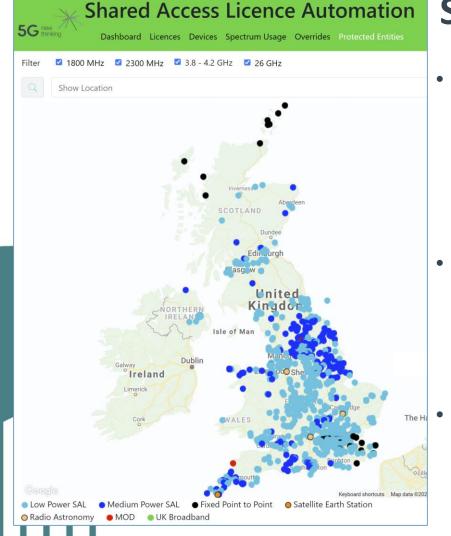


5GNT Spectrum Prospector

Taking SALs from Here to Full DSA Automation

28th October, 2021



Shared Access Licences and DSA Automation

Manual application for 1 yr renewable licence for low power (urban) or medium power (rural) private networks with device ecosystem support

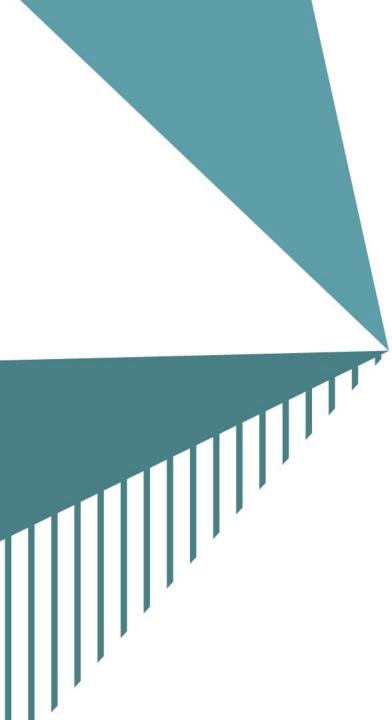
- 1800 MHz (paired) B3 1.4, 3 MHz
- 2390-2400 MHz B40, n40 5, 10 MHz
- 3800-4200 MHz n77 10-100 MHz
- 24.25-26.5 GHz n258 50, 100, 200, 400 MHz
- Good uptake (1292 licences in WTR as of 23 Oct), but
 - Long waits (4+ weeks) for licence to be issued
 - No way of checking whether an application is likely to succeed before applying
 - Ofcom's manual process presumably can't scale indefinitely?
- Interest from industry and Ofcom to:
 - Automate existing process
 - Transition to fully automated DSA



DSA Automation Dilemmas

- Ecosystem Bootstrapping and Evolution
 - Why develop a new technology when there's no market?
 - Can't develop a new market without the enabling technologies
- Spectrum Sharing Population Paradox
 - Supply is abundant where there is limited demand
 - Demand is abundant where there is limited supply
- Scale Versus Optimization
 - Scale for silicon pulls towards regulatory harmonization
 - Optimizing for local conditions leads to regulatory fragmentation



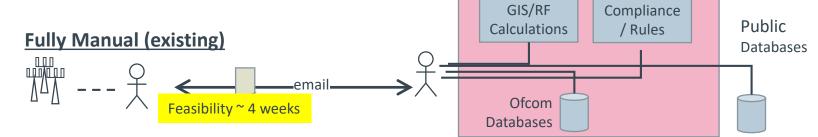


Key Insights

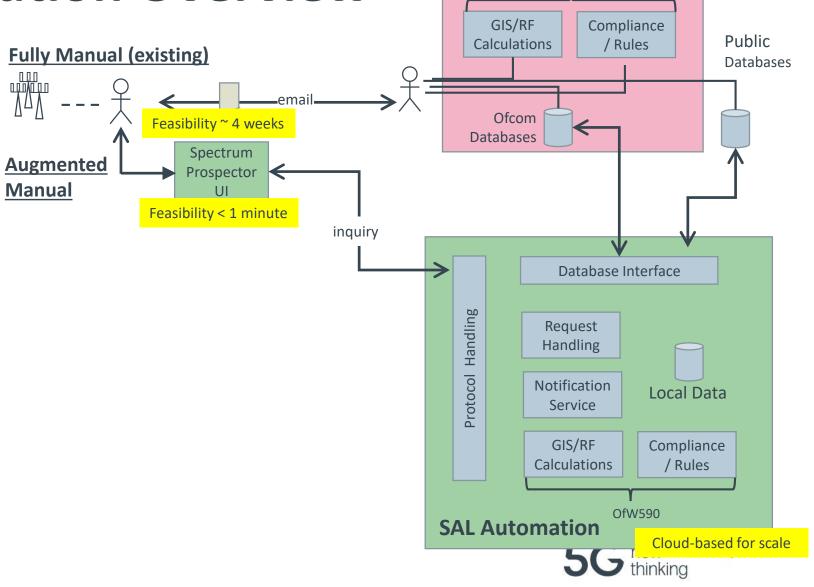
- Cloud-based software can do scale, customization, and service evolution well
 - Individual recommendations or localized RF optimizations at scale
 - GIS + RF Modeling at scale "solved" problems in this space
 - DSA devices don't have to be exposed to complexity or changes
- A REST server doesn't care if the request originates from a webpage or a device
 - Automate to the Engineer or Automate to the Device Same protocol can support manually configured and automatically configured devices
- Heartbeat periods were always meant to be variable. Make periods explicitly condition-based like other regulations (e.g., rural vs urban, band)
 - Population or device density, Incumbent dynamics
 - Heartbeat = periodic message for grant renewal
- Existing one-month SAL notification of need to modify service can be handled as a heartbeat



11







GIS/RF Compliance Public Calculations / Rules Fully Manual (existing) Databases emai Ofcom Feasibility ~ 4 weeks Databases Spectrum Augmented Prospector Ofcom Manual UL UI Feasibility < 1 minute inquiry **Streamlined Manual** Application Database Interface Assignment < 1 min Protocol Handling Inquiry Request Lic Request Handling Notification Local Data Service GIS/RF Compliance Calculations / Rules OfW590 **SAL** Automation Cloud-based for scale thinking

OfW590

 Existing manual process can be streamlined

• 4 wks => seconds

GIS/RF Compliance Public Calculations / Rules **Fully Manual (existing)** Databases emai Ofcom Feasibility ~ 4 weeks Databases Spectrum Augmented Prospector Ofcom Manual UI UL Feasibility < 1 minute inquiry **Streamlined Manual** Application Database Interface Assignment < 1 min Protocol Handling Inquiry Request Automated to Engineer Lic Request Handling ATTE UI Notification Local Data Service **Automated to Network** 0.0.0 0.0.0**0** GIS/RF Compliance Device Mgmt Calculations / Rules Proxy SW/ **Automated to Device** Full DSA OfW590 **SAL** Automation 1 П П Mgmt Cloud-based for scale SW thinking

- Existing manual process can be streamlined
 - 4 wks => seconds
- ATTE enables legacy DSA devices to work alongside fully automated DSA devices
 - 1 mo heartbeat

GIS/RF Compliance Public Calculations / Rules **Fully Manual (existing)** Databases Ofcom Feasibility ~ 4 weeks Databases Spectrum Augmented Prospector Ofcom Manual Sophistication IШ UI Feasibility < 1 minute inquiry Compatibility **Streamlined Manual** Application Database Interface Assignment < 1 min Handling Inquiry Request ncreasing DSA Automated to Engineer Lic Request Handling Greater ATTE UI Protocol Notification Local Data Service **Automated to Network** GIS/RF Compliance Device Mgmt Calculations / Rules SW/ Proxv **Automated to Device** Full DSA OfW590 **SAL** Automation Mgmt Cloud-based for scale SW thinking Subsets of same protocol

- Existing manual process can be streamlined
 - 4 wks => seconds
- ATTE enables legacy DSA devices to work alongside fully automated DSA devices
 - 1 mo heartbeat
- Same protocol, same backend services can support all options
 - Eliminate ecosystem bootstrapping issue
 - Path to Full DSA and beyond

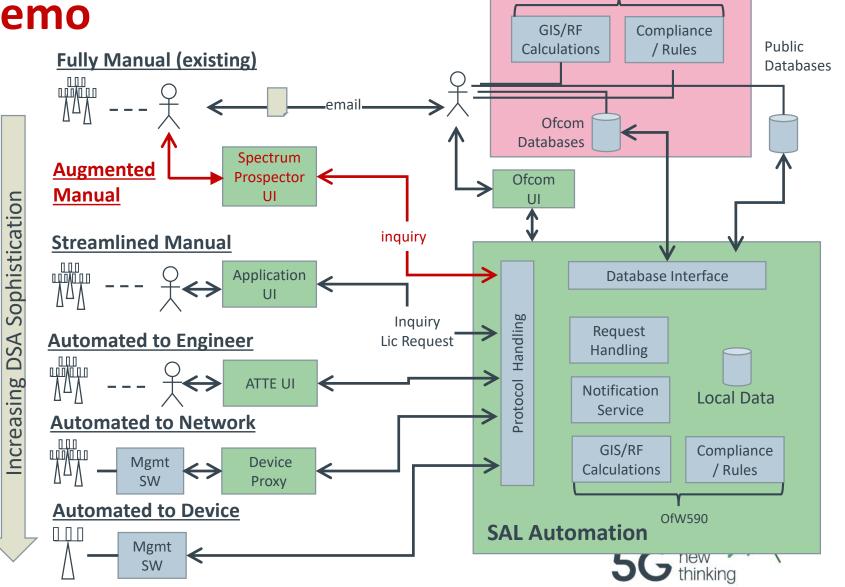
- Works within existing regulations
- Implements Ofw590 calculations using Ofcom and public data
- Not a replacement for
 Ofcom

Compatibility

Greater

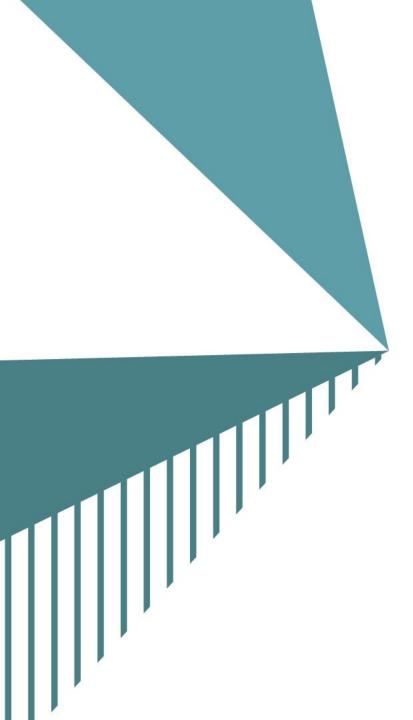
- Instant feedback on expected viability of application
- Some guidance on alternate configurations
- Publicly available soon

Spectrum Prospector Demo



Backups





Manual SAL Application Automated SAL Application Automated to the Engineer Automated to the Device DSA Evolution

