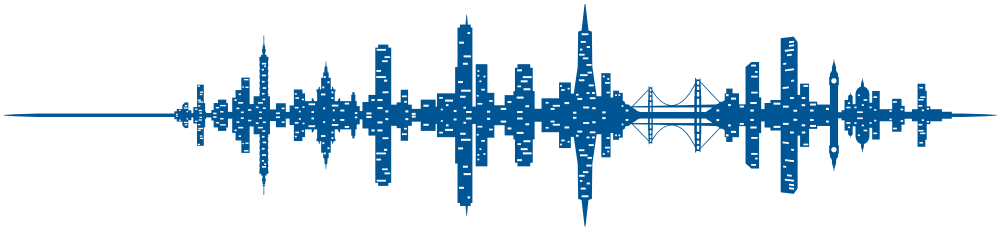

Plantronics UC Toolkit
Wireless Voice in the Office Environment

The workplace is changing, and the way people communicate is evolving along with it. Combined with e-mail, instant messaging, audio and video conferencing, and the use of voice over IP (VoIP), landlines and mobile phones, users are more connected than ever before. New technology is enabling employees to work from a variety of locations. People are working from the office, at home, in airports, cafés, and anywhere else work takes them. Whilst corded headsets work in many environments, the freedom to move whilst continuing conversations is fast becoming a necessity.

Wireless audio devices connected to landline desk phones, soft phones, or mobile phones give workers unprecedented mobility, allowing them to do their jobs in new and more efficient ways. Employees can move throughout the building or take work on the road and remain connected to vital communication systems, improving productivity and collaboration. Whether you are deploying audio devices as part of a Unified Communications (UC) strategy, or into a contact centre or other phone-intensive environment, putting the right audio solution to work in the right situation is key to optimising employee satisfaction and UC adoption.

Plantronics — The Leader in Wireless Audio Device Technology

With proven experience and a vast portfolio of personal, enterprise, and UC-optimised audio devices, Plantronics can help you integrate wireless devices into your organisation. Our comprehensive portfolio of audio devices is suited to a broad range of work styles and applications — from wireless Digital Enhanced Cordless Telecommunications (DECT™) headsets that help bridge the gap between existing traditional telephony and PC communications, to Bluetooth® headsets that provide a bridge for mobile and PC communications.

Overview of Wireless Technology

Wireless technology surrounds us — in the workplace, at home, and many places in between. Mobile phones, WiFi networks, wireless computer accessories, and cordless phones all use radio transmissions for wireless communication. Even devices not used for communication, such as microwave ovens and lighting systems, emit radio frequency energy that can impact wireless devices. In this crowded radio environment, two technologies have emerged as the standard for wireless voice communication in UC and enterprise applications.

- **Digital Enhanced Cordless Telecommunications.** Digital Enhanced Cordless Telecommunications (DECT) headsets provide the enterprise standard in voice communication. A dedicated frequency allocation, strict behaviour protocols, and the ability to actively avoid interference from other wireless devices, enable DECT headsets to provide clear voice communications (corded quality audio) over distances of 100 metres.

- **Bluetooth.** Initially designed as a replacement for cables in computer applications, Bluetooth is an open wireless technology standard that has been adapted for voice communications. Whilst Bluetooth headsets are commonly used to connect with mobile phones, they can also connect to computers through a Plantronics USB Bluetooth module and to Bluetooth enabled desk phones. Whilst the most common Bluetooth implementations allow communication up to 10 metres, the Bluetooth standard also supports classes of operation that can communicate up to 100 metres.

General Concepts for Wireless Headset Success

Several factors can influence wireless headset technology selection, deployment, and performance.

- **User density.** When multiple wireless headsets operate near each other, they share the radio spectrum. It is important to understand how many wireless headsets can be used near each other without experiencing interference, and how you can maximise the number of wireless headsets that can be deployed. The key factor — *user density* — defines the number of users who can talk on wireless links simultaneously, and depends on the wireless headset technology in use. As a result, it is important to understand the capabilities of DECT and Bluetooth headsets and appreciate how they affect support for multiple users in close proximity.

- **Roaming needs.** The ability to move from place to place and continue conversations is key in many corporate environments. Where users need to roam, and whether or not they are likely to roam into areas containing other wireless headsets, are important factors to consider when planning and deploying wireless headsets.

- **Coexistence with other wireless technologies.** In a busy office, wireless headsets may need to contend with other transmitting devices. Whilst different systems coexist best when each has its own frequency band, this isn't always possible. For example, Bluetooth and WiFi share the same radio spectrum. As a result, it is important to understand how many and what kind of wireless devices are in use, and how interaction between them affects operation.

- **The building and environment.** No two offices are alike. Some utilise an open plan, whilst others are divided by meeting rooms and walls. Building layout and materials affect how far wireless headset signals will reach, which influences roaming range and density. Concrete and metal construction blocks wireless signals, reducing the potential for interference whilst limiting roaming range. On the other hand, large windows or a central atrium allow signals to travel farther, allowing greater range whilst potentially decreasing density. Understanding how building design affects wireless performance is key to maximising wireless headset deployment density and audio quality.

- **Security needs.** Older wireless systems using analogue modulation are subject to eavesdropping by receivers tuned to the right frequency. Whilst this low security may be fine for relaying orders to a cook, it is inadequate for many business conversations. DECT and Bluetooth incorporate security technologies to block eavesdropping. Digital keys limit access to authorised devices, and sophisticated encryption algorithms encode speech. Additionally, DECT and Bluetooth systems do something else: they change the frequency and/or timing of transmissions, making interception more difficult.

Table 1 summarises the key characteristics of DECT and Bluetooth wireless headsets.

Table 1. Overview of DECT and Bluetooth technology

FEATURE	DECT	BLUETOOTH
Radio Frequency	1.9 GHz	2.4 GHz
Voice Quality	Desk phone quality	Mobile phone quality
Use with WiFi	Excellent	Limited
Use with Mobile Phones	No	Yes
Range	Up to 100 metres	Up to 10 metres (Class 2) Up to 100 metres (Class 1)
User Density	Up to 1 per workspace	8 active users per 278 m^2
Talk Time	Excellent	Excellent
Security	Excellent	Excellent

An In-Depth Look at Wireless Headset Technology

IT architects and other technical staff tasked with creating a wireless headset deployment strategy may need to understand the technology to a greater depth. The following sections provide more technical information on the important characteristics of DECT and Bluetooth technology.

DECT ARCHITECTURE AND CHARACTERISTICS

Digital Enhanced Cordless Telecommunications or DECT was created by the European Technology Standards Institute (ETSI) as a voice optimised communication system operating in the 1,880 to 1,900 MHz radio band. Similar to Time Division Multiple Access (TDMA) cellular phone systems, DECT uses a FDMA/TDMA/TDD transmission system. Data is synthesised and encrypted before Gaussian Frequency-shift Keying (GFSK) modulation takes place. The transmitter operates at a low duty cycle in non-constant-envelope mode. DECT is limited to two-way voice isochronous communications. This results in a cooperative environment of like-designed devices that mitigates contention for frequency channels when higher numbers of devices are deployed in a given area.

The European DECT standard segments its allocated radio band into ten 1.728 MHz carriers. Each carrier is further divided into 24, 10 ms timeslots (Figure 1). In Plantronics headset applications the units are not synchronised with each other, leading to birectional channel allocation typically in excess of 70 channels. Protocol requirements force cooperation between headsets in the band. When a wireless headset or other transmitting device selects a channel for use, it must *listen* first and determine that no other nearby transmitters will be affected before it attempts to *talk* (transmit).

A DECT headset system consists of a headset and a base. The two components operate together once they are paired through a subscription process in which they exchange unique authorisation and encryption codes. Other DECT devices are not able to communicate with or decode transmissions from headsets that do not have the unique subscription codes.

DECT Channels	10 ms Timeslots																							
	Downlink												Uplink											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1881.792 MHz																								
1883.520 MHz																								
1885.248 MHz																								
1886.976 MHz																								
1888.704 MHz																								
1890.432 MHz																								
1892.160 MHz																								
1893.888 MHz																								
1895.616 MHz																								
1897.344 MHz																								

Figure 1. The DECT standard divides the allocated spectrum into 10 frequency bands, with 24 timeslots in each band.

COEXISTENCE WITH OTHER WIRELESS TECHNOLOGIES

Because DECT wireless headsets use a dedicated radio band, they do not interfere with, or receive interference from, WiFi networks, wireless security systems, mobile phones, or other wireless equipment operating in adjacent frequency ranges (Figure 2).

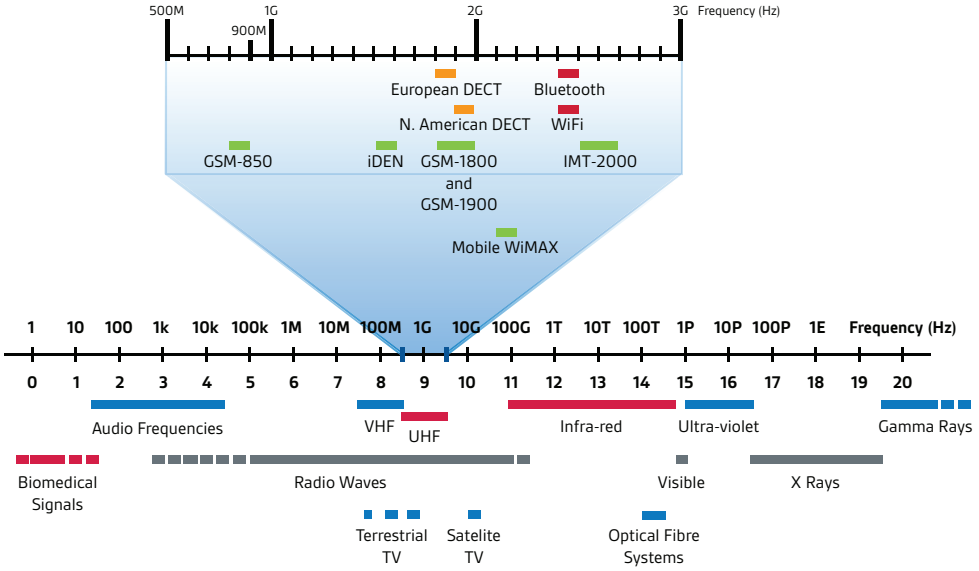

Figure 2. Radio spectrum allocations.

Plantronics wireless headsets emit power levels below the level required for the Specific Absorption Rate (SAR) testing typically associated with mobile phones. The general rule is that Plantronics wireless headsets can be used wherever mobile phones can be used, and present less of an electromagnetic interference risk than a mobile phone due to the lower transmit signal level.

INTERFERENCE AVOIDANCE AMONG DECT HEADSETS

DECT headset systems avoid interference by selecting the best available channel at the start of a call, and changing channels automatically when encountering interference. Interference can occur when a roaming user moves closer to another user on the same channel, or in dense installations with workers seated close together and all channels in use. Interference manifests as pops, clicks, or blanks noticeable to headset users.

Each headset and base continuously monitors the channels and maintains a map of channel versus signal strength. When interference is encountered, the headset consults the channel map and changes to the best available channel. This *aperiodic adaptive frequency hopping* lets the system respond to changing conditions and eliminate interference before it impacts audio quality. The result is a clear frequency optimised for voice communication.

ROAMING RANGE

The ability to move around is an important factor for deciding to go wireless. The distance you can travel is commonly called the *roaming range*. In a simple system with a small number of users, roaming range primarily is a function of the strength of the radio transmitter and the effects of objects that block the transmitted signal.

The maximum range in an outdoor line of sight environment is easy to predict since signal transmission path loss is well defined. For this reason, manufacturers commonly use the unobstructed outdoor range — typically up to 106 metres — as the stated maximum roaming range for a DECT wireless headset system. Whilst evaluating wireless headsets in an open, outdoor environment with no obstacles is easy to calculate and results in a large range value, it is not how most people use the technology.

Using DECT wireless headsets within buildings changes the way radio signals propagate and affects the usable range of wireless headsets. Signal strength can no longer be modelled according to a neat mathematical equation. Many objects in typical office environments can reduce the range of radio signals. Walls, furniture, and people attenuate the radio signal and reduce the roaming range of a wireless headset.

DENSITY

Density is the term used to describe the number of active users operating in an area in which headsets share the radio spectrum. When considering wireless headset density, the most important factors are the number of simultaneous active headsets and the size of the area. An active headset may be a person on a telephone call, a person listening to music or a webinar on their computer, or a contact centre agent with a headset connected to an automatic call distributor (ACD) and operating in constant-on mode.

Every DECT user occupies a portion of the DECT frequency spectrum, with active calls consuming more than idle devices. In comparison to Bluetooth, DECT technology allows for the deployment of many more wireless systems within a single site. Nevertheless, several inter-related factors eventually limit how many units can be deployed.

- **Concurrent users.** As long as the total number of simultaneous users is lower than the total number of channels available, DECT headsets operate with little restriction. When there are more active users than channels, range is reduced.

- **Room size.** The size of the room, combined with the number of active users, affects the distance between users during channel sharing.

- **Channel sharing.** When there are more active headsets than there are channels, the headsets share channels. Channel sharing works by exploiting the distance between sharing users. This is where the relationship between density and roaming comes into play. The greater the distance between the sharing users, the greater the roaming range. As the number of active users increases in an installation, the effective roaming range decreases.

- **Density versus roaming range.** As the density of DECT devices in an area increases beyond the point of available channel space, roaming range is affected. In a large room with many users and high phone usage rates, roaming range may be reduced significantly (Figure 3).

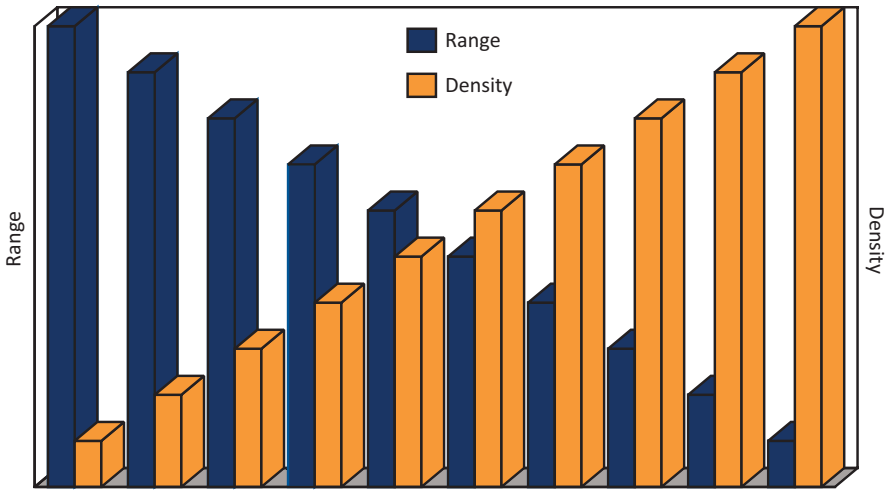

Figure 3. As the number of DECT headsets in an area increases, roaming range decreases.

- **Density effects.** When the number of active users exceeds the practical density for the room, users will experience density effects in the form of audio dropouts and other audio artefacts. As users roam away from their base, the potential for conflict over a shared channel increases. The greatest potential for problems occurs with a combination of high density and roaming.

- **Headset behaviour in high density.** When a roaming user approaches another user that is sharing the same channel, they initially hear audio artefacts. Typically users recognise that they are moving out of range and move back toward their desk. The headset continually looks for a better channel space during normal and range boundary use. If there is no better channel, the headset ultimately mutes its audio. The headset keeps the call active for five minutes. When the user moves back toward their base, the audio is restored. If the user remains out of range for five minutes, the call is disconnected.

- **Wideband operation.** Wideband technology provides wider frequency response than conventional telephones, resulting in rich, natural-sounding voice and multimedia transmissions. Because wideband audio requires the headset to transmit more information, it reduces the number of simultaneous calls that can be supported and depletes batteries faster. Plantronics has implemented new CAT-iq® technology on a number of its wideband DECT products to increase wideband efficiency by 25 percent, resulting in improved density performance and longer battery life. Plantronics headsets with wideband capability allow users to select standard audio when maximum battery life and density are required.

- **Variable power supports higher density.** Some headsets, such as Plantronics Savi® systems, can support higher deployment density by automatically adjusting their radio transmitting power to match communication demands. When the user is close to the base, Plantronics Savi DECT headsets reduce their transmission power to the minimum required for reliable communication, effectively leaving more room for others. Power adaptation allows units on the same radio channel to be spaced closer to one another to achieve greater density.

SECURITY

Protecting the confidentiality of wireless conversations is paramount. DECT incorporates digital encryption and authentication to deliver excellent security against eavesdropping. Key security provisions include the following.

- Protection against deliberate eavesdropping takes the form of user authentication and 64-bit true digital encryption of voice data according to the ETSI standard algorithm EN 300 175-7. Together these techniques render DECT secure enough for commercial applications requiring voice privacy. The casual eavesdropper listening to the radio channel hears only a buzzing sound rather than voices, because the transmission is digitally coded and encrypted.

- DECT headsets jump to new channels in response to interference. Because the timing and destination of the hop is unpredictable, it adds an additional layer of security to the transmission.

BLUETOOTH ARCHITECTURE AND CHARACTERISTICS

Originally designed for data transmission, Bluetooth is an open wireless technology standard for exchanging data over short distances. Bluetooth headset support is a common feature on most mobile phones, making Bluetooth an ideal choice for workers who use a mobile device as a primary communication tool.

Bluetooth devices operate on the 2.4 GHz Instrument, Scientific and Medical (ISM) band. This radio band is shared with other technologies, including WiFi access points, cordless phones, amateur radios, garage door openers and more. Because different technologies share the same radio frequencies there is potential for conflict between devices. More specifically, Bluetooth operates on the 2,402 MHz to 2,480 MHz frequencies. This band is divided into seventy-nine 1 MHz channels. In operation, a Bluetooth headset hops among the 79 channels 1,600 times per second in a psuedo-random sequence known only to the transmitter and receiver.

Bluetooth headsets operate in a relationship with a phone, USB Bluetooth module, or other device which is referred to as the Audio Gateway (AG). Communication between a headset and an AG can occur only when the devices have been introduced to one another through a process called *pairing*. During the pairing process, the devices coordinate to create secure 128-bit codes for authentication and encryption of communication content.

ADAPTIVE FREQUENCY HOPPING

Plantronics Bluetooth headsets employ adaptive frequency hopping (AFH) to mitigate the interference effects of sharing the ISM spectrum with other users. When Bluetooth headsets encounter interference, they mark the frequency of interference and remove that frequency from the hopping sequence. This system works well with just one or two 802.11 WiFi access points in the vicinity, although short bursts of interference may occur. When more than two WiFi access points are in operation within the same area, Bluetooth headsets must operate on a significantly reduced number of channels, increasing the incidence of interference (Figure 4).

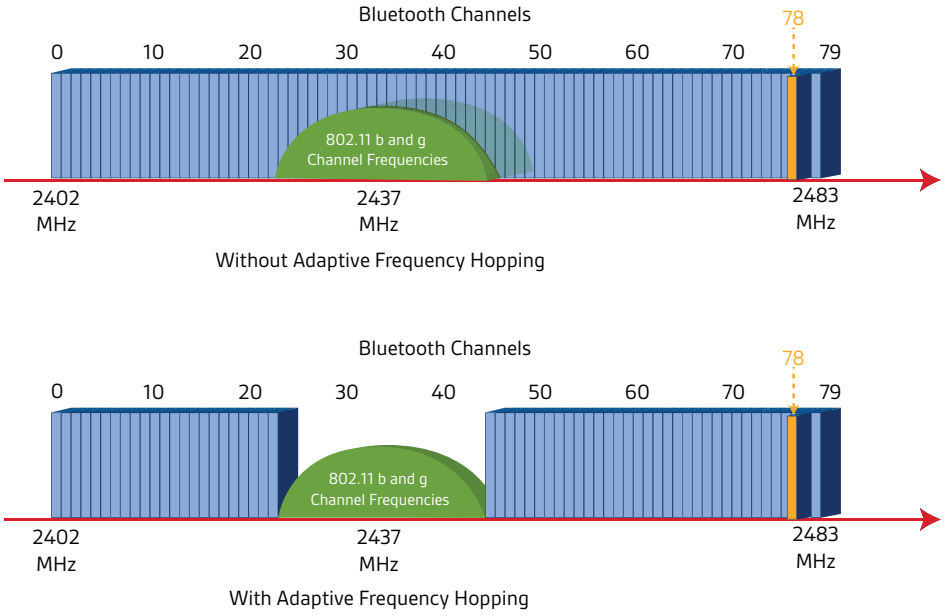

Figure 4. Adaptive frequency hopping attempts to mitigate the effects of nearby WiFi devices.

RANGE AND POWER

The Bluetooth standard defines three classes of transmit power operation (Table 2). The most common headsets utilise Bluetooth audio Class 2, which provides a good balance of performance, reasonable operating range, good battery life, and less interference with other devices. Plantronics also sells devices that can operate at Class 1, providing significantly longer range. Plantronics Class 1 headsets have the advantage of adaptive power control — they operate at Class 1 power when paired to a Class 1 AG or when Class 1 range is required. When less range is needed, or when paired to a Class 2 AG, they reduce their transmitter to Class 2 operation.

Table 2. Bluetooth power classes

CLASS	MAXIMUM POWER	APPROXIMATE RANGE
1	100 mW	100 metres
2	2.5 mW	10 metres
3	1 mW	1 metre

SECURITY

With mobile users walking freely and communicating at any time from any location, security and privacy are paramount. Bluetooth incorporates several layers of security to ensure communication privacy.

- Bluetooth devices connect to one another using 128-bit authentication measures. A combination of a Personal Identification Number (PIN) and a Bluetooth address are used to identify Bluetooth devices.

- The fast frequency hopping spread spectrum scheme used by Bluetooth devices provides another layer of security. Instead of transmitting over one frequency within the 2.4 GHz band, Bluetooth radios hop continuously in a pseudo-random sequence known only to paired devices.

CLEARER VOICE WITH eSCO AND ADPCM

Older Bluetooth devices use a Synchronous Connection Oriented (SCO) link to transfer packets. With standard SCO operation, encoded voice data is transmitted in a reserved timeslot, and packet acknowledgement and retransmission are not performed. When interference occurs, there is no mechanism to recover the lost information. More recent Bluetooth standards introduced the Extended Synchronous Connection protocol (eSCO) that lets headsets and base systems acknowledge packet receipt and retransmit lost packets to improve transmission and audio quality. The latest Plantronics Bluetooth headsets utilise eSCO technology.

The addition of adaptive differential pulse code modulation (ADPCM) over eSCO enables headset systems to digitise audio signals with greater clarity. As UC systems gain in popularity, the ability for ADPCM-capable devices to improve audio quality makes it possible for users to take advantage of features such as voice dialing.

MULTIPOINT CONNECTIONS

A multipoint-capable Bluetooth headset can be connected to two different Audio Gateways at once, enabling it to be used alternately with either base. For example, a multipoint capable Bluetooth headset can be paired simultaneously with a mobile phone and another Bluetooth UC endpoint, allowing the user to wear one headset and switch conveniently between phone systems.

WIDEBAND SOLUTIONS

Wideband technology provides wider frequency response than conventional telephones, resulting in rich, natural-sounding voice and multimedia transmissions. Because wideband

audio requires more data packets to deliver enhanced sound, it occupies more of the radio frequency spectrum and depletes batteries faster. Plantronics headsets with wideband capability allow users to select standard audio when maximum battery life and density are required.

USING BLUETOOTH WITH COMPUTERS

Many computers come equipped with built-in Bluetooth radios. Unfortunately, these radios vary widely in design and capability. Most do not support all the functions needed for voice communication. For this reason, Plantronics Bluetooth headsets designed for computer applications are supplied with USB Bluetooth adapters that support wireless voice communications and ensure the highest end to end experience.

Planning Considerations for Wireless Headsets

There are a number of factors to consider when planning a wireless headset deployment.

- **Match technology to user needs.** Select headset technologies based on job requirements and mobility needs. For office-centric environments where density, sound quality, and range are paramount, Plantronics recommends DECT wireless headsets. If you have users that rely on their mobile or smart phone for the majority of their communication, consider Bluetooth headsets with support for multi-device connectivity. When considering Bluetooth for enterprise applications, be sure to evaluate the range and density characteristics and ensure they meet business and user needs.

- **Understand when, and how, workers use headsets.** The percentage of time users are on the phone or otherwise using a wireless headset is a key criterion. In addition to phone conversations, understand how often users will attend webinars, participate in Web conferences, listen to music or take part in online training courses, as these activities all consume wireless capacity.

- **Identify your peak time.** Because wireless headsets must share air waves, it is important to plan for the highest demand you can expect to see to ensure you have sufficient bandwidth available for users.

- **Plan for growth.** Organisational and personnel changes occur frequently. Perform density calculations and leave headroom for new wireless headset users.

- **Know how your building design affects performance.** Walls, building cores, and concrete and metal floors block wireless signals, enabling each floor to operate independently. Wood floors allow signals to pass through, reducing the number of headsets that can be supported with sufficient performance levels. Identify the building materials in use and factor them into your wireless headset density calculations.

- **Consider nearby users.** Consider the presence of equipment in adjacent offices or buildings. Even if your organisation only occupies one floor, it is important to identify the presence of technology being used by other companies in close proximity, as the wireless spectrum may end up being shared. Within your organisation, partitioned areas or offices allow for some improvements in density.

ADDITIONAL PLANNING FOR DECT HEADSETS

Whilst DECT provides the utmost quality for enterprise workers, several factors should be considered when estimating wireless density.

- **Take advantage of isolation.** Areas that are completely separate from a wireless signal perspective can operate independently. Large sites with multiple isolated areas can support many more users than completely open designs.

- **Understand headset usage requirements.** The amount of time workers use their headsets has a large effect on how many headsets will work in a given building. A typical office in which workers use their headset a few hours per day can support many more headsets than a contact centre where everyone is on the phone all the time.

- **Mix technologies for maximum density.** In very dense environments, consider mixing DECT and Bluetooth headsets to take full advantage of a wider frequency spectrum. Because different radio frequencies are used, the two systems can coexist without issue.

ADDITIONAL PLANNING FOR BLUETOOTH HEADSETS

Whilst Bluetooth headsets are ideal for highly mobile workers, other factors can impact their effectiveness. Consider the following when evaluating where to utilise Bluetooth headsets in your deployment.

- **Match the technology to user profiles.** Bluetooth headsets are best used by mobile phone-centric users—those who are mobile more than 60 percent of the time and use a mobile phone as their primary phone. Consider Bluetooth headsets for that segment of your population.

- **Anticipate WiFi effects.** When Bluetooth wireless headsets are used in an environment with 2.4 GHz WiFi networks, interference can degrade audio quality. Even with adaptive frequency hopping, there is greater potential for interference because the Bluetooth headsets must operate on a reduced number of channels. Problems increase when a Bluetooth headset is within range of more than one WiFi access point. To maximise Bluetooth capacity, consider moving WiFi to 802.11a which operates on 5.8 GHz.

- **Plan for density.** Many users can have access to Bluetooth headsets, as all headset users are unlikely to be on calls at the same time. When the recommended number of active headsets for a given environment is exceeded, users may experience a degradation in audio quality. Plan for the maximum usage rate to ensure audio quality. As a guide, we recommend a maximum of eight simultaneous users (active calls) in a typical 15 m x 20 m office. Each time the area doubles, the maximum number of calls that can be supported increases by a factor of 1.5. Since all users typically are not on active calls at the same time, a greater number of total users can be supported.

Best Practises for Wireless Headset Deployment

Successfully integrating wireless headsets into the enterprise requires educating users about characteristics that can affect audio quality. Key areas to consider include the following.

- **Set performance expectations.** Users may have unrealistic expectations for how far they can roam in the building. Let them know that moving outside the range of the headset, or into a congested area, can degrade audio quality.

- **Charge wireless headsets before the first use.** Users may be frustrated if a new headset is not ready for immediate use. Be sure to charge all headsets prior to deployment.

- **Train users to keep headsets charged.** Inform users of the need to charge wireless headsets daily. In high usage environments, train users to dock DECT headsets in their base station when taking breaks. Keeping headsets charged also extends battery life, reducing operating costs.

- **Use wideband wisely.** Wideband provides improved call clarity and a better user experience at the expense of battery life and density. In high-density applications, or when maximum battery life is needed, set headsets to standard frequency response to obtain the best performance.

- **Ask users to share the air space.** Wireless headsets operate on a relatively small portion of the radio spectrum. Efficient use of the spectrum is essential to achieving the best performance in your wireless installation. Some phone systems allow users to leave their headset active when there is not an active phone call. Train users to turn off their headset radio if they are not on a call, and not to roam with the headset active if they are not on a call or are not required to keep the headset active for their job.

Trust the Leader in Audio Device Technology

Audio devices are an integral part of today's dynamic workplace. For years Plantronics has been at the forefront of audio device technology, offering products that are engineered to deliver superior audio quality in even the most challenging situations. Based on industry standards and decades of engineering expertise, our DECT and Bluetooth audio devices deliver unprecedented mobility that fosters efficiency and improves productivity. When deploying audio devices into UC platforms, contact centres, or other phone-intensive environments, trust the leader in wireless headset design to help you integrate the right wireless technology right from the start.

For More Information

The Plantronics UC Toolkit is the collective wisdom of customer experiences and lessons learnt whilst integrating audio devices into a UC environment. It's a portfolio of best practises, recommendations, and off-the-shelf training tools designed specifically for IT organisations to leverage – ensuring accelerated end-user adoption. To access the Plantronics UC Toolkit visit *plantronics.com/uctoolkit*. We'd like you to be part of our community of learning.

RESOURCE

Additional Planning Resources

The following resources, available at *plantronics.com/uctoolkit/plan*, provide supplementary information to help in the planning process.

PLANNING RESOURCES	
Planning FAQ	Provides responses and direction to typical questions IT organisations raise when planning UC audio device integration
Planning Guidelines for Success	Helps IT organisations prepare for the successful introduction of UC audio devices on a UC platform
Planning Checklist	Provides IT with a high-level list of items to consider when planning UC audio device integration
Planning Survey	A list of suggested questions IT organisations can use to assess user UC audio device needs and environmental conditions
Wireless Voice in the Office Environment White Paper	A technology overview for IT organisations covering the most common wireless technologies used for UC audio devices

For more information, visit *plantronics.com/uctoolkit*.