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

| Frame comparison | **OPTION B** 4G-5G compatible frame  
LTE config 2 | **OPTION A** 5G early access frame  
current use |
|------------------|--------------------------|--------------------------|
| **Pros**         | • Allow 4G and 5G co-exist without frequency separation / guard bands or restricted emission limits  
• Supports large cell (radius up to ~14.5 km)  
• Allow 8 SSB set sweeping (long consecutive downlink time), useful for massive MIMO beam alignment. | • Low uplink latency due to halved Uplink periodicity (2.5 ms per Uplink slot versus 5 ms) |
| **Cons**         | • A much higher uplink latency, requires Supplementary Uplink (SUL) to reduce it. However, in NSA mode, the anchor link can provide the SUL. | • Can’t synchronise with 4G LTE  
• Cell size is smaller (radius up ~9 km) but still reasonable (depends on Zcs re-use) |

**OPTION B**  
4G LTE config 2  
5G NR 30KHz LTE compatible  
5G 2020 early access  

**OPTION A**  
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, CIG, 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

{  "applicationType": "SAW",  "certify": true,  "clientNumber": 680510,  "licenceType": "SPECTRUM_CROWN_MSP_MANAGED_SPECTRUM_PARK_NS",  "fixedTerm": true,  "licenceClassification": "A",  "commencementDate": "2024-02-28",  "expiryDate": "2023-06-30",  "additionalInformation": "Channel Type: RB2\nService and Protection Area Radii: 9 km\nService and Protection Area Coverage: 19 sq km\nCoverage of the Service Area: 40 dB\n0dBcV\nChannel": "RB2",  "specificConditions": "\n2022 UEs in the out-of-band emissions domain and the spurious emissions domain must be defined as o.a.r.p. in units of dBm with a reference bandwidth of 1 MHz.\n2022 UEs in the spurious domain must meet or be lower than Recommendation ITU-R SM.1559-1 or Category B of 3GPP TS 38.156 for base stations (transmitters) or meet the limits prescribed in Category B of Recommendation ITU-R SM.329.\n2022 License holders can use TDD LTE or LTE-like Configuration Type 2 as a secondary frame structure in accordance with the appropriate TDD LTE or LTE-like standard such as 3GPP TS 36.211 (\n2021 Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and Modulation\n2012 The conditions on Management Right 514 apply to this licence which is created in relation to the Management Right. Use that does not conform to the default synchronisation and frame structure, in accordance with the primary technical conditions in the 3 300 \(2013\) 3 800 MHz band, must not cause interference to and can not claim protection from licences in other management rights using the default synchronisation and frame structure.,"  "anniversaryMonth": "JUN",  "managementRightId": 546,  "transferLicenceAuthority": "Rightholder and Manager",  "modifyLicenceAuthority": "Rightholder and Manager",  "cancelLicenceAuthority": "Rightholder or Manager",  "newSpectrumRecords": [  {   "spectrumHigh": 3340.0,   "spectrumLow": 3328.0,   "polarisation": "T",   "referenceFrequencies": [    {      "frequency": 3338,      "frequencyType": "Registered Frequency",      "power": 11,      "powerType": "Mean Power",      "emissions": "C90MHz"    }   ]  } ]
# Licence Record: Registered

<table>
<thead>
<tr>
<th>Client number</th>
<th>Client name</th>
<th>ASL number</th>
<th>Title of service</th>
<th>Date of issue</th>
<th>Expiry date</th>
<th>Revision status</th>
<th>Licence reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>000048</td>
<td>PSHRE NET LIMITED</td>
<td>0000189</td>
<td>IP-Managed Spectrum Park</td>
<td>2022-01-01</td>
<td>2022-12-31</td>
<td>Completed</td>
<td>646635</td>
</tr>
</tbody>
</table>

**Basic Licence Details**

- **License Type**: IP-Managed Spectrum Park
- **License Status**: Completed
- **License Reference**: 646635

**License Information**

- **License Title**: IP-Managed Spectrum Park
- **License Duration**: 1 year
- **License Fee**: $150.00
- **Additional Information**: 
  - **Channel Type**: IP
  - **Service Area**: Entire License Area
  - **Spectrum Details**: None

Additional Details:

- **Support License Details**: None
Licence Record: Registered
Licence Record: Registered
3.3 GHz as Deployed
State of Registered Licences