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Spectrum Policy Forum - Cluster 3

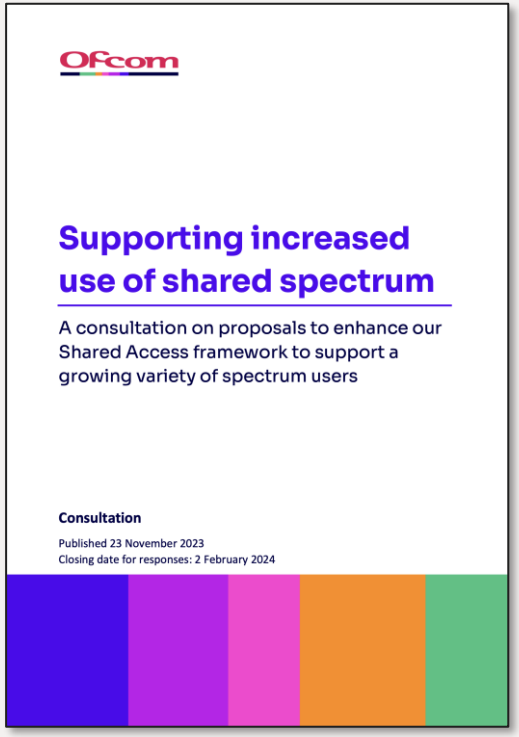
Shared Spectrum for Shared Networks!

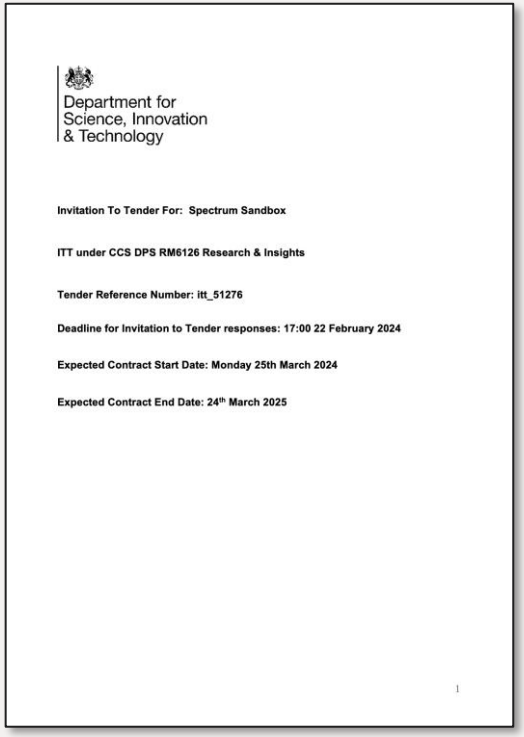
What does the Neutral Host industry want?

1st March 2024

Background to upcoming changes in the UK

Better use of Shared Spectrum is a hot topic… and action is being taken





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Proposed Changes to Spectrum Access License regime

Change is needed in many areas… OFCOM has recognised many of these in its active consultation…

	Topics addressed in OFCOM consultation on increased use of Shared Spectrum	Benefit
	Additional Antenna Parameters (i.e. directionality, azimuth and elevation) o Could have a positive impact, but should be applied to "use case" coexistence scenarios	√√√
	Improvement to Shared Access License Coordination (user-led) o Practical way to allow SAL holders to resolve coordination issues themselves	√
	Higher Indoor Power Levels o Increased Tx powers to better align with the US CBRS eco-system at 3.55-3.7 GHz	√√
	Removal of Mobile Terminal Record Keeping for Indoor Base Stations o Will permit Neutral Hosts extending MNO public networks indoor using Shared Access spectrum	√√√
	SAL Allocation Assumes Synchronization Between Users o Positive assumption that should deliver more spectrum	√
	Relaxation of Coordination Parameters o Useful change that should help to improve license allocation	√√√

These changes should be supported by empirical results

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Proposed Changes to Spectrum Access Licenses regime

Change is needed in many areas… OFCOM has recognised many of these in active consultation…

	Topics addressed in OFCOM consultation on increased use of Shared Spectrum	Benefit
	Increase the Building Entry Loss assumption (dB) o Yes, this is needed, but 12dB to 14dB will have little impact and we doubt 14dB is the "right" number	✓
	Adjacent "In-Band" protection to just 5 MHz above/below o Will have benefit, but synchronisation is the key issue here	✓
	Using Pricing to address spectrum shortages o This proposal does not consider the underlying business case of most deployments	XX
	Using Bandwidth, Power Levels and Urban/Rural to set license price o This proposal does not consider the underlying business case of most deployments	XXX
	Impact of OFCOM proposals for 3.8-4.2 GHz on future deployment plans o The proposal within the consultation would result is a decrease in the use of shared spectrum	X
	Proposals for improvements in the "Exception" process o Rural/Urban definitions need to be reassessed, so they are better suited to use cases	✓
	OFCOM proposed User-Led / Outcome Led Coordination o This is a positive suggestion and should be pursued	✓✓✓

These changes should be supported by empirical results

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What other changes are needed?

Many areas have not been considered, but must be addressed…

	Additional Issues that <u>should be addressed</u> by the Consultation	
	Further alignment with CBRS technical specifications and parameters o Will help development of a healthy eco-system for 3.8-4.2 GHz	✓
	Enable Private Network Shared Access allocations to be utilised for Neutral Host o To enable neutral host sharing of spectrum and infrastructure in particular locations and facilities to efficiently support 5G mobile operators, venues and end users	✓✓✓
	Further improve Operator-to-Operator Coordination Process o Everyone wants to make Shared Access licenses work, there are many ways to solve things	✓
	Change the simple Definitions of Indoor and Outdoor and Rural/Urban o Essential to enable seamless integration (Handover) with Public Mobile Networks	✓✓
	Remove the need to track / record addresses for mobile terminals o Support Public/Private network sharing use cases, fundament to Neutral Host business cases. Reflect the reality of how networks operator (Dual SIM / eSIM etc…)	✓✓✓
	Synchronisation processes and specifications added to Shared Access regime o Key for resolving interference and ensures protection for downlink and uplink centric use cases	✓✓

These changes should be supported by empirical results

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Shared Access for Shared Networks!

Readily available 3.8-4.2 GHz Shared Access Licenses can be used to dramatically improve uptake

- **Shared Access to "Enable wireless innovation through local licensing…"**
  - However, OFCOM's "use case" specific rules for Shared Access Licenses have dictated how this spectrum can be utilised…
  - Clear that "Innovation" through local licensing has been stifled…
  - Any disappointment in the uptake for licenses must be caveated by the wisdom of a regulator picking the use cases that local Shared Access Spectrum can be used for

- **Shared Spectrum must enable Shared Networks and Neutral Host use cases, as this is the key innovation in global local spectrum licensing**
  - Consultation has proposed to allow Neutral Hosts to utilise SALs for Indoor deployments, which is a positive step, but is not a key use case to date (not well aligned with existing Indoor UK JOTS)

- **OFCOM should permit Hybrid Public/Private Networks on Private Land**
  - Enable use case/revenue stacking on Private Network deployments in 3.8-4.2 GHz Shared Access Licenses, which are key to mass deployment
  - Easy to implement on the basis that Public Network connectivity (on a Shared Access License) can only be activated on private land
  - There is strong support from Neutral Hosts, MNOs, Venues and End-Users for this
  - Everybody wins from a simple change to the permitted use cases for SALs

Uses	1800 MHz shared spectrum	2300 MHz shared spectrum	3.8-4.2 GHz	Lower 26 GHz band
Private networks	✓ (Narrowband)	✓	✓	✓ (Indoor)
Mobile coverage (rural)	✓	Certain locations	✗	✗
Mobile coverage (indoor)	✓	✓	✗	✓
Fixed wireless broadband	✗	✗	✓	Prior authorisations

Licences by Licensee Company

Licensee Company	No of Licences
Quickline Communications Limited	211
Boldyn Networks UK Limited	68
Dense Air Limited	62
BlueWave Communications Limited	18
Projex Cellular Infrastructure UK Ltd	17
Total	**531**

Little or no Innovation from Local Licensing?

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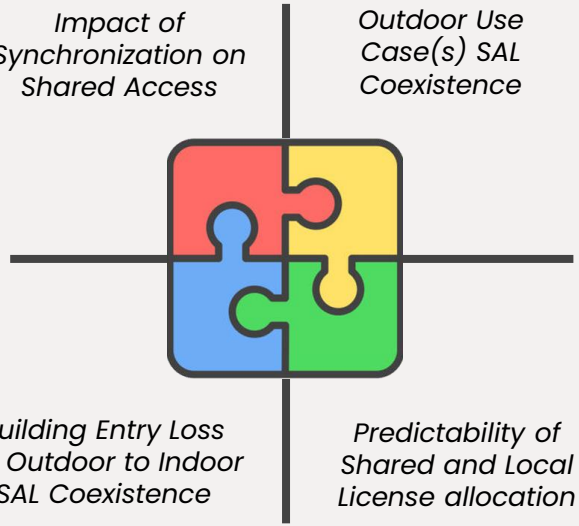
DSIT Spectrum Sandbox ITT and Shared Access Licenses

Changes in Shared Access and Local Licensing rules supported by empirical data and "Real-World" test results

- **DSIT Spectrum Sandbox project must be used to inform OFCOM changes to "Support the Increased use of shared spectrum"**
  - DSIT's one year project will deliver new insights that OFCOM can use to be as aggressive as possible in the revision of the Shared Access rules
- **Spectrum Sandbox ITT called out Spectrum Sharing Focus Areas that included OFCOM local licensing**
  - **Shared access licences**, enabling local access to mobile spectrum on a first-come first-served basis for administrative fees
  - **Local access licences**, enabling mobile spectrum awarded under a national licence to be authorised locally if not in use
- **The concept of Interference Tolerance is at the heart of any spectrum sharing scheme. DSIT Sandbox results can deliver these insights**
  - Examination of use case coexistence can inform the changes to OFCOM Shared Access rules
  - It would be better to **delay the OFCOM consultation process**, to include these insights and learnings, rather than make small incremental changes



Areas of critical importance to any change in Shared Access rules

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Conclusions and Summary

It's a critical time for Shared Spectrum Access in the UK. Upcoming decisions will impact

- **The time is right to enable "Shared Spectrum" to be used for "Shared Networks"**
  - Hybrid Public/Private Networks operating in Shared Access spectrum (3.8-4.2 GHz) are a key toolset for building out 5G SA wireless connectivity to un- and under-served communities, use cases, venues and
  - Enabling this use cases is fundamental to the business case of a Neutral Host. Traditional solutions based on using MNO spectrum assets (i..e. four separate allocations) have poor economics which constrain deployment to a very limited number of unique scenarios
  - This is now happening at scale in the US in CBRS spectrum

- **Neutral Host use cases on Shared Access spectrum must be allowed both Indoors and Outdoors (on private land)**
  - OFCOM on course to allow Indoor usage, but must answer the "What is indoor?" questions
  - This change (related to mobile device record keeping) should permit Public use cases on outdoor Private Networks.
  - This would not consume additional Shared Access spectrum (as it stacks Public services onto the licenses used for Private Network, improving the economics for all parties)

- **Changes to the Shared Access rules, should be informed by the results of the DSIT Spectrum Sandbox project**
  - Synchronisation and existence real-world measurement are critical
  - It would be better to delay the OFCOM Shared Access consultation rather than make changes rules, which are subsequently found to be overly conservative or at odds with real-world results

Shared Spectrum for Shared Networks!