Appendix 2 - Overview & Scrutiny Board – Call for Evidence – 5G Background and Information

Contents

1. What is 5G?

This section outlines two views 1. UK government 2. UK regulator for communications services, Ofcom

UK Government

5G is used to describe the fifth generation of mobile communications technologies. It is anticipated that it will deliver a step change of ultrafast, low latency (i.e. quicker reaction times), reliable, mobile connectivity that is able to support ever-larger data requirements, as well as wide-ranging new applications. 5G has the potential to transform communications and is likely to lead to new business models and innovation in service provision. Given the potential size of the global 5G prize - a recent report estimated 5G will enable USD$12.3 trillion of global economic output in - we need to ensure that the UK is at the forefront of 5G

Source: Next Generation Mobile Technologies: An update to the 5G strategy for the UK (Department of Culture, Media and Sport, December 2017)

Ofcom

5G is the new generation of wireless technology.

It follows previous generations of mobile technology such as 3G - which gave us mobile internet access that led to the launch of smartphones - and 4G - which offers much faster browsing and allows us to do things like watching videos on the move.

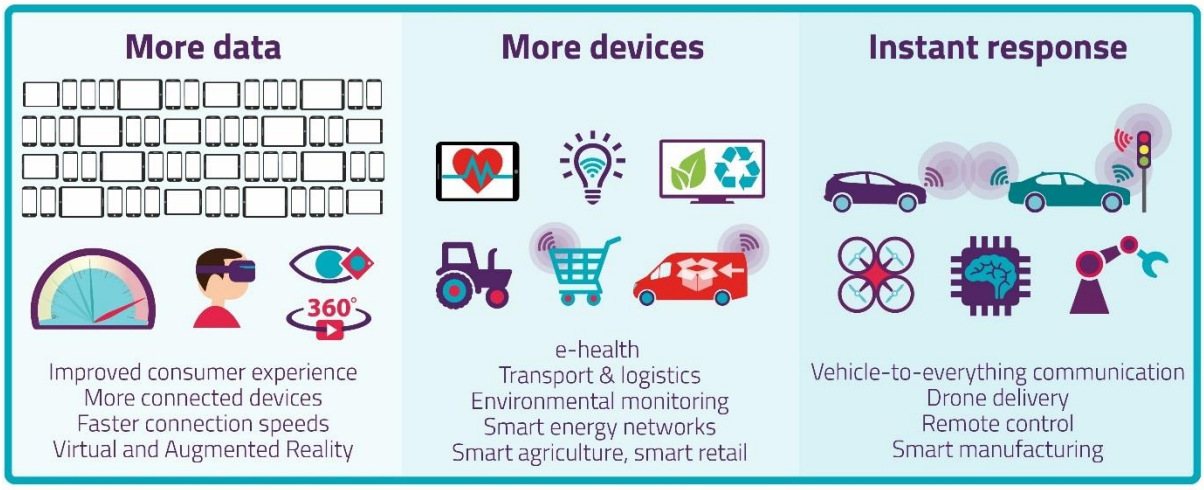
UK consumers are using 40% more data every year. 5G goes further than previous technology, offering the capacity for thousands of devices in a small area to be connected at the same time.

One of the main differences is how responsive 5G is. For example, gamers will see an end to the slight delays that can occur, when games can take time to reflect what they're doing on their controller.

But the biggest differences are expected to go far beyond improving the way we use existing products like smartphones or games consoles. The instant connection 5G offers and its capacity to have thousands of devices connected at one time opens up the potential for new, innovative services.

For example:

- Manufacturers could use more automated machinery, providing and reacting to real-time data to improve efficiency;
- Transport networks, local authorities and other public bodies could use it to improve public services like parking, traffic management and street lighting; and
- It could also bring revolutionary changes to healthcare. For example, by enabling technology that allows medical students to practise surgery in a connected, virtual reality environment that reflects a real-life experience – even enabling them to 'feel' the surgery they are training to deliver



Source: Ofcom, what is 5G?

www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/advice/what-is-5g

2. UK Government's 5G Strategy

The Government's strategy for future digital infrastructure – full-fibre and 5G – is set out in Department for Culture, Media and Sport's Future Telecoms Infrastructure Review (FTIR), published on 23 July 2018. In the FTIR, the Government set a target that the majority of the population will be covered by a 5G signal by 2027.

DCMS's 5G Strategy states that, 'Government has a clear ambition that the UK should be a global leader in 5G so that we can take early advantage of its potential and help to create a world-leading digital economy that works for everyone'.

Government has set aside significant funding to achieve this ambition. This includes the £31bn National Productivity Investment Fund, from which the £1.7bn Transforming Cities Fund for intra-city transport is being supported.

£1bn of public investment has also been set aside to boost digital infrastructure including £200m for 5G testbeds and trials and £190m for local ares to encourage 'Full Fibre' rollout. Each of these funding opportunities , plus many others are being made available to local authorities.

Example DCMS funded 5G projects are Rural First (Orkney Islands); 5G Smart Tourism (Bristol); Worcester 5G Consortium (Manufacturing); Liverpool 5G Testbed (Adult & Social Care); West Midlands Combined Authority (Smart City at Scale); 5G Rail Next (Infotainment); National Cyber Security Centre (Security).

Applications are currently open for Industrial 5G Testbed and Trials, focusing on manufacturing and logistics.

Sources and relevant documents:

Houses of Parliament Library: 5G
https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7883

- 5G in the UK
- Challenges for 5G
- Spectrum for 5G

Future Telecoms Infrastructure Review

https://www.gov.uk/government/publications/future-telecoms-infrastructure-review

Next Generation Mobile Technologies: An update to the 5G strategy for the UK (Department of Culture, Media and Sport, December 2017)

https://www.gov.uk/government/publications/next-generation-mobile-technologies-an-update-to-the-5g-strategy-for-the-uk

3. Commercial Operator 5G Roll Out Plans

Commercial operators have already begun to roll out 5G in the Sub 6GHz band in key UK cities.

For example, Vodafone is live in Birkenhead, Birmingham, Bolton, Bristol, Cardiff, Gatwick, Glasgow, Lancaster, Liverpool, London, Manchester, Newbury, Plymouth, Stoke-on-Trent and Wolverhampton, with Blackpool, Bournemouth, Guildford, Portsmouth, Reading, Southampton and Warrington following later this year.

02's 5G network will switch on in October 2019, going live in 20 towns and cities this year and a total of 50 by Summer 2020

Three's initial 5G offering is only available as home broadband in London. By 2019, Three plans to have brought 5G to parts of the following locations: Birmingham Bolton Bradford Brighton Bristol Cardiff Coventry Derby Edinburgh Glasgow Hull Leeds Leicester Liverpool London Manchester Middlesbrough Milton Keynes Nottingham Reading Rotherham Sheffield Slough Sunderland Wolverhampton

EE have launched 5G in London, Birmingham, Manchester, Edinburgh, Belfast and Cardiff.

In 2019, 5G will be introduced in Bristol, Leeds, Nottingham, Coventry, Leicester, Sheffield, Glasgow and Liverpool, Hull and Newcastle

In 2020, 5G will launch in Aberdeen, Cambridge, Derby, Gloucester, Peterborough, Plymouth, Portsmouth, Southampton, Wolverhampton and Worcester

Sources:

Vodafone.co.uk

O2.co.uk

Three.co.uk

EE.co.uk

4. UK Government Funded 5G Testbed Use Cases (Case Studies)

(i) Case Study: Liverpool (Adult & Social Care)

By 2022, it is expected that analogue services will be switched off, which means Liverpool City Council must find affordable and future-fit technologies to replace current telehealth services. 5G technology offers tangible solutions that have the potential to exceed the status quo by providing more reliable, agile, responsive, and targeted solutions; digitalised health and social care services that can be scaled up affordably.

The following proposed trials are intended to be undertaken within the Liverpool 5G Testbed:

- *Telehealth in a Box* – improving communication between hospitals and the community
- *Pharmacy in the Home* – on call access to pharmacy assistant for vulnerable people in their own home
- *Use of ambient IoT sensors in home* care *services* – keeping people living independently at home for longer
- *Push to Talk* – a device to reduce social isolation
- *Reducing Loneliness in Older People* – using emerging technologies and apps to bridge physical distance, using 5G
- *Remote Hydration Monitoring* for vulnerable people;
- *Consent-based trusted analytics/research (TAE/TRE) environment,* with access for researchers/analysts across the UK
- *Chromatic Cameras in Home Care Settings* – comparing patterns of behaviour at home
- *Cloud Based Clinical Mobility* – using 5G to accelerate mobile solutions
- *Optimising access to and use of 5G networks for multiple IoT devices.*

Liverpool 5G Health and Social Care's goal is to provide affordable 5G connectivity to digitally deprived communities. This would help keep people healthier for longer, creating opportunities that are available to everyone, regardless of income or location. Liverpool 5G will continue to work towards realising the benefits of these possibilities.

The 'digital twin' of Kensington (an online visualisation of the area), designed by CGA simulation, has enabled the project to find the perfect 'lines of sight', needed to place the 5G nodes for the network. They can do this online and can see the exact location of trees, buildings and other obstructions, which means we can avoid them entirely and plan our equipment around them, without disrupting the surrounding environment.

The usability, accessibility and the desirability of any products being used in the [Liverpool] project is very important to them and we will continue to assess the usefulness of any products we are using. The creation of the Adoption Readiness Level (ARL) policy has given them a better understanding of how useful and easily adopted our technologies have been for those using them. The policy ensures that they continue to create technologies that respond to a need within the sector.

Sources: How can 5G Support the transformation of health and social care services? (Tech UK, July 2019)

https://www.techuk.org/insights/reports/item/15804-5g-supports-the-transformation-of-health-and-social-care-services

(ii) Case Study: Bristol (Smart Tourism)

Earlier this year, Bristol hosted a one-day showcase - Connected Futures - where visitors were invited to take part in a series of innovative events ranging from virtual reality to augmented reality to 360° video and locative media, allowing them to sample a wide range of the future applications of 5G technology and its undoubted potential to transform tourism and commercial activity in the region.

The BBC demonstrated the potential of augmented reality with a high bandwidth network, building on their successful 5G trial at the Roman Baths in Bath of an app developed with Aardman Animation, which combined Virtual Reality (VR) and Augmented Reality (AR) content to bring three periods of the Bath's rich history to life; beginning with the mythical discovery of the hot springs by King Bladud, through disrepair and final renovation during the Victorian Era.

The University of Bristol Smart Internet Lab enabled the public to take part in 5G events in Bristol and two locations in London and create a perfectly synchronised experience for the remotely located audiences. Key 5G technologies deployed and managed across all three locations provided the connectivity and latency required for audiences to feel in the same natural space.

Bristol also demonstrated how 5G technology can enhance the planning, management and incident response within an urban setting, particularly at large outdoor public gatherings, like festivals. This was made possible by allowing the whole architecture of the network to be controlled and sliced to deliver a range of advanced consumer and safety-critical services required by a particular event. These systems use real-time analytics to detect incursions into dangerous areas, left objects as well as unauthorised people and vehicles - cultivating safer environments on the Bristol Harbourside, managed by the Bristol Smart Operations Centre, and delivering faster response times for the emergency services to reach those in need.

https://www.bristol.ac.uk/policybristol/news/2019/5g-smart-tourism-project-to-host-connected-futures-showcase-across-bristol.html

(iii) Case Study: West Midlands 5G Trial: The Connected Ambulance

In September 2018, the West Midlands was selected to become the first multi-city 5G testbed as part of the Government's Urban Connected Community Project. The project developed a large-scale 5G pilot across the region, with hubs in Birmingham, Coventry and Wolverhampton. Through this competition, the West Midlands Combined Authority (WMCA) was selected with their bid that focuses on the health, construction and automotive sectors, with its overarching ambition to help drive economic growth and benefit people's lives through participation in new digital technologies and digitally transformed public services. Most recently, the authority partnered with the University Hospital Birmingham NHS Foundation Trust (UHB) to demonstrate the benefits of a 5G connected ambulance.

The demonstration, which is designed to serve as a real case study, has shown ways in which 5G connectivity can facilitate the work of public and emergency services, saw paramedics conduct an ultrasound scan on a patient with real-time remote guidance from a clinician viewing the ambulance through a 5G connection. This has been done using a joystick operated remotely by the clinician which sends control signals over the live 5G network to a robotic glove worn by the paramedic. Cameras are also installed in the ambulance which transmits a high definition view of the overall scene inside of the ambulance covering the patient and paramedic to a second screen located to the clinician's workstation. Enabling ultrasound scans to be performed by paramedics on-the-go and

reviewed remotely by an expert clinician through a 5G network has the potential to speed up diagnoses for patients, as well as reduce the number of ambulance journeys and emergency department visits.

https://www.mobileeurope.co.uk/press-wire/connected-ambulance-bt-demonstrates-uk-s-first-remote-ultrasound-over-5g

5. UK Government Funded 5G Testbeds (Infrastructure)

The following places are already deploying 5G in a test environment

(i) Liverpool Testbed Technology:

The Liverpool 5G testbed includes "A blend of advanced low cost 5G technology and modern applications designed to revolutionise the future delivery of health and social care" as set out below:

- Fixed 5G mmWave networks (60+ GHz) (licence free);
- Open Source 5G networking software on an open platform 5G Mesh technology;
- Long-Range Wide Area Network (LoRaWAN) providing connectivity for the 'Push-to-Talk' trial;
- Intelligent IoT sensors to aid independent living in the home;
- High resolution video and distributed artificial intelligence (AI) for patient event and movement monitoring;
- Teleconferencing, Augmented Reality (AR), and Virtual Reality (VR), etc. to manage loneliness in older adults;
- High resolution video and remote diagnostics for 'telehealth in a box', facilitating communication between hospitals and the community;
- Edge and/or cloud computing.

http://liverpool5g.org.uk/

(ii) Bristol Testbed Specification:

The following technology has been deployed at Bristol:

- 4G and 5G Cloud Network Solution operating: EPC, LTE-A, 5GNR, M-MIMO on frequency bands at 2.6GHz, 3.5GHz, 26GHz and 60GHz;
- Self-organising multipoint-to-multipoint wireless mesh network in 26GHz mm-wave;
- Multi-vendor Wi-Fi access points;
- Li-Fi access points;
- Datacentre, Cloud and Network Function Virtualisation hosting on Openstack and Cloudband using high end compute;
- Quantum Key Distribution solution for enhanced security;
- Advanced fibre optics FPGA convergence of transmission network integrating Elastic Bandwidth-Variable Transponders;
- Software Defined Network (SDN) - SDN enabled L2 packet switched network and L3 service routers; SDN enabled optical fibre switched network.

6. BCP Council 5G Plans (Use Cases/Trials)

As part of the work required to deliver the Dorset LEP funded Pipeline Programme '5G Pilot', officers of the Council, have drafted the following use cases in readiness for delivering the '5G Pilot'

(i) Public Safety (drafted in consultation with Devon & Cornwall and Dorset Police, the Home Office and the National Police Chief's Council for BCP Council's application to DCMS 5G Testbed and Trial's Programme in January 2018)

Public safety is critical for the UK and for the BCP area. The number and types of challenges law enforcement services face is growing at local, national and international level, while at the same time they experience pressure in terms of available resources. In Bournemouth, a combination of high profile events (the annual Bournemouth Air Festival attracted 800,000 people in August 2019) and fast growth (BCP has a thriving night time economy fuelled by the presence of two universities in the area) is putting increasing pressure on local policing resources. Developing 5G capabilities will enable the more efficient and effective management of available resources and drive productivity in these services.

This use case demonstrates how the high capacity and high bandwidth of 5G will bring can increase police officer operational effectiveness in all stages of handling an incident using High Definition Real Time Video (HD RTV) streaming to officer mobile phones including:

- Preparation: on their way to an incident, police officers are able to directly stream live HD RTV footage from CCTV cameras thus increasing their situational awareness and allowing them to be better prepared and make tactical decisions on their mode of intervention
- Protection: increased situational awareness and being better prepared also contributes to the protection of the police officers
- Enforcement: Once the incident is contained, officers can review high quality video footage and use it as evidence during their in-situ interrogations, thus reducing the chance of making unnecessary arrests or detaining innocent people is reduced;
- Evidence: if needed officers can overlay forensics data onto HD quality video footage using augmented reality methods thus being able to digitally recreate a crime scene;
- Prosecution: Quick access to evidence material can greatly accelerate prosecution processes and reduce corresponding costs.

The innovative aspect of the trial is enabling police forces to have access to consolidated streams of high quality information from multiple sources such as CCTV Cameras, devices and eventually body worn cameras in real-time. 4G networks do not have the reliability, capacity or latency that 5G will provide.

Benefits will be proven at an individual police officer level, increased and augmented situational awareness will enable officers to be better prepared, more efficient and eventually safer. At a local police force level, assets and resources will be more efficiently managed. At a national level the technical solutions and practices that will be developed and demonstrated in this trial will be transferrable and applicable to all police forces across the UK as well as in other sectors, such as fire & rescue and first responder teams.

(ii) Health: Drafted by Dorset Clinical Commissioning Group

Tech UK: How can 5G support the transformation of health and social care services? July 2019

"The adoption of digital tools in the health and social care sector has increased rapidly in recent years, from patient-facing apps to communication tools for clinicians and social workers. Digital Connectivity is an essential, though often overlooked, pre-requisite to realising the full benefits of these tools.

Technology is the catalyst in the rebalancing of investment from cure to prevention; from health to social care; and from professional locations to wherever is convenient for the public. The healthcare technology revolution comprises both medical grade devices, supplied to the public by medical professionals, and consumer products. The former is tested and approved by regulators, but the latter is usually not.

In this revolution, data will be key: getting a consistent series of trustworthy data from patient to professional. Connectivity will be crucial, where 5G will be the latest tool in the box alongside Wi-Fi and previous generations of mobile technology. What 5G offers is fast, secure, reliable, low latency (delay) connectivity, and (for in-home use) removes a reliance on the patient to have broadband (which many with chronic conditions may not have)."

A key focus of the NHS Long Term Plan is self-management via digital health apps and wearables for promoting independence and helping facilitate behaviour change.

The CCG have explained how existing local health self-management applications may benefit from 5G in the future.

What is myHeart?

myHeart is a comprehensive digital health application that can be combined with a wristband (wearable technology) that collects and connects real-time patient data to a mobile application. The mobile application enables the patient to manually record data around their condition. The clinician can then view this data and make interventions and adjustments to treatment where appropriate without needing to see a patient in person. It is for patients suffering with heart conditions including; Heart Failure, Angina, Heart Attack, Post PCI, Valve Replacement, Valve repair, Coronary Artery Bypass Graft Surgery (CABG) and Valvular Heart Disease. Robotic innovation and wearable technology acts as an elastic band around the person according to risk.

myHeart helps change patient behaviours and encourages patients to prevent themselves becoming unwell, developing a long-term condition or to manage a condition in the best possible way when away from the medical teams.

For clinicians, this application helps ease pressure on the currently stretched health workforce and frees up capacity that supports the growing demand on health services.

myHeart Patient

"*I started using myHeart 5 months ago. I attended a half day educational session and got introduced to myHeart. It is a most useful tool. It has helped me manage my condition and it has kept me focused.*

I use it every day, so I find it easy to navigate. I log in every day in the morning and record the medications I have taken. If I have forgotten I can add medications retrospectively for up to 5 days. I record cholesterol, BP and how long I have exercised for and number of steps. I do walking and

swimming. I have lost half a stone already. I take my i-Pad everywhere, even in my holiday. myHeart has become part of my daily routine" (myHeart 63)

Why is 5G is needed?

For clinical effectiveness, interventions require accessibility at any time and, most importantly, when away from the safety and comfort of one's own home. 5G will enable the reliability of connectivity and the capacity required to support the millions of devices that are expected to connect to the mobile network in the future, which 4G will not be able to support.

Strategic Context

Like the health services of all developed countries, the NHS is facing multiple pressures that undermine the sustainability of the service in its current form. In 2019, there are more than three million people aged over 80 years old living in the UK. By 2030, this figure is projected to almost double, and by 2050 reach eight million.

The ageing population is a major factor. We are living longer lives because of medical advances, better drugs, healthier lifestyles, and safer workplaces. A girl born in the UK today has a one in three chance of living to 100, and the chance of living to 100 will double in the next 50 years. This is certainly something to celebrate. Infectious diseases are no longer a significant threat. Heart attacks do not claim the lives of people early in the same numbers. Even cancer is not the death sentence it once was - half of people now survive for a decade or more.

But the prospect of longer lives will create new demands for new care technologies, products and services. People are living with a growing number of long-term chronic conditions such as diabetes, heart disease and dementia. These are more about care than cure - what patients usually need is support. By the age of 65, most people will have at least one of these illnesses. By 75 they will have two and therefore the demand for health services will increase to help patients with the care of these conditions.

A key pillar of DCCG's Digitally Transformed Dorset Programme is 'Infrastructure, driven by Enabling Technologies, including Smart City', which includes implementing the right infrastructure to deliver projects such as WIFI, broadband, 4G and 5G throughout Dorset.

7. BCP Council 5G Plans (Proposed Infrastructure)

Bournemouth Borough Council was awarded £8.75m from government's Growth Deal initiative, administered through the Dorset Local Enterprise Partnership (Dorset LEP), for a regeneration programme around the Lansdowne. £900k of this funding was set aside for creating a digital pilot project and some of this funding has gone towards installing a fibre ring around the Lansdowne area, with the potential to link in with the University digital network.

BCP Council has recently been awarded a further £1m from the Dorset LEP Pipeline funding (subject to formal agreement) to develop the 5G aspects of the digital pilot in the Lansdowne area of Bournemouth.

Overall the Lansdowne Digital Pilot plans include:

- The extension of fibre networks;
- An 'Internet of Things' IoT network around the Lansdowne (Sigfox; LoRaWAN; (800-900 MHz) or NB-IoT (LTE/4G Network));
- A Public Wi-Fi (2.4GHz & 5GHz) network around the Lansdowne;
- A proof of concept 3.8 to 4.2GHz 5G mobile network around the Lansdowne;
- A proof of concept 26GHz mmWave 5G outdoor mobile network around the Lansdowne;
- Development of a digital and 5G core network (hardware and software) to be able to test the networks;
- A link into the UK5G Exchange via the university JANET system;
- A link into a commercial data centre;
- 5G (3.8-4.2 GHz and mmWave) mobile phones, modems and devices.

Further work may include the trial of indoor 5G in the 3.8 -4.2 GHz range at specific locations.

The pilot will include the testing and commissioning of radio equipment both prior to and after installation to ensure compliance with international radio wave emissions (ICNIRP) standards. The pilot could also be used to test ambient radio wave emissions.

8. 5G Health Matters

Public Health England (PHE) takes the lead on health matters relating to radio frequency electromagnetic fields (radio waves) and 5G. PHE's advice is informed by the work of expert bodies such as the World Health Organization (WHO). The WHO has been undertaking an extensive review of the evidence for health effects arising from exposures to radio waves, including the sort emitted by 5G networks.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP), which is formally recognised by WHO, independently produces exposure guidelines for exposure to radio waves. ICNIRP's website states:

"As an independent organization, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) provides scientific advice and guidance on the health and environmental effects of non-ionizing radiation (NIR) to protect people and the environment from detrimental NIR exposure."

Public Health England advice on 5G:

Public Health England summarises its position on radio waves and health relating to mobile phone base stations on its website, and this has been updated to include information relating to 5G as this technology develops.

The health effects of exposure to radio waves have been researched extensively over several decades. Independent expert groups in the UK and internationally have examined the research and their conclusions support the view that health effects are unlikely to occur if exposures are below international guideline levels.

PHE's main advice about radio waves from base stations is that the guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) should be adopted for limiting exposures. ICNIRP guidelines relate to frequencies used by both existing mobile systems and those intended for 5G.

It is the responsibility of the industry to ensure the total exposure remains within ICNIRP guidelines.

PHE advises that it is possible there may be a small increase in overall exposure to radio waves when 5G is added to an existing network or in a new area, but the overall exposure is expected to remain low relative to exposure guidelines and therefor there should be no consequences for public health. ICNIRP guidelines apply up to 300 GHz, well beyond the maximum (few tens of GHz) frequencies under discussion for 5G.

Public Health England (PHE) continues to monitor the health-related evidence applicable to radio waves, including in relation to 5G, and is committed to updating its advice as required. In 2018 ICNIRP produced new draft guidelines for public consultation and final guidelines are anticipated to be published in the autumn of 2019.

Dorset Clinical Commissioning Group Statement

"There has been extensive scientific enquiry into the effects of non-ionising radiation and radiofrequency electromagnetic fields, including the potential impact on health (Health effects from radiofrequency electromagnetic fields, Health Protection Agency, 2012). To date, there has been no credible evidence of harms caused to humans as a result of exposure to mobile phone signals despite rigorous scientific study and surveillance. UK Government has an ambition to be a global leader in 5G and the proposed roll-out of the 5G network by commercial operators maintains public exposure to levels below international guidelines. Consequently, there does not appear to be any cause for health concern in the implementation proposed. This remains an area of active research and monitoring."*

Dr R.A. Page, Chief Clinical Information Officer, Poole Hospital NHS Foundation Trust

** The Health Protection Agency 2012, has been superseded by Public Health England.*

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/333080/RCE-20_Health_Effects_RF_Electromagnetic_fields.pdf

9. BCP Council responsibility as the Local Planning Authority

BCP Council main responsibilities in regard to the commercial roll-out of 5G is as the Local Planning Authority (LPA). Local Planning Authorities should comply with The National Planning Policy Framework (NPPF) which sets out the Government's planning policies for England and how these should be applied.

Chapter 10 of the NPPF covers 'Supporting high quality communications' and sets out the high-level responsibilities of councils and of planning applicants. Chapter 10, Section 112 states:

"Advanced, high quality and reliable communications infrastructure is essential for economic growth and social well-being. Planning policies and decisions should support the expansion of electronic communications networks, including next generation mobile technology (such as 5G) and full fibre broadband connections."

In regard to planning applications for communications networks, Chapter 10, Section 114 of the NPPF requires councils to ensure that:

a) they have evidence to demonstrate that electronic communications infrastructure is not expected to cause significant and irremediable interference with other electrical equipment, air traffic services or instrumentation operated in the national interest; and

b) they have considered the possibility of the construction of new buildings or other structures interfering with broadcast and electronic communications services.

Chapter 10, Section 116 of the NPPF states that local planning authorities (councils) must determine applications on planning grounds only. They should not seek to prevent competition between different operators, question the need for an electronic communications system, or set health safeguards different from the International Commission guidelines for public exposure.

In accordance with Chapter 10 (Section 115) of the NPPF, applications from commercial mobile network operators for the development of 5G networks (including applications for prior approval under the General Permitted Development Order) should be supported by the necessary evidence to justify the proposed development. This should include:

a) the outcome of consultations with organisations with an interest in the proposed development, in particular with the relevant body where a mast is to be installed near a school or college, or within a statutory safeguarding zone surrounding an aerodrome, technical site or military explosives storage area; and

b) for an addition to an existing mast or base station, a statement that self-certifies that the cumulative exposure, when operational, will not exceed International Commission guidelines on non-ionising radiation protection; or

c) for a new mast or base station, evidence that the applicant has explored the possibility of erecting antennas on an existing building, mast or other structure and a statement that self-certifies that, when operational, International Commission guidelines will be met.

A mobile network operator may submit a planning application for prior approval under the General Permitted Development Order (Part 16 of Schedule 2 of the GPDO 2016). Prior approval applications establish the principle of the development as permitted development but require operators to obtain the prior approval from the LPA on the siting and appearance of the items to be installed, in addition to providing the 'necessary evidence' set out in NPPF Chapter 10 Section 115.

The factors which can be considered in relation to appearance as part of the prior approval process include:

- design, form, shape and dimensions
- colour and materials,
- whether there are more suitable sites for the proposed works.

The factors which can be considered concerning siting include:

- height of the site in relation to surrounding ground
- existing topographical features and natural vegetation
- the effect on the skyline or horizon
- the site when observed from any side
- the site in relation to areas designated for scenic value
- the site in relation to existing masts, structures and buildings
- the site in relation to residential properties

The Local Planning Authority can set local planning policies either within its statutory Local Plan or within a Supplementary Planning Document. BCP Council has not set out any specific local planning policies in regard to 5G networks, but if it were to produce any local polices these would need to align with the NPPF.

10. Background Papers

Industrial Strategy: Building a Britain Fit for the Future (Department for Business Energy, Industry and Skills)

Next Generation Mobile Technologies: An update to the 5G strategy for the UK (Department of Culture, Media and Sport and Cabinet)

How Can 5G support the transformation of health and social care services? Tech UK

https://www.techuk.org/insights/reports/item/15804-5g-supports-the-transformation-of-health-and-social-care-services

https://www.gov.uk/government/publications/future-telecoms-infrastructure-review

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/333080/RCE-20_Health_Effects_RF_Electromagnetic_fields.pdf