DECT Forum

20 May 2022

Reply to Ofcom's discussion paper "Spectrum Roadmap Delivering Ofcom's Spectrum Management Strategy"

To:
Ofcom UK
spectrum.roadmap@ofcom.org.uk

Dear Madam or Sir,

DECT Forum thanks Ofcom's Radio Spectrum Roadmap Management Strategy team for being able to express the views of our members, the global DECT community.

Our interest is solely on frequency management potential action items to support current and future DECT technologies. Therefore, we do focus on the opportunity of what DECT services and applications do offer to UK's citizens and community. We are discussing the future use of the frequency band 1880 – 1920 MHz, while we do not want to limit the potential of DECT-2020 NR to this band only as DECT-2020 NR is recognized within ITU-R as IMT-2020 technology, complementary to 5G.

This document has the following structure:

- Introduction
- Answers to typical questions
- Comments to specific sections of the consultation document
- Annex with several, non-exclusive use cases

Please do not hesitate to contact us for further questions.

Yours sincerely,

DECT Forum

DECT is well known for its world-wide use in cordless phones, but today it also supports the most diverse range of professional use cases of any wireless technology. From high-quality corporate conferencing to professional intercom, from critical healthcare communication & monitoring to emergency support for the elderly and disabled, DECT has been the technology of choice for many years, due to its unequalled quality and reliability. More than 135 million DECT devices are sold every year, with professional DECT representing the fastest growing segment.

World economies rely on the many thousands of large businesses and the millions of SMEs that generate wealth, and it is these businesses that the DECT technology, has been supporting with communication and collaboration solutions, often behind the scenes!

This response focuses firstly on **preserving DECT Quality of Service (QoS) for incumbent users** in the 1880-1900 MHz band. It is also crucial that any new technology in the overall spectrum 1880-1920 should not generate interference and disturbance to these existing DECT users and their businesses.

However, this response also presents an exciting opportunity for DECT, together with the next generation of DECT, **DECT-2020 NR** to bring new applications to the entire 1880 – 1920 MHz spectrum in the UK, with considerable economic and user benefits.

DECT-2020 NR (or **DECT NR+** as it will become known) has been designed to be **spectrum-compatible with DECT,** and hence this opportunity comes with a very **high level of co-existence** – in sharp contrast to the prospect of new technologies sharing the band that are not compatible with DECT, and that would likely cause interference, degrading the existing Quality of Service.

DECT-2020 NR is not targeted to replace all original DECT applications but will be an extension bringing new capabilities, such as Ultra-Reliable Low-Latency Communication (URLLC) and Massive Machine Type Communication (mMTC). DECT-2020 NR will open up unprecedented opportunities for professional service providers, and will help meet some of the big challenges facing governments and technology innovators as we approach the mid-21st century:

Smart Cities : an evolutionary step forward from Smart Homes and Smart Buildings, Smart Cities will be one of the World's frontiers in the battle to combat Climate Change, by reducing carbon emissions using an array of applications such as traffic management, finding parking spaces, optimizing refuse collection and street lighting, smart energy storage etc. All of these applications require literally millions

of remote sensor & control (IoT) nodes connected through networks to cloud-based control centres. Such network complexity is only feasible and practicable with wireless mesh networking covering metropolitan and rural areas – coverage that until now was the domain of the cellular network. DECT-2020 NR has been designed to incorporate highly reliable high-performance wireless mesh networking, that will make deployment of such massive machine communication not only possible but economically attractive.

Industrial IoT (Industry 4.0) : One of the key technologies that will enable the new industrial revolution (Industry 4.0) is Ultra-Reliable Low Latency wireless IoT solutions for industry, that will be able to orchestrate fast-moving unmanned vehicles and operations across huge factory floors and warehouses. Bringing together DECT's historic ability to send and receive messages with microsecond-synchronism with DECT-2020 NR's lower latency and IoT capabilities, opening up great opportunities for DECT-2020 NR in this industrial sector

Pro-audio / PMSE market : DECT-2020 NR has been designed to deliver the higher performance and lower latency required for microphones used by touring bands, recording studios, theatres and for broadcasting (including electronic news gathering). **DECT-2020 NR** will have improved indoor performance, able to deal with a wider range of venue constraints and challenges. The use of **DECT-2020 NR** for performance microphones will facilitate the ever-increasing demand for wireless microphones in all live & recorded entertainment as well as media streaming sectors.

Already deployed with DECT, Intercoms (Talkback) will benefit from higher user densities increasingly needed for large festivals and sporting events such as The Olympic Games. And both microphones and intercoms systems will have the ability to be deployed in other IMT-2020 frequencies since special touring events (sporting, rock tours & music festivals etc.) need to be deployed world-wide.

Additional information to the above can be found in the Annex

DECT & DECT 2020-NR can meet UK's future need for stand-alone private communication networks : The use of DECT and **'DECT-2020 NR'** would not require any changes in the 1880-1900 MHz band. If the band was extended to 1920 MHz, as mentioned earlier, this expansion would provide new spectrum-compatible opportunities for entirely new applications, with an existing 'off-the-shelf' set of standards guaranteeing a very high level of spectrum sharing and spectral efficiency. As mobile operators extend their footprint in even larger spectrum allocations, professional stand-alone wireless-enabled services need long-term secure spectrum (space) to operate in. These services summarized here and in the annex, provide very high value to the national economy, through business and industry growth and their contribution to GDP, which whilst difficult to measure, is nonetheless vital to the UK economy!

Please find below some typical questions, which are asked by regulators :

1. What is the interest in the use of DECT to provide a service?

DECT and introducing DECT-2020 NR: We believe that the evolutions of the DECT technology and the introduction of DECT-2020 NR present the best spectrum-efficient use of the 1880-1900 MHz band and by extending this to 1920 MHz, both DECT and DECT-2020 NR will bring the opportunity to welcome entirely new and important large-scale 21st-century applications in rapidly growing markets to UK. These include Programme Making and Special Events (PMSE), Smart Cities and Industrial IoT (Industry 4.0). There is already a continuous growth and variety of uses of the DECT technology as the attached annex A shows, many of which operate behind the scenes in professional communication and collaboration systems, helping to deliver crucial services in areas such as Security, Emergency Response & Rescue, Retail (traditional, online and drive-thru), Programme Making and Special Events (PMSE), and more generally, Content Production.

PMSE 'Talk-Back' : The already heavy increase in use of the DECT band by the content production sector has been caused by the reduction in the 470-862 MHz band available for PMSE Talkback[1] which previously used that spectrum. Remaining spectrum in the 470-862 MHz band where available, is regarded as "clean spectrum" and reserved for radio microphones. Many touring productions use DECT as a universally available license exempt spectrum within UK. Content production sector includes web, theatre, adverts, films, sports, concerts and public and cultural events.

DECT-2020 NR and Smart Cities : Smart Cities will become one of the World's frontiers in the battle to combat Climate Change. Smart Cities will reduce carbon emissions using an array of applications such as; traffic management, finding parking spaces, optimizing refuse collection and street lighting, smart energy storage etc., All of these applications require remote sensor & control (IoT) solutions connected through a network to control centres. DECT-2020 NR has been designed to incorporate highly reliable high-performance wireless mesh networking, that will make deployment of such massive machine-type communication possible and practicable.

DECT-2020 NR and Industry 4.0 : One of the key technologies that will enable the new industrial revolution (4.0) is Ultra-Reliable Low Latency IoT solutions for industry, that will be able to orchestrate unmanned operations across huge factory floors and warehouses. Bringing together DECT's historic ability to send and receive messages with microsecond-synchronism with DECT-2020 NR's lower latency and IoT capabilities, opens up great opportunities in this industrial sector.

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[1] *the ability for duplex communication between directors/organizers and those supporting the production, engineers video operator's "talent" control*

In general : DECT-2020 NR as a technology foundation is targeted for local area wireless applications (Non-Public-Networks), which can be deployed anywhere by anyone at any time. The technology supports autonomous and automatic operation with minimal maintenance effort. Where applicable, interworking functions to Wide Area Networks (WAN). e.g. PLMN, satellite, fibre, and internet protocols foster the vision of a network of networks.

DECT-2020 NR can be used as a foundation for:

- Very reliable Point-to-Point and Point-to-Multipoint Wireless Links provisioning (e.g. cable replacement solutions);

- Local Area Wireless Access Networks following a star topology as in classical DECT deployment supporting URLLC use cases; and

- Self-Organizing Local Area Wireless Access Networks following a mesh network topology, which enables to support mMTC use cases.

- Please note that DECT-2020 NR is a 'Wireless Broadband Radio Interface', see TS 103 636 part 3.

   a) How much spectrum is required to provide the service?

We believe that the evolutions of the DECT technology and the introduction of DECT-2020 NR present the best spectrum-efficient use of the 1880-1900 MHz band and by extending this to 1920 MHz, both DECT and DECT-2020 NR will bring the opportunity to welcome entirely new and important large-scale 21st-century applications in rapidly growing markets to UK.

High density DECT applications, such as enterprise (business) communication, call centres, event team communication and corporate conferencing tend to occupy the majority of the 1880-1900 MHz band in the proximity of the installation, and demand is increasing. Expanding the band to 1920 MHz can support those applications.

In addition, new applications supported with the new developed DECT-2020 NR, which being fully spectrum-compatible with DECT, will require spectrum resources.(See also Fig. 1, P.10)

   b) What interservice considerations need to be undertaken for the service to be deployed?

DECT-2020 NR has been designed to be **spectrum-compatible with DECT,** and hence this opportunity comes with a very **high level of co-existence** – in sharp contrast to the prospect of new technologies sharing the band that are not compatible with DECT, and that would likely cause interference, degrading Quality of Service.

DECT & DECT-2020 NR present the UK government with an unmatched ability to add entirely new services, that if compliant to the DECT standards, will mutually self-organize and share the DECT band with no need for governmental spectrum management.

c) What are the deployment scenarios for the service?

DECT is very well-liked by installers as there is rarely anything to be done (beforehand or at the customer site) as far as frequency management is concerned. All DECT technologies revisions and variants have been are designed for user-driven, self-organizing local deployment – any-where, at any time and by anyone. Services are specific to the user applications to be served. An update to Government policy and class license for license-free use of the band would be helpful, to appropriately recognise the breadth of applications that can make use of the band.

d) Are services still using DECT or are they transitioning to DECT-2020 NR?
DECT 'DECT-2020 NR' is not targeted to replace all original DECT applications but will be an extension. DECT2020-NR is a technology bringing new capabilities, such as Ultra-Reliable Low-Latency Communication (URLLC) and Massive Machine Communication (mMTC). DECT-2020 NR will open up unprecedented cost-effective opportunities for professional ser-vice providers, and will help meet some of big challenges facing innovators as we approach the mid-21st century.

2. Are there any applicable coexistence scenarios not identified? Are there any sce-narios that are unlikely to be practically achievable (and hence the associated planning scenario should be discounted), or are there any that are readily achieved?

DECT-2020 NR has been designed to be **spectrum-compatible with DECT,** and hence this opportunity comes with **high level of co-existence** – in sharp contrast to the prospect of new technologies sharing the band that are not compatible with DECT, and that would likely cause inter-ference, degrading Quality of Service. Coexistence with other technologies is only possible if they share the same medium access principle, e.g. LTE and DECT cannot share spectrum without inter-ference.

3. What are possible planning scenarios and industry views on the overall future use of the 1.9 GHz band and its services:

a) How much spectrum is required (distinguishing between the minimum viable and desirable) to provide the service?

As mentioned earlier, density DECT applications, such as enterprise (business) communication, call centres, event team communication and corporate conferencing tend to occupy the majority of the 1880-1900 MHz band in the proximity of the installation, and user demand is increasing. Expanding the band to 1920 MHz can support those applications.

In addition, deploying new applications (mentioned earlier) supported with the new developed DECT-2020 NR would be more feasible by expanding the band to 1920 MHz.

We suggest allocating the complete band 1880 MHz to 1920 MHz to DECT (original DECT and DECT-2020 NR).

b) Is there a clear geographical delineation – for example, metropolitan or regional – for the service?

No, there is no geographical delineation.

c) Is there or will there be equipment readily available for the service?

DECT can be redeployed to use the extended band quickly. DECT-2020 NR chipsets will be available in 2022 and development of new equipment and products has started.
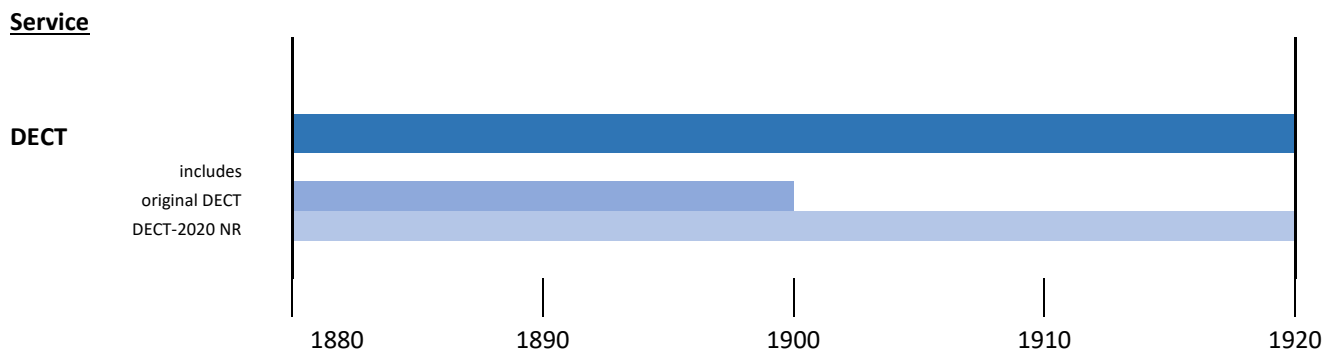
Service

Figure 1

Please find below comments to specific sections of the Spectrum Roadmap discussion document :

To 3.5 Enabling growing demand for the use of drones

DECT Forum is highly concerned about the discussion in CEPT FM59 to potentially allowing drones in the band 1880 - 1920 MHz. DECT technology is a benchmark for sharing an available frequency band politely for many different applications and services. Sharing this band with another non-polite technology, e.g. LTE, will damage the complete eco system and is therefore not acceptable.

To 3.6 Future use of unpaired 2100 (1900-1920) MHz) spectrum

We kindly request that Ofcom considers to expand the current band assigned for DECT use 1880 – 1900 MHz to 1880 -1920 MHz allowing the growth of DECT use cases and applications as described in this document.

To 4.34ff A potential shift towards 'general purpose' network technologies

DECT is recognized as an IMT-2020 technology and is currently the only technology allowing ad-hoc local private networks. Voice across a campus or ad-hoc communication system are reality since several years, while DECT NR+ development offers even more versatile applications including mesh networks.

To 4.44ff Spectrum sharing and interference management technologies

DECT offers a polite protocol with automatic coordination among many different applications and use cases. It is the best sharing technology for efficient use of the available spectrum.

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Annex follows

For Professional Applications

DECT today supports the most diverse range of professional use cases of any wireless technology. From high-quality corporate conferencing to professional intercom, from critical healthcare communication & monitoring to emergency support for the elderly and disabled, DECT for years has been the technology of choice, due to its unequalled quality and reliability. More than 135 million DECT devices are sold every year, with professional DECT representing the fastest growing segment.

Recent evolution in the technology has pushed the boundaries and further extended the already impressive range of use cases that DECT can support. With lower *fixed* latency, three-times higher user densities, and an impressive Quality of Service, more manufacturers and their customers are moving to DECT to meet critical local-area wireless audio and voice communication needs. Every year at the Integrated Systems Europe (ISE) and Infocom trade shows, the list of manufacturers exhibiting new DECT products grows, as does the market penetration.

The latest and most exciting variant of DECT, **DECT NR+** is an IMT-2020 wireless technology and in the coming years, will help private enterprises and 5G service providers solve one of the biggest and fastest-growing challenges facing the communications industry's quest for URLLC (ultra-reliable, low-latency communication): ***how to provide a wireless local-area solution for very high densities of extremely robust, high-quality, low-latency voice and low-medium data-rate communication.***

The DECT technology has steadily evolved to meet the demands of its expanding market. The main capabilities driving the increasing use of DECT for professional applications include :

Very high densities of users :
In call centres, corporate conferencing, and enterprise communication, DECT is the technology of choice for wireless headsets, microphone systems, and handset/pagers, as no other technology can support such a high density of live users without drop-outs or interference. Recently, higher-level modulation support has tripled the already high density of users. User density with live, independent audio can reach one user per 2 square meters!

Robustness & Security :
Due to its highly regulated license-free band, available in more than 100 countries at around 1.9 GHz, DECT is *the* choice for intercom systems – many of which require very high levels of reliability for **secure & safety-critical** use cases. Also, DECT is unique in its ability to support complex hierarchies of call groups – essential for clear and precise intra-team and inter-team communication such as in PMSE (shown opposite), rescue, and oil and gas. DECT-enabled intercom types have a wide range of uses, but a common requirement unites them all **- the '*high-stakes*' communication where failure is not an option.**

High Audio Quality :
Since 2010, DECT has enabled networked conferencing microphone solutions providing 'Super-wide-band' audio (CD quality 50Hz–20kHz). Using DECT's built-in QoS features, these systems can avoid other in-band DECT interferers before any audio artefacts result, giving **a communication quality experience unparalleled by any other wireless technology.**

Low / Fixed Latency :
DECT provides a low-latency wireless audio streaming performance further enhanced by the consistency of its TDMA structure. This attribute is attractive to live voice and live audio streaming use cases, where end-to-end acoustic/RF latency has been driven down towards 5 milliseconds.

Total in-building/campus/outdoor range :
DECT's band at 1.9 GHz can provide 300m range Line Of Sight (LOS), while its multi-cell capability enables total campus coverage, regardless of size. Compared with RF frequencies of 5GHz and greater, which suffer from through-wall propagation losses, DECT provides the perfect balance of range and data rate, enabling comprehensive enterprise capability. Typical installations include; hospitals, TV and radio broadcasting studios, supermarkets & drive-thru outlets, manufacturing plants, power stations, R&D facilities, large commercial office buildings, conference centres, hotels, penitentiaries, schools and university campuses.

The future of DECT : It is often said by users that **"DECT is the next best thing to a wire."** In the next evolution, **DECT NR+**, will drive the above-mentioned five primary user benefits even further and add new capabilities in **mesh networking and low-power wireless IoT**. With the advent of DECT NR+, DECT's professional applications will become even more unique in their ability to collaborate and support **IMT-2020's** goals. The latest DECT NR+ performance projections show that DECT will continue to be the technology of choice for its current wide range of users, and in addition, 'NR+' will enable important new use cases :

Smart Cities :

An evolutionary step forward from Smart Homes and Smart Buildings, Smart Cities will be one of the World's frontiers in the battle to combat Climate Change, by reducing carbon emissions using an array of applications such as; traffic management, finding parking spaces, optimizing refuse collection and street lighting, smart energy storage etc. All of these applications require literally millions of remote sensor & control (IoT) nodes connected through networks to cloud-based control centres. Such network complexity is only feasible and practicable with wireless mesh networking covering metropolitan and rural areas – coverage that until now was the domain of the cellular network. DECT-2020 NR has been designed to incorporate highly reliable high-performance wireless mesh networking, that will make deployment of such massive machine communication not only possible but economically attractive.

PMSE (Program Making and Special Events):

By reducing acoustic/RF latency to < 5 milliseconds for more than ten coexisting channels and keeping DECT's extremely high QoS performance, DECT is poised to deliver a viable supplement to UHF Band wireless microphones, where the available TV spectrum is gradually being reduced.

Industry 4.0 (next generation factory automation) :

The unparalleled robustness of DECT combined with DECT-5G's over-the-air *fixed* digital latency of less than one millisecond will make DECT the only wireless control and sensing solution fast enough and reliable enough for semi-autonomous vehicles working in the Industry 4.0 "Factories of the Future."

Seamless Collaboration :

As organisations of all shapes and sizes seek ways to globalise and become as responsive, and agile as customers increasingly demand, and at the same time strive toward a carbon-neutral future, the need to be highly effective and secure collaborators in the real world *and* in cyberspace will become one of the biggest challenges to be faced in the decades to come.

And in the post-Covid world, **Hybrid Working** will further transform collaboration needs. The universal challenge for the first half of the 21st century will be to make collaboration intuitive and effective, regardless of location, making **communication and information sharing, a seamless experience for all individuals and teams**.

Powered by DECT and DECT NR+, professional collaboration applications promise to *further* eradicate the dual frustrations of **a) lack of integration and b) a lack of 'inclusiveness'** faced by physical present and remote collaborating participants – especially those with disabilities.

The future for DECT and DECT NR+ for professional applications holds great promise, to innovatively adapt to future customer needs. This was clearly evident during Covid-19 Pandemic, when behind the scenes, DECT-enabled products played their part in the fight to keep our societies safe, supplied and cared for! DECT Intercoms & headsets were used extensively to keep teams well-coordinated and deal with emergencies. The DECT technology and the ingenious engineers behind DECT Professional products will strive to exceed all expectations of their customers, users, and those of us that sometimes without knowing, depend on this extraordinary technology!

DECT Professional Gallery