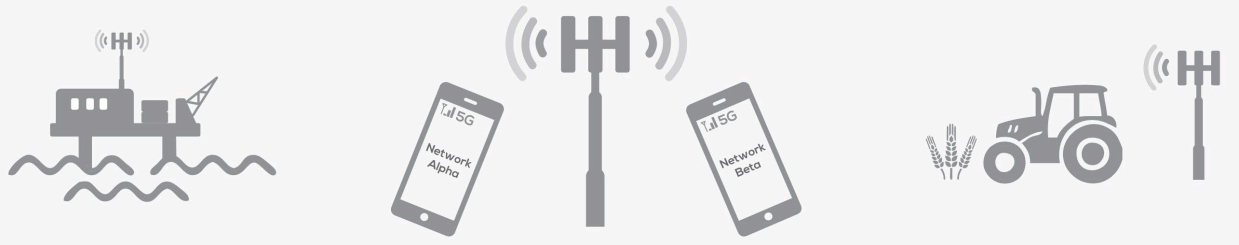


# CALL FOR INPUTS: EVOLUTION OF THE SHARED ACCESS LICENCE FRAMEWORK

## FROM

## NEUTRAL WIRELESS

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# Question 1

***How do you think demand for Shared Access is likely to change in future and why; Which use cases do you think are likely to emerge or grow, and which decline? Please provide a view on the bandwidth you would consider the minimum and optimal requirement for growth use cases, and timelines you would expect for their development.***

*Is this response confidential? – N*

We expect to see an increase in the number of SAL applications, specifically in the 3.8-4-2 GHz band, from the broadcasting market vertical for use in Content Production environments.

Over the last two years, Neutral Wireless has successfully demonstrated the commercial potential of private 5G networks as part of live and remote production scenarios.

Working with partners such as BBC R&D, BT Sport, and others through the IBC Accelerator programme, we have delivered high-profile network deployments – both domestically and internationally. Notable examples of such deployments include coverage of "Operation Unicorn" at Edinburgh Airport, the opening of the Danish Parliament in Copenhagen, and most recently as part of the coronation of His Majesty King Charles III in London.

The success of these implementations, alongside deployments at other prominent events such as the Commonwealth Games, is representative of an overall industry-wide increase in the use of private 5G networks within Content Production environments. These deployments could occur at stadia, in both urban and rural environments, at other locations where sporting events occur such as golf courses, and as part of "on location" news coverage.

Depending on the location and scale of production environment, networks will typically serve small coverage areas of less than 1km. Basestations will therefore require relatively low transmit power, and often use elevated antenna systems that are highly downward tilted. Carrier bandwidths of around 50-100 MHz will be required, depending on the content being supported.

## Question 2

***Are there elements of the current framework that complicate the use of Shared Access licences for specific use cases? If so, please provide specific examples and indicate the changes that would be required to facilitate this and how this might co-exist with other use cases.***

*Is this response confidential? – N*

To allow the Content Production use case to develop, and become even more commercially viable, there would need to be adjustments made to the licensing application processes, particularly with regard to the time taken to receive authorisation.

Currently, the uncertainty and long timescales for spectrum access are stifling the potential growth of this use case. To receive an SAL for a practical deployment, the broadcaster or equivalent entity must apply 6-8 weeks in advance of the event, assuming the initial submission is successful. This is incompatible with industry standard production schedules, before even considering coverage of on-location "breaking news" segments.

Similarly, the current minimum licence duration of 1 month greatly exceeds the requirements of a typical broadcast production network. The private network enabling coverage of the coronation of King Charles III required SALs for a period of only about one week to cover post-installation testing and the event itself.

Most Content Production deployments would need a licence with a duration of less than five days. This means that the spectrum would be unused for the majority of the currently allocated licence periods. An option for more flexibility in the active dates of a licence, or a shorter duration for certain deployment use cases, would be desirable by the industry.

Support of shorter licence durations would then allow for better spectral utilisation by reducing the time users are allocated frequencies that would be largely unused.

## Question 3

***Do you have any comments on the power restrictions currently in place, particularly in urban/high density areas, under the Shared Access licence? Please explain what benefits could be delivered using a higher operating power (e.g. medium power in urban areas), or any concerns you sharing with such operations).***

*Is this response confidential? – N*

We agree with the stakeholder feedback indicating that some deployment scenarios in urban locations could require medium power licensing. Some of these may be required only for short durations.

## Question 4

***Do you have any comments on the exceptions process, and how some of its benefits could be maintained within more standardised and automated assessments?***

*Is this response confidential? – N*

We encourage the existence of an exceptions process for deployments operating in unique environments or situations.

For the Coronation of King Charles III, eight medium power licences were issued to the BBC in Central London – an exception to the standard procedure, which would normally be restricted to low power licences.

It would be desirable for more details of the exception process to be made available to potential applicants.

We believe that manual assessment mechanisms can co-exist with an otherwise automated process – especially when the current rate of exception requests is a significant minority of total new licence requests.

## Question 5

***Do you have any views whether and how the coordination approach should be modified? If yes, please provide comments in light of the issues set out above.***

*Is this response confidential? – N*

The coordination methodology outlined in paragraph 2.21 does not seem reflective of real-world deployment scenarios. Most practical networks will very probably be using one or more directional antennas to provide coverage.

We believe that it is important for coexistence calculations to account for antenna directionality, tilt/orientation, and elevation. If they could also take into account the antenna patterns, this would allow for even more accuracy in the coordination approach.

For the private network enabling coverage of the Coronation, there were concerns regarding coexistence between the 5G deployment and nearby C-Band satellite terminals operating in the vicinity. As a result of this, there were compromises on the total allocated carrier bandwidths. It is debatable if elevated C-Band satellites would detect interference from terrestrial, relatively low power, gNB systems, especially considering that the antenna of these platforms would be pointing downwards from their minimal elevation.

We support the ability to supply additional information as part of a licence application, as this can only facilitate more accurate coexistence calculations.

Particular details, such as operating frame structure, could also be considered. However, we are strongly against the introduction of mandatory frame structure synchronisation in the 3.8-4-2GHz band, as we feel that this would significantly impact the flexibility of deployments and would hinder innovation.

## Question 6

***Do you have views on whether newer or emerging technologies can support coexistence between additional users in the band, and if so, how?***

*Is this response confidential? – N*

We believe that future generations of SDR-powered basestation equipment, particularly those based on the Xilinx RF-SoC platform, have strong potential as cognitive radio transmitters.

This will allow for devices that are capable of providing wireless connectivity while simultaneously monitoring, and optionally reporting on, their surrounding RF environment.

This is not necessarily a novel concept, as spectrum sensing has long been a component of DSA architectures, including CBRS in the US.

The significance of the RF-SoC platform is the capability to measure the entire FR1 frequency range, rather than solely the band being used for wireless connectivity.

We would be happy to participate in further investigations into this area coupled with future automated licensing and sandbox test environments.

## Question 7

***Please outline any comments on the current licensing process (e.g. ease of application, time taken, the information we require). If relevant, please note aspects you are currently content with and areas which could be improved.***

*Is this response confidential? – N*

We agree with the stakeholder feedback regarding the time taken to issue a SAL.

We are strongly in favour of the move towards automated mechanisms for the management and distribution of spectrum licences, and agree that this approach will enable accelerated turnaround times.

The duration of the application process is one of the major barriers to wider deployment of private 5G networks in live production environments. As highlighted in our response to Question 2, the current application process is too slow and not suited to the short application times that are required by Content Production schedules.

We believe that the amount of information currently requested as part of a SAL application represents a reasonable minimum level of detail. However, we support the presented option to provide deployment details beyond what are currently required, assuming, of course, that this would be genuinely useful and would be used in the coordination process. It may also be pertinent to include the number of expected terminals as part of the licence application process.

We also support the presented option to access additional information prior to application submission. While we acknowledge that the Spectrum Information Portal contains information on current licensees, it is not clear that this represents all of the information that could be useful to have prior to submitting a licence application.

## Question 8

***Do you have any comments on the suitability of available spectrum for your use cases? Please consider the relevance of the additional bands we are proposing for the framework, and the impact of any limitations on existing bands.***

*Is this response confidential? – N*

The 3-8-4.2 GHz band is primarily being targeted by the Content Production sector as it is the only frequency range available currently, under SAL or PMSE licensing, that offers enough bandwidth to support the live production use case.

Although larger carrier sizes are supported at mmWave frequencies, practical implementations of networks using this spectrum face a number of challenges. For example, the coverage areas of mmWave deployments are generally not sufficient to meet the requirements of most outdoor live production environments.

Outdoor Content Production environments would more probably prefer the option to use a frequency band with better propagation and coverage characteristics, such as in the <1 GHz range if sufficient bandwidth carriers could be made available.

We are strongly in favour of expansion of the current bands supported by the SAL framework and also of expansion of the SAL framework itself to include new bands. We note that broadcast and defence industries have a good precedent for spectrum collaboration, in particular the mutually beneficial spectrum sharing arrangements that exist around PMSE. There is a particular interest in enabling access to the MoD range 2300-2350 MHz for Content Production.

## Question 9

***Do you have any comments on equipment availability limiting deployment options in 3.8-4.2 GHz? Please comment on the impact of any experiences you have had, and where relevant, your expectations for when more equipment will be broadly available across the band.***

*Is this response confidential? – N*

While there is a challenge with regards to availability of basestation equipment for the full N77 band, there is also a limitation on COTS terminals, and this will impact the use cases that can be enabled by shared spectrum policies. This applies not only to the 3.8-4.2 GHz SAL but also to the 1800 MHz and 2300 MHz SAL bands as well as the LAL bands.

Essentially, the current ecosystem of mobile handsets for private 5G networks is being restricted by manufacturers through what are known as Carrier Configuration lists. Larger MNO carriers are included on these lists, while smaller (non-public) operators are not. This is effectively 'feature locking' on Voice over LTE (VOLTE) and also on 5G connectivity – in both NSA+SA.

As a result, it is currently not possible for the vast majority of COTS handsets to be used with private 5GSA networks. There are workarounds, but these are dependent on handset OS and they are not a cost effective or scalable solution for private network operators.

## Question 10

***Do you have any other general comments on the Shared Access framework? Please consider any areas where future innovations could further support Ofcom's policy objectives for this spectrum, and/or improve the experience for users.***

*Is this response confidential? – N*