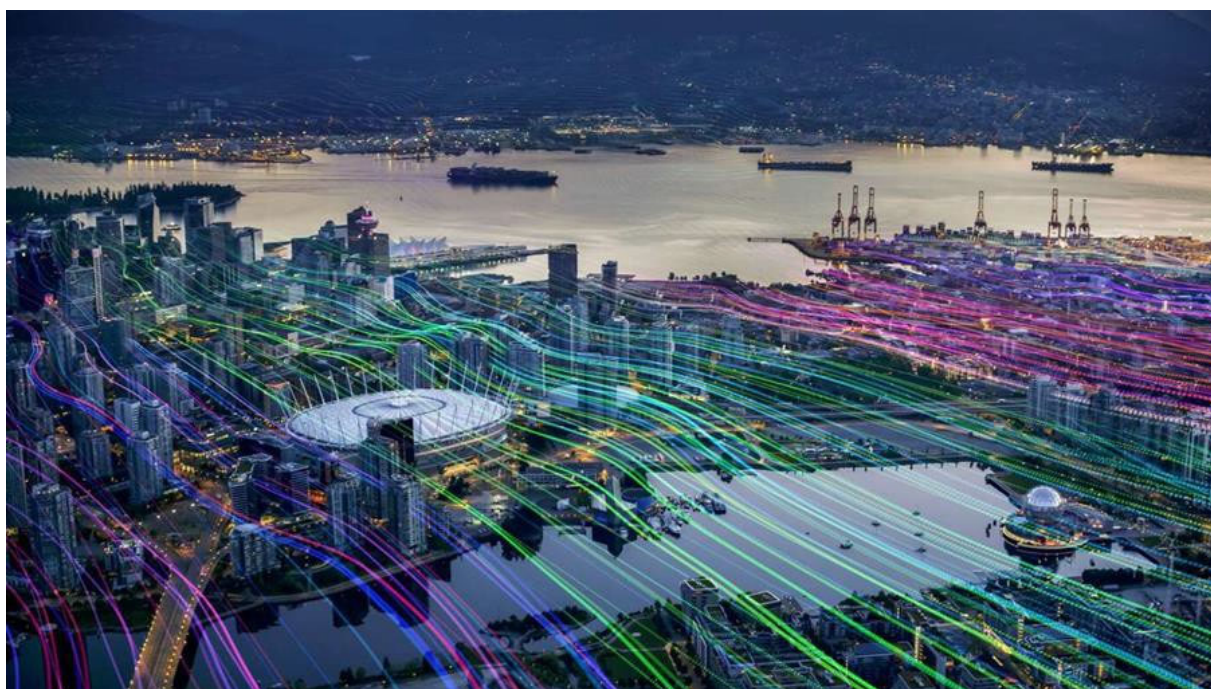


# Ofcom Consultation

## Potential spectrum bands to support utilities sector transformation



### About [Ericsson](#).

Ericsson is one of the leading providers of Information and Communication Technology (ICT) to service providers. We enable the full value of connectivity by creating game-changing technology and services that are easy to use, adopt, and scale, making our customers successful in a fully connected world. Our comprehensive portfolio ranges across Networks, Digital Services, Managed Services and Emerging Business; powered by 5G and IoT platforms.

Ericsson welcomes the opportunity to respond to Ofcom's [Call for Input: Potential spectrum bands to support utilities sector transformation](#). Response is due on 7 September 2023.



## Summary

Utility companies face significant near- and long-term challenges, steadily growing demand, a changing mix of energy sources that includes renewables and rapidly increasing complexity in sustainability, cost control, cybersecurity and much more.

Utilities require digital transformation to adapt and address these challenges. Mobile connectivity is a fundamental enabling technology that underpins a wide range of digital transformation use cases, thanks to its wide area coverage, reliability, strong security, high performance, scalability, and its nature as a future-proofed technology.

Digital transformation, underpinned by mobile connectivity, can meet challenges across the entire rapidly changing value chain, from generation to distribution and transmission all the way to consumption. Mobile connectivity provides a robust, secure, and scalable method for collecting data from huge numbers of embedded sensors throughout the infrastructure, but can also enable extremely low-latency, high throughput communications for use cases that need real-time data transfer.

Standardised 3GPP wireless networks enable utility organisations to plan long term, supporting multiple use cases with a single deployment and providing seamless indoor and outdoor coverage.

Spectrum policy considerations for enabling digitalisation in the utilities sector: -

- Wherever possible Spectrum should be harmonised on an international basis and as a minimum regionally (across Europe), ideally with common technical and regulatory regimes.
- Harmonise spectrum ensures the widest range of devices, support for roaming, fewer cross-border interference issues, and economies of scale resulting in lower total cost of ownership.
- Harmonisation of spectrum is key to encourage the development of the eco-system particularly where there is a need for specialised devices.
- It may be necessary to allocate dedicated spectrum for critical control use cases as per the ranges identified by Ofcom.
- It is also anticipated that utilities will have a need for low and mid band spectrum for a wide range of use cases that require real time, low latency, high throughput, resilient and secure networks.
- A Multi-band spectrum strategy is likely to be needed for economically supporting the potential varied use cases.
- Utilities are likely to want to implement various use cases on nationwide, regional, and local basis.
- Due to the need for additional channel bandwidths and higher bandwidth applications it is anticipated that certain use cases could be delivered via the MNOs, with technologies such as QoS, Priority and Pre-emption (QPP) and network slicing, using the MNOs wide area coverage and multiband spectrum networks.
- Dedicated spectrum is expected to be in operation in specific locations, and there will be areas where the spectrum is not in use. It may be possible to explore sharing the spectrum across other critical communication users or verticals.



## Consultation Questions

### Question 1:

**Have we correctly identified the key changes in the utilities sector that could lead to additional spectrum requirements?**

There are numerous use cases that will be enabled by mobile networks addressing the near- and long-term challenges faced by utilities. Examples of use cases include intelligent grid management, predictive maintenance, remote site inspections, digitally-enabled workforce, intelligent load flow control, plus many more.

### Question 2:

**What alternative communication solutions might play a role in meeting the future operational communication needs of the utilities sector, alongside or instead of additional spectrum for a private network?**

Due to the wide variety of use cases, it is anticipated that utilities will require access to mobile networks with multiple bands particularly low and mid band spectrum. Use cases are likely to be deployed on a nationwide and/or regional basis. An approach could be a combination of dedicated networks to address coverage and capacity needs that are critical for the management of utility infrastructure, as well as the use of a private slice(s) over public networks, for higher bandwidth and/or less critical services such as best effort monitoring and predictive maintenance.

It is likely that utilities will have an arrangement to use commercial networks as a fallback/backup in the extreme event of loss of connectivity within their own private network.

### Question 3:

**Are there any other spectrum bands we should consider for use by utilities?**

Due to the wide variety of use cases, it is anticipated that utilities will require access to mobile networks with multiple bands particularly low (to address their extensive coverage needs on a viable economic basis) and mid band spectrum (to address new innovative use cases, often requiring higher bandwidths). It may be possible to fulfil this demand via a combination of dedicated networks to address coverage and capacity needs for use cases and applications that are critical for the management of utility infrastructure, as well as the use of a private slice(s) over public networks, for higher bandwidth and/or less critical services such as best effort monitoring and predictive maintenance.

### Question 4:

**Do you have any comments on the three bandwidths we have considered that might be necessary to support a private network for utilities? Please reference our capacity analysis in annex 7 where relevant.**

The table below gives an illustration of different audio and video Codecs with their respective bitrate and maximum output throughput.

Service Type	Codec Type	Min/Max Bitrate
Video	H.264/AVC 720p HD	0.5 Mbps / 8 Mbps
	H.264/AVC Full HD	1 Mbps / 16 Mbps
	H.264/AVC UHD	32 Mbps
	H.265/HEVC Full HD	0.2 Mbps / 3.2 Mbps
	H.265/HEVC Full HD	0.4 Mbps / 7 Mbps
	H.265/HEVC UHD	19 Mbps
Audio	G.722	64 kbps
	G.722.1 (Wideband)	24 kbps / 32 kbps
	AMR-WB	6.6 kbps - 23.85 kbps
	EVS (Narrow Band)	5.9 kbps - 24.4 kbps
	EVS (Wideband)	5.9 kbps - 128 kbps
	EVS (Super Wideband)	9.6 kbps - 128 kbps
	EVS (Full Band)	16.4 kbps - 128 kbps



**Question 5:**

**Do you have any comments on our approach to examining each potential candidate spectrum band, including the factors relevant to assessing suitability, and the capacity and coverage analysis provided in annexes 7 and 8?**

When examining potential candidate spectrum bands, it is key to consider the channel bandwidth maximum throughput versus the use-case throughput requirements, the impact on the TCO from ISD (inter-site distance) when deploying low, mid, and high bands, as well as the possible interference with adjacent bands.

**Question 6:**

**Do you have any comments on our overview of the 400 MHz band in NI? Please consider the specific factors we have discussed in your response.**

No further comment

**Question 7:**

**Do you have any comments on our overview of the 450 MHz band in GB and NI? Please consider the specific factors we have discussed (including the coexistence analysis in annex 9) in your response.**

Based on number of deployments, the 450 MHz band is likely to be the most popular band used by the utility operators across Europe to address their critical mobile communication needs. Thus far, Sweden, Germany and Poland have or are in the process of deploying utility networks in this band, and others are expected to follow. The moves made by these early adopters are encouraging ecosystem equipment and application vendors to invest and thus driving competition and innovation.

**Question 8:**

**Do you consider that changes in the spectrum environment for the 450 MHz band mean that there is a case for re-examining whether this band should be reconfigured in the UK to align with the harmonised band plan?**

Several countries in Europe are deploying or actively considering deploying utility networks in the harmonised B31/72 bands; some of these countries are not far from the UK border. If the UK were to align with these band plans, it is likely to minimize future interference issues.

**Question 9:**

**Do you have any comments on our overview of the 700 MHz band in GB and NI? Please consider the specific factors we have discussed in your response.**

For information: Interest in the 700 MHz 'PPDR B28 2x3 MHz' is picking up amongst PPDR agencies across Europe. Thus far, there are a handful of countries that have deployed or are planning to deploy in the short term (next few years), and we expect that number to grow over the mid to long term.

**Question 10:**

**Do you have any comments on our overview of the 800/900 MHz band in NI? Please consider the specific factors we have discussed in your response.**

Railways globally are using 800/900 MHz frequency to run their operations (train control and voice communications), Please refer to ECC Report 294 for more information on GSM-R (standard and extended) frequency allocations.

On the other hand, n101 is allocated to FRMCS (Future Railways Mobile Communications System) and considered in European deployments. Note, the equipment ecosystem is not in place yet and is expected to take several years to emerge. The long-term intention is for GSM-R channels to be re-farmed to n101; however, we understand there are several operational challenges that some rail operators will face which may delay matters.



**Question 11:**

**Do you have any comments on our overview of the 1900 MHz band in GB and NI? Please consider the specific factors we have discussed in your response.**

N100 (1900-1910 MHz) has been allocated to FRMCS and is considered by many rail infrastructure organisations across Europe to be dedicated to critical control and voice communications, along with n101. Note, for this TDD band, the uplink and downlink traffic usage patterns have been tailored specifically to meet the needs of rail, and therefore may not be optimal for utilities.

**Question 12:**

**Which band(s) do you consider we should examine further with a view to developing consultation proposals to enable their use in a private network, if this were needed? Please reference the factors we have considered where appropriate and provide separate answers for GB and NI if relevant.**

No further comment