

# **New Zealand's 3.3 GHz Managed Spectrum Park for local and regional providers**

# What's a Managed Spectrum Park?

- Concept agreed in 2007 and implemented in 2010
- First spectrum available was 2580-2620 MHz
- Government-Managed right which can enter into licence agreements with local and regional providers
- Relatively strict acquisition and utilisation rules
- Expects cooperation between "park users"
  - *This doesn't always happen, and 2.6 GHz closed to new applicants in 2021 as a result.*

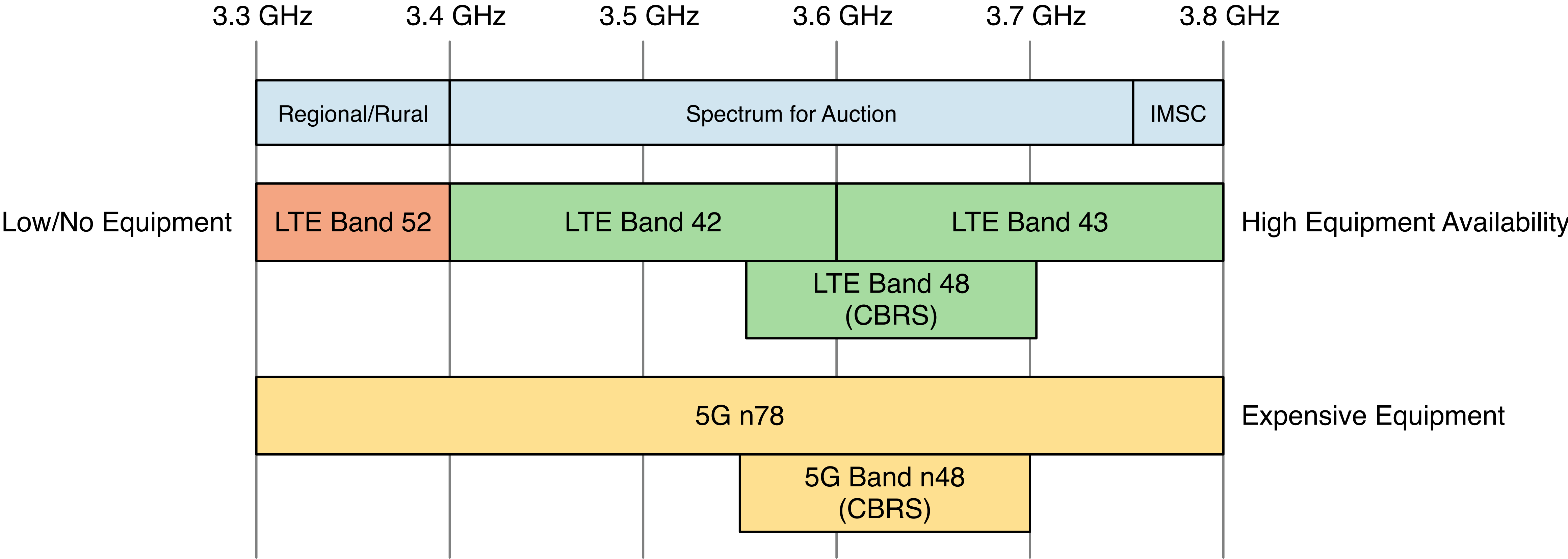
# 3.3 GHz Managed Spectrum Park

- Local/regional use 3 GHz spectrum is present in many markets including Australia, Europe, EU, UK and the USA where it's known as CBRS.
- 3300-3800 is 5G "New Radio" band n78
- New Zealand partitioned band into blocks, leaving 3300-3410 for local and regional use
- 3300-3340 is now a Managed Spectrum Park

# Points of Contention re n78 band

- MNOs believe entire band should be used for 5G, with a TDD (timing) configuration supporting 9 km cell radii.
- Regulator wants to assign MNOs spectrum at the top of the 3.3-3.8 GHz allocation & local/regional at bottom.
- Local/regional providers want both LTE and 5G support, and larger cell radii (32 km using LTE).
- Local/regional providers want spectrum anywhere above 3.4 GHz (not at the bottom of the allocation)

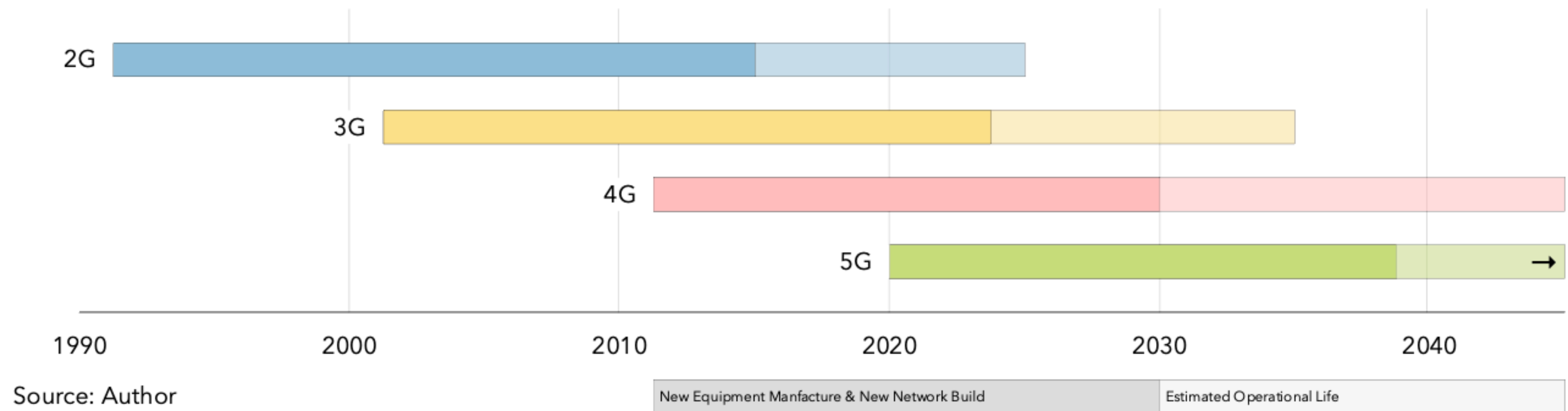
# 3.3-3.4: great for 5G, not for 4G



# Is 4G still a reasonable tech choice?

New 4G networks will continue to be built until at least 2030 and operated well into the 2040s. Encouraging the rollout and uptake of 4G in DMCs should be a priority for both governments and operators.

**Figure 16: Estimate of New Network Build and Operational Life of Mobile Technologies**



Source: Author

# 4G & 5G Can Sync: Technical Details

**OPTION B**

4G LTE config 2  
5G NR 30KHz LTE compatible

**OPTION A**

5G 2020 early access

1ms	1ms	1ms	1ms	1ms	1ms	1ms	1ms	1ms	1ms
D	S	U	D	D	D	S	U	D	D
D	D	S	U	U	D	D	D	D	D
D	D	S	U	D	D	S	U	D	D

Frame comparison	<u>OPTION B</u> 4G-5G compatible frame LTE config 2	<u>OPTION A</u> 5G early access frame current use
<b>Pros</b>	<ul style="list-style-type: none"> <li>Allow 4G and 5G co-exist without frequency separation / guard bands or restricted emission limits</li> <li>Supports large cell (radius up to ~14.5km)</li> <li>Allow 8 SSB set sweeping (long consecutive downlink time), useful for massive MIMO beam alignment.</li> </ul>	<ul style="list-style-type: none"> <li>Low uplink latency due to halved Uplink periodicity (2.5ms per Uplink slot versus 5ms)</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>A much higher uplink latency, requires Supplementary Uplink (SUL) to reduce it. However, in NSA mode, the anchor link can provide the SUL.</li> </ul>	<ul style="list-style-type: none"> <li>Can't synchronise with 4G LTE</li> <li>Cell size is smaller (radius up ~9 km) but still reasonable (depends on Zcs re-use)</li> </ul>

**MNOs Prefer Option A**

# Markets with LTE in 3400-3800 MHz

- B42 LTE (3400-3600 MHz)
  - Australia, Azerbaijan, Bangladesh, Canada, Congo, Iran, Italy, Jordan, Nigeria, UAE
- B43 LTE (3600-3800 MHz)
  - Argentina, Azerbaijan, Czech Republic, Norway
- B48 LTE (3550-3700)
  - USA Citizens Broadband Radio Service (Local & Regional Allocations)

# Markets with LTE in 3300-3400 MHz

- B52
- None (previously China)

# **LTE Equipment for B42, B43, B48**

- Transmitters available from \$600 USD
- Low power (250mW) can operate on 20 Watts
- Airspan, Baicells, Blinq, CableFree, Cambium, ClG, Eion Wireless, Huawei, Lime, Mikrotik, Parallel Wireless, Redline, Ruckus, Star Solutions, Tecore, Telrad, Ukama, Vanu, VNL, ZTE

# LTE Equipment for B52

- Transmitters available from \$8,000 USD
- Minimum power consumption 200W per sector
- Telrad

# 5G Equipment for n78

- Transmitters available from \$14,000 USD
- Lowest power consumption around 300 Watts
- Manufacturers: Airspan, Ericsson, Huawei, Parallel Wireless, Nokia, Samsung, WiFrost, ZTE
- 5G will always be more costly, complex, and more power intensive due to its distributed architecture.

# 5G "Syncable" Equipment for n78

- Transmitters available from \$1,000 USD
- Lowest power consumption 18 Watts
- Manufacturers: Cambium

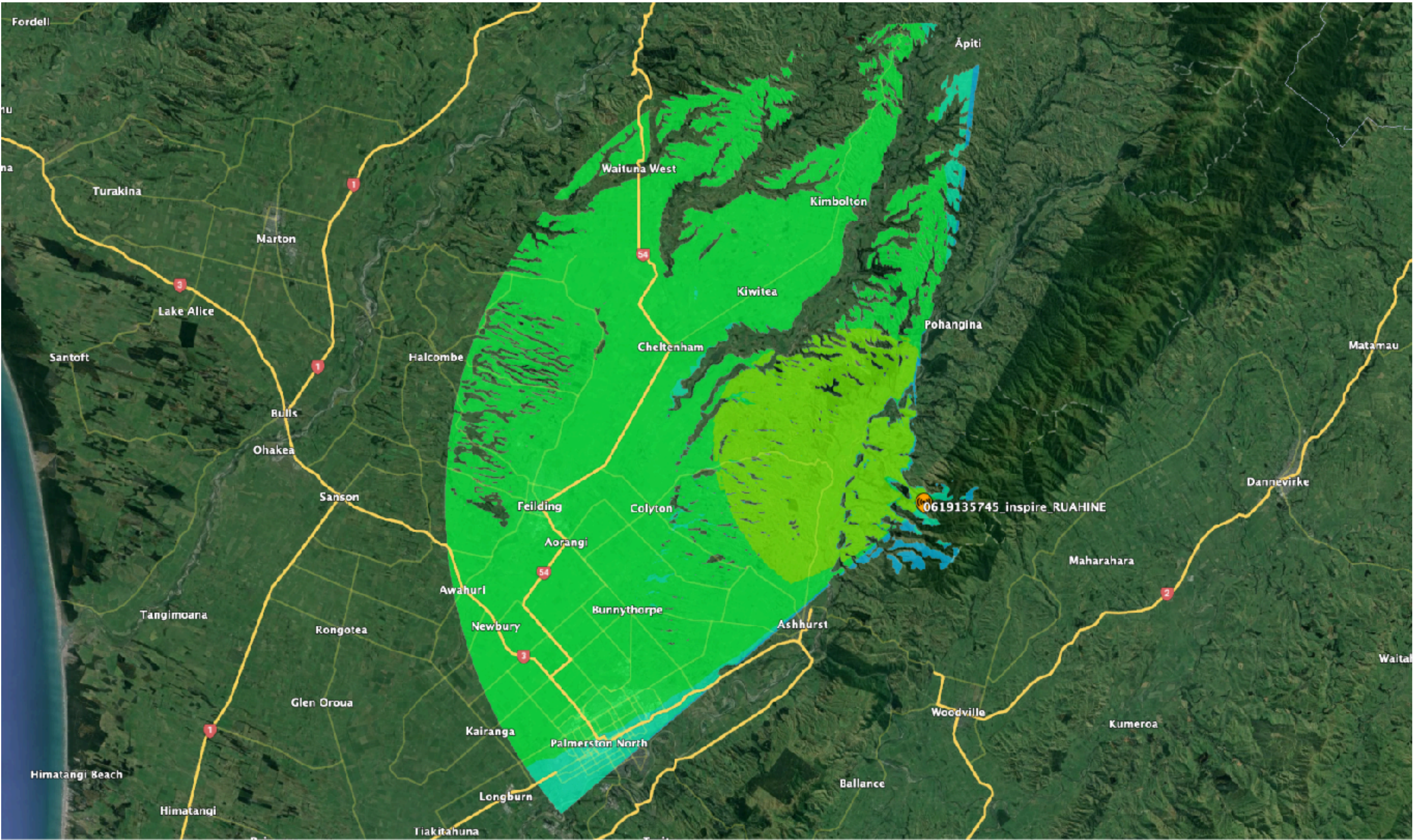
# 3.3 GHz Park Rules

- Regional/Non-National with acquisition limits
- Population-based utilisation fees
- Two-year implementation requirements (use or lose)
- 30k max cell radius
- No sync requirement
- Complicated process for initial access

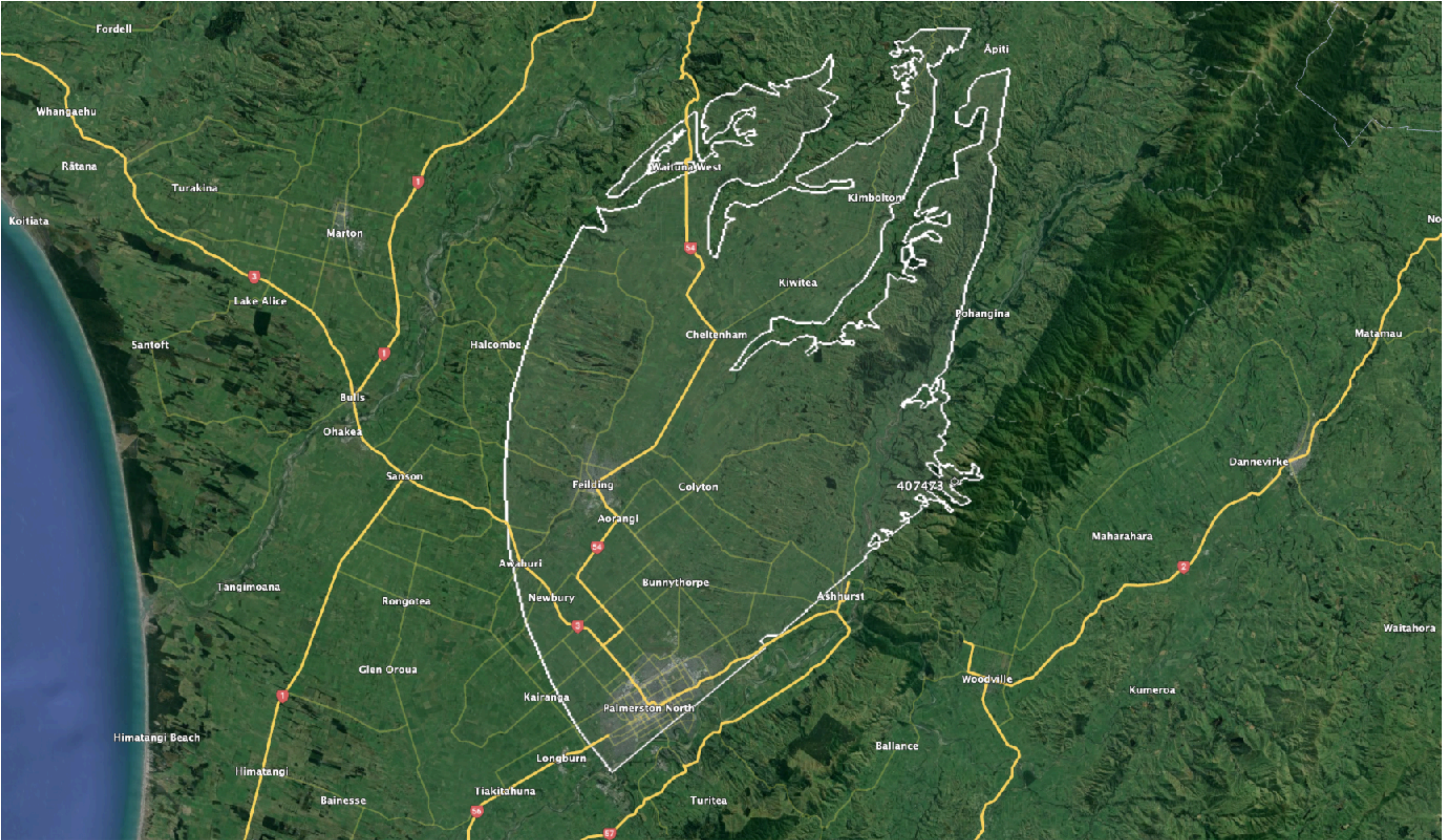
# 3.3 GHz Park Engineering

- Open to all Approved Radio Engineers in NZ
- In practice only two Engineers participate (I'm one)
- Predict coverage
- Define coverage area
- Ensure no interference with incumbent licence
- Write licence to register of radio frequencies

# Coverage Predictions: TowerCoverage or Similar



# Coverage Area Definition: Manual



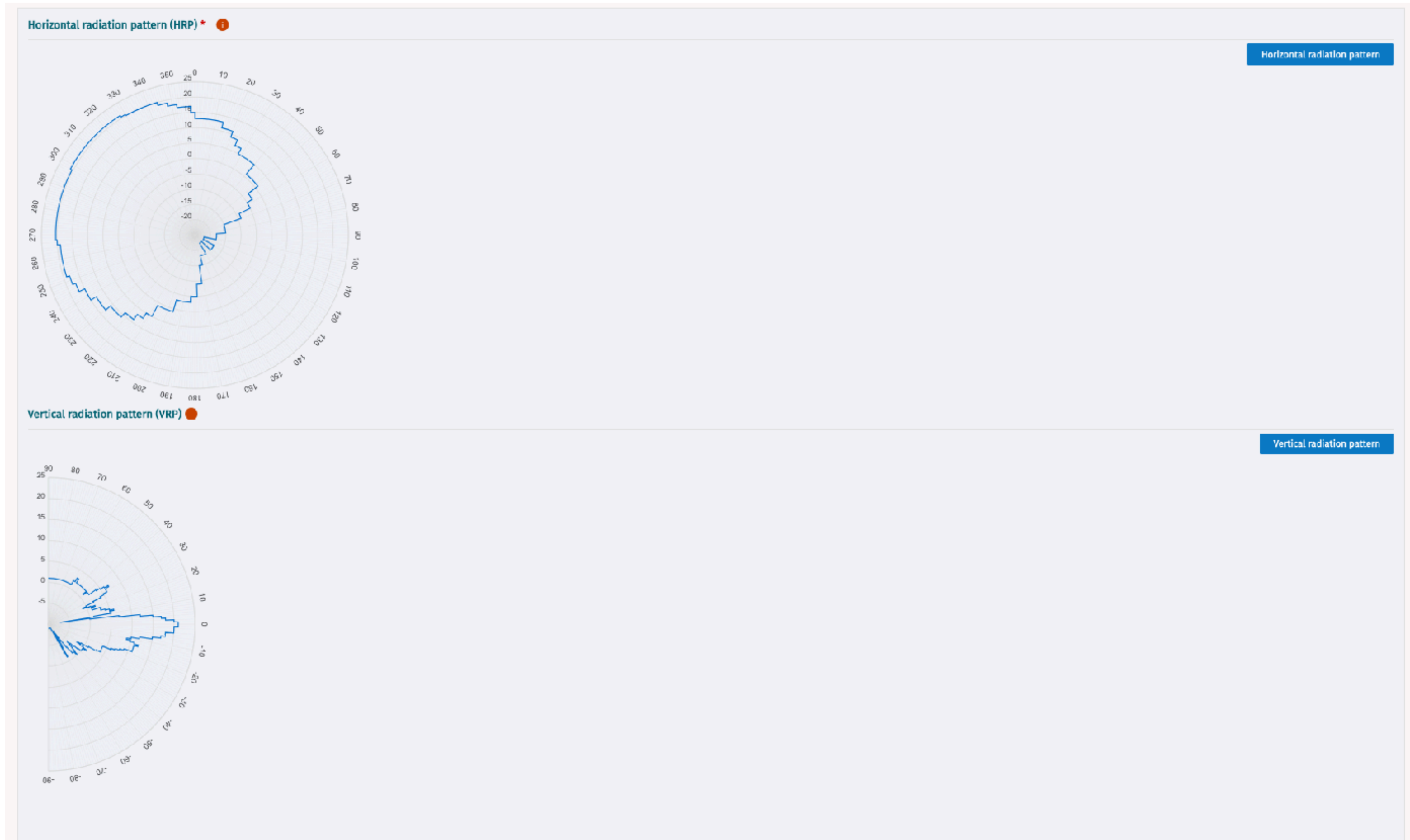
# Licence Upload: Via API

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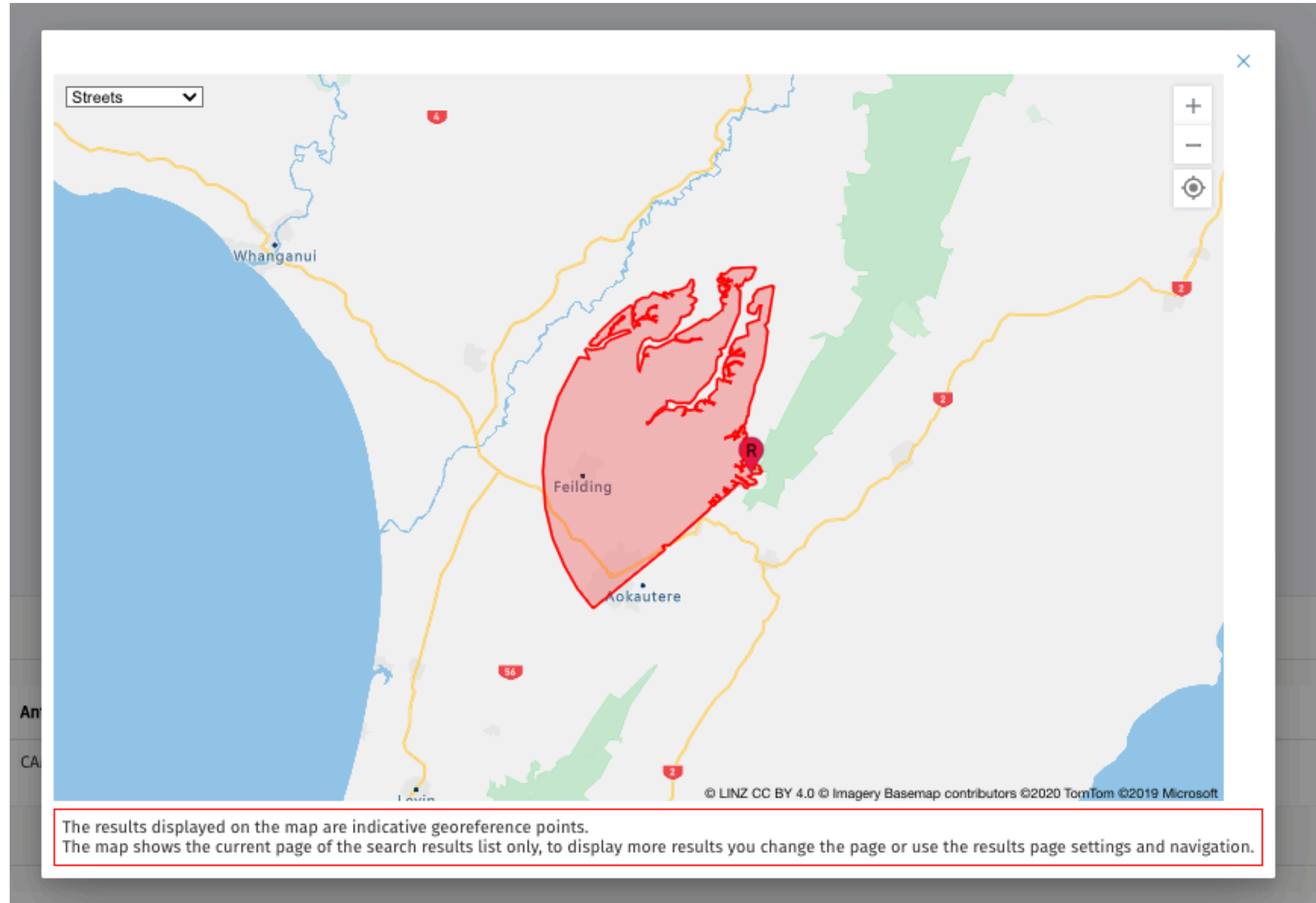
# Licence Record: Registered

Client number <b>510440</b>	Client name <b>INSPIRE NET LIMITED</b>	Email address <b>james@inspire.net.nz</b>		
<a href="#">  More</a>				
<b>Application details</b> ^				
Application number <b>111520</b>	Application status <b>Completed</b>	Application date <b>26 Jul 2023</b>		
Licence type <b>Spectrum Crown/Managed Spectrum Park/Managed Spectrum Park (MS)</b>				
<a href="#">+ More</a>				
<b>Basic licence details</b> ^				
Licence ID <b>407473</b>	Licence number <b>406816</b>	Licence status <b>Current</b>	Licence reference <b>-</b>	
Licence type <b>Spectrum Crown/Managed Spectrum Park/Managed Spectrum Park (MS)</b>		MR Number <b>514</b>	Manager <b>The Crown acting by and through the Chief Executive of the Ministry of Business, Innovation, and Employment</b>	
Licence classification <b>Licence to Transmit and Have No Interference</b>				
Engineer <b>Jonathan Michael Brewer - AP1 (ARE159)</b>				
Fixed term <b>Yes</b>				
Commencement date <b>5-Sep-2023</b>	Expiry date <b>30-Jun-2033</b>	Cancellation date <b>-</b>	Certification date <b>26-Jul-2023</b>	Registered date <b>5-Sep-2023</b>
<a href="#">+ More</a>				
Anniversary month <b>October</b>	Annual licence fees <b>\$150.00</b>	Fees paid on <b>4 Sep 2023</b>	Paid up till <b>OCT 2023</b>	
Additional information <b>Channel Type: RB12 Service and Protection Area Radius: 25 km Service and Protection Area Coverage: 871 sq km Coverage of the Service Area: 34 dBµV/m</b>			Suppress licence details <b>No</b>	
Reserved licence <b>No</b>	System ID <b>-</b>			
<b>Spectrum details</b> ^				

# Licence Record: Registered



# Licence Record: Registered



# 3.3 GHz as Deployed



