The Need for Licensed Spectrum for Fixed Wireless

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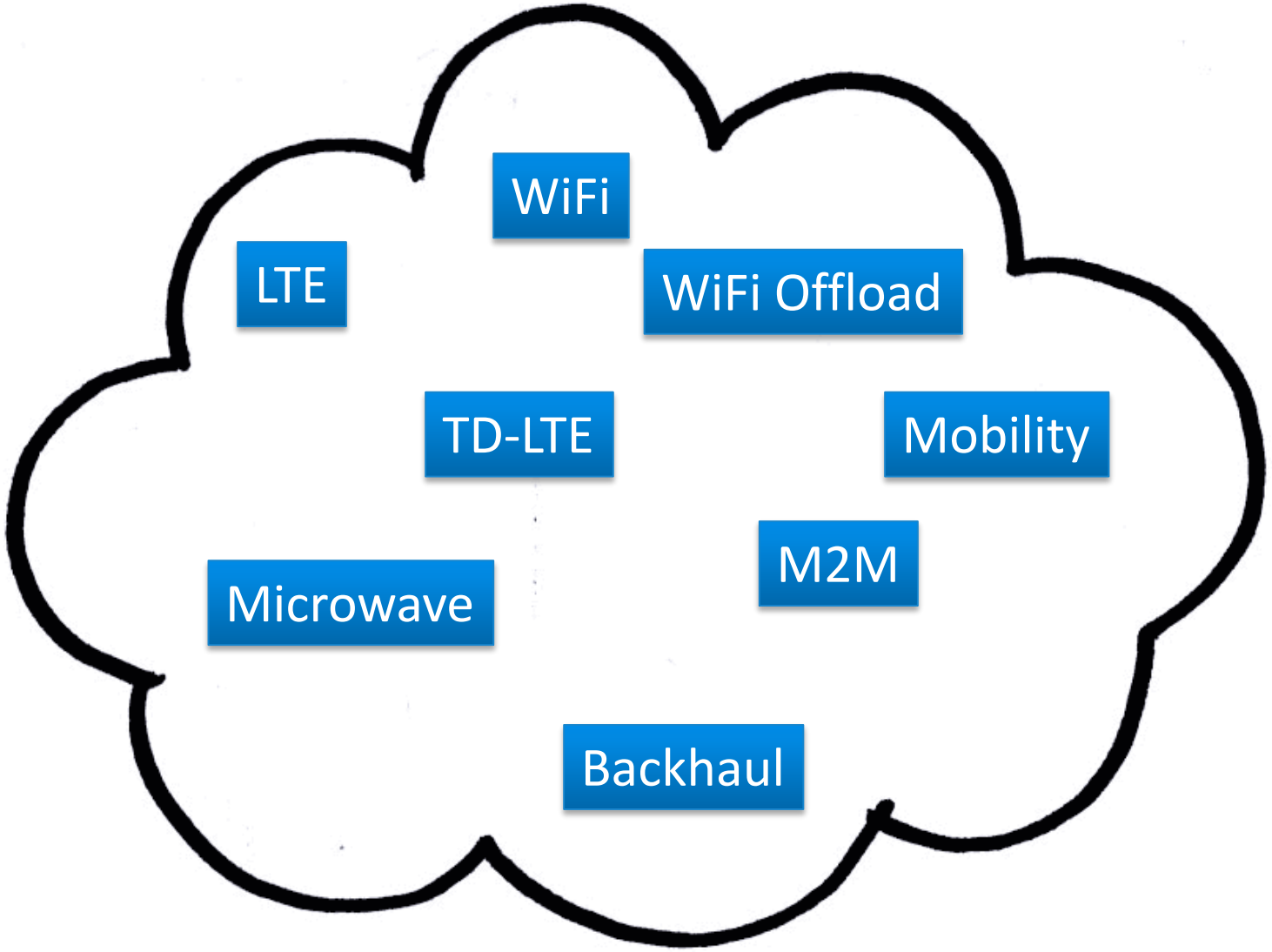
What does Wireless Broadband mean to you?

The Wireless Broadband Industry Buzz

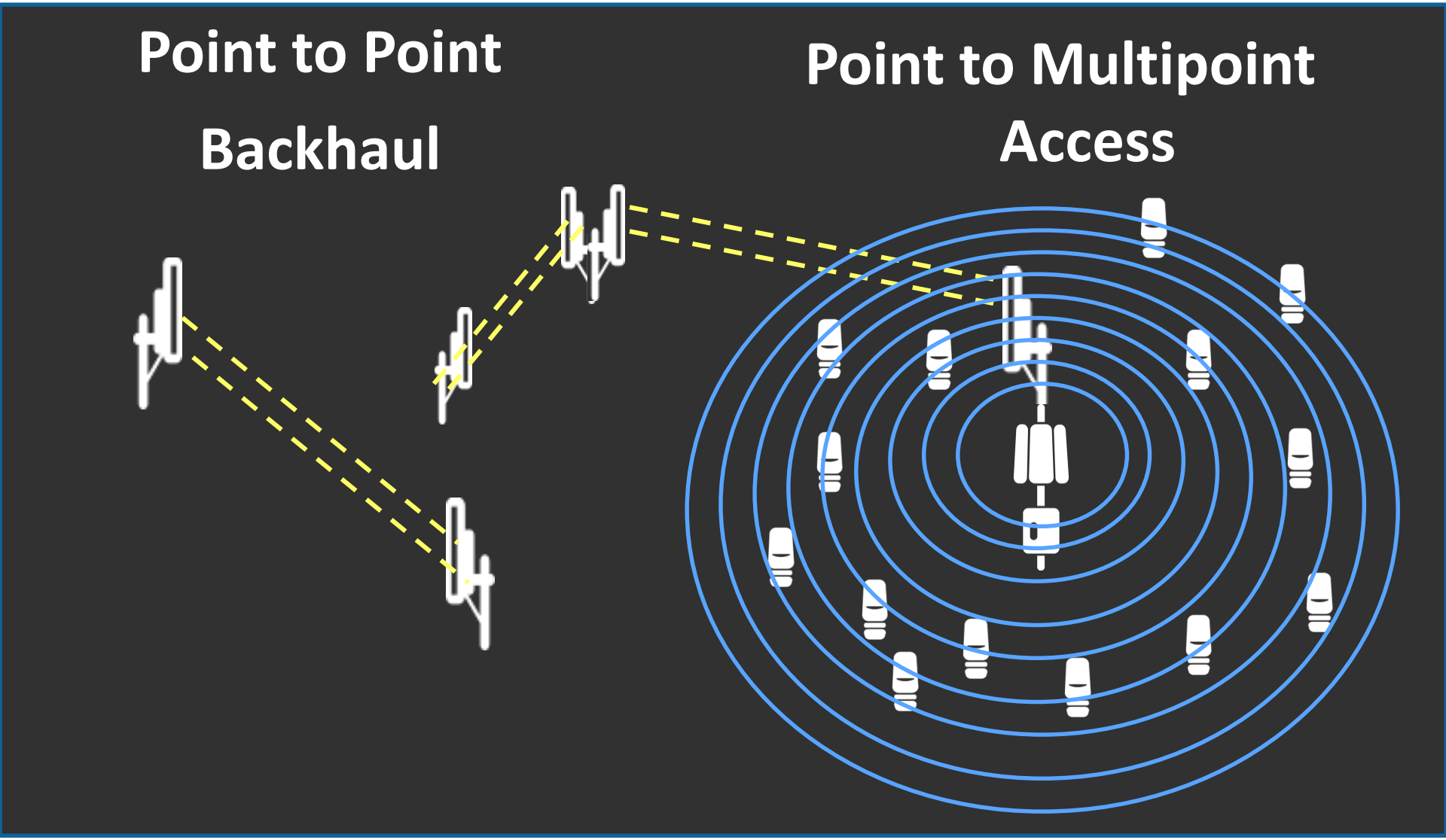


What is Fixed Wireless?

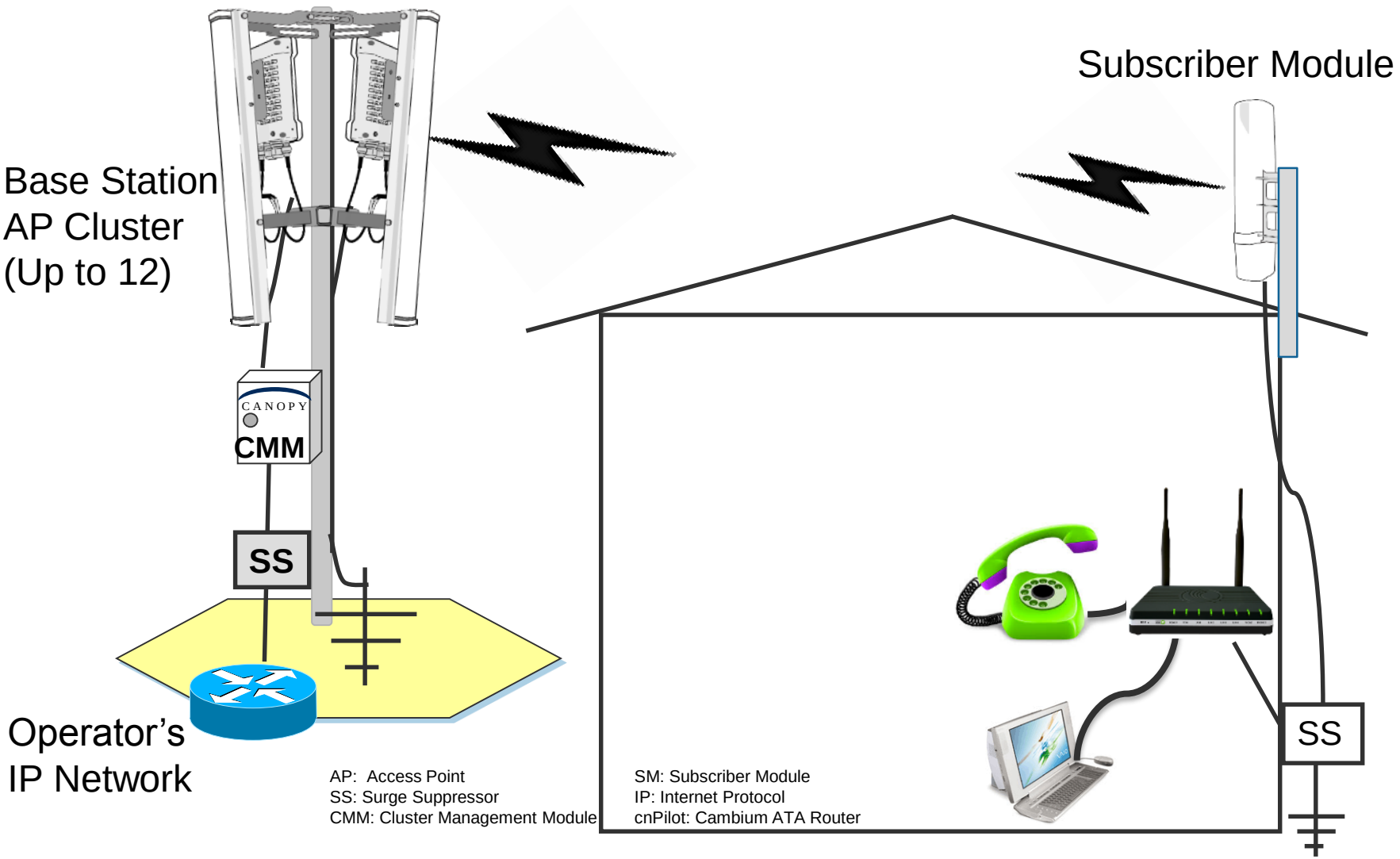
- Fixed Wireless can be thought of as a “blue cable” in the sky.
- Microwave Radio Frequency to provide outdoor data connectivity were copper and fibre are not available or too costly to deploy.
- Data links can be:
  - Point to Point (PTP)
  - Point to Multipoint (PMP).
- Fixed Wireless is different from Mobile Broadband and Wi-Fi.

What is Fixed Wireless Broadband?

It's NOT WiFi and it's NOT LTE



Typical Fixed Wireless Architecture



AP: Access Point
SS: Surge Suppressor
CMM: Cluster Management Module

SM: Subscriber Module
IP: Internet Protocol
cnPilot: Cambium ATA Router

Why the need for Fixed Wireless?

- Fixed Wireless Allows Service providers to build backhaul (PTP) and last mile access (PMP) infrastructure in difficult to reach, remote or rural locations that do not have access to fixed line broadband.
- Fixed Wireless is a proven solution for connecting the unconnected.
- Fixed Wireless will help bridge the digital divide.

Why is there not more Fixed Wireless?

- Fixed wireless has been largely ignored by Tier 1 carriers.
- There is no specific standard for fixed wireless.
- WiMAX was considered the fixed wireless standard for some time, but carriers got confused about using it for fixed or mobile broadband.
- The failure of WiMAX stalled the deployment of fixed wireless.
- Limited licensed spectrum

Why did WiMAX Fail?

- Narrow FDD channels offered limited bandwith
- High latency
- 3GHz used with indoor CPE and dongles on PCs taken indoors did not work well as 3GHz is not ideal for NLOS solutions.
- LTE has emerged as preferred Mobile Broadband standard globally.

LTE and Fixed Wireless.

- LTE can be used for Fixed Wireless but is not ideal.
  - Typically asymmetric service.
  - Layer 3 vs Layer 2.
  - Higher Latency than alternate Layer 2 TDD solutions.
  - EPC architecture adds complexity and **cost**.

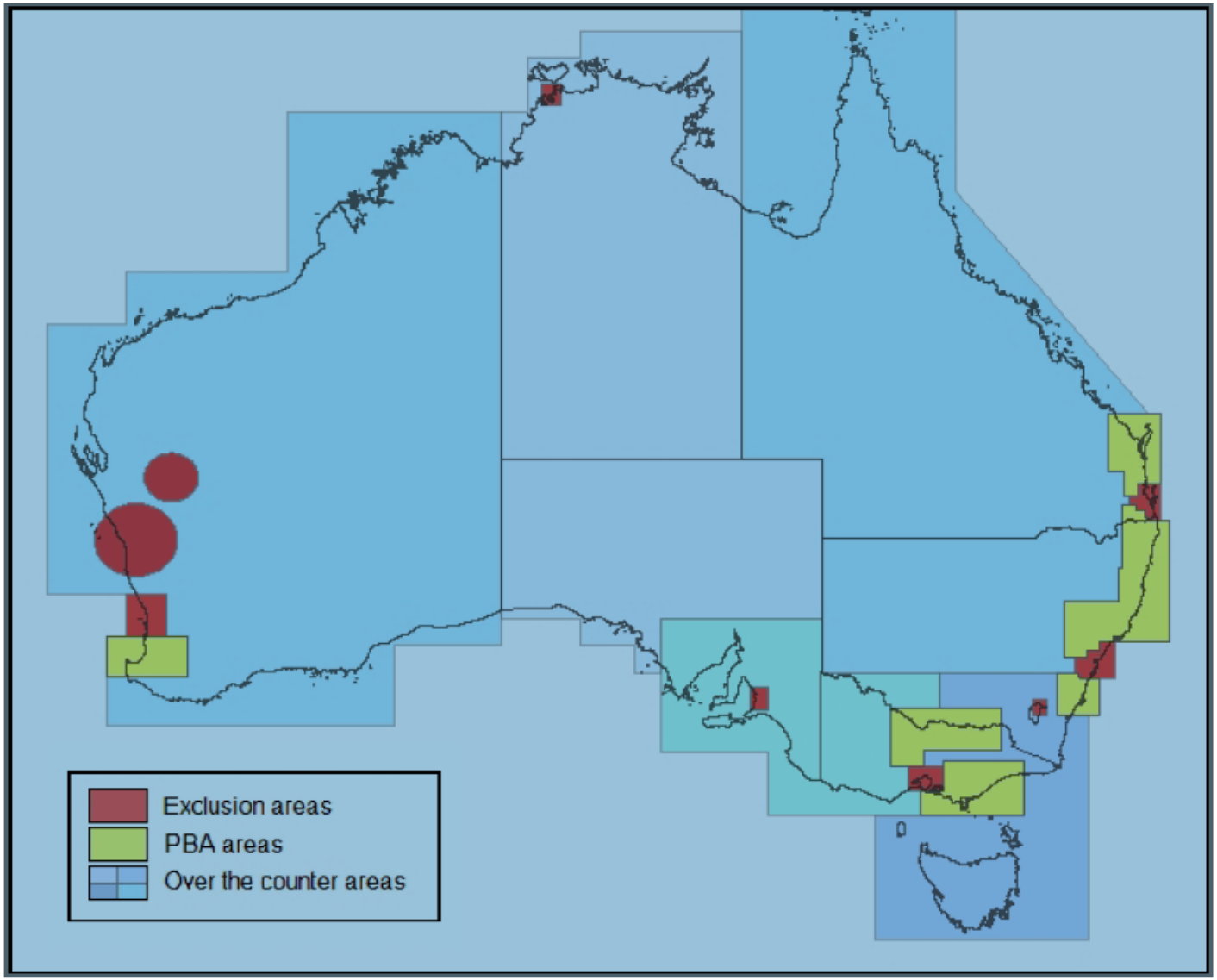
Why the need for Licensed Spectrum

- Service providers want more certainty to be able to invest in Fixed Wireless Infrastructure.
- Fixed Wireless in unlicensed bands is reliable and secure, but does and can get congested.
- Interference can limit service effectiveness.
- Guaranteed SLAs.

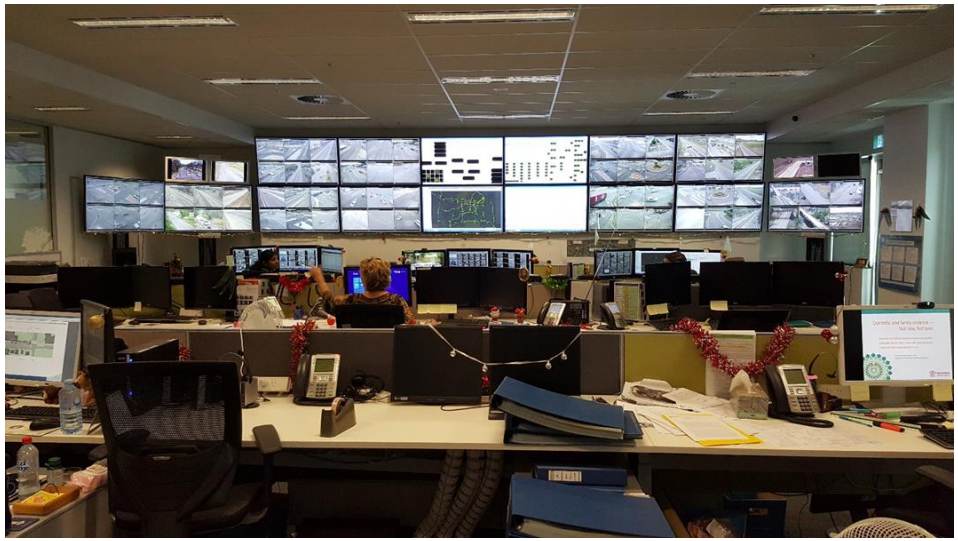
Who is deploying Fixed Wireless?

- Traditionally small Tier 2/3 Wireless Service Providers (WiSPs) around the world in both licensed and unlicensed band (but mostly unlicensed 2.4GHz and 5GHz.
- Used Canopy (Motorola/Cambium), WiMAX from Alvarion and Airspan, Ubiquity, Mikrotik, Proxim, Radwin and ePMP (Cambium)
- Typically 100 to 3000 customers.
- Large Fixed Wireless Solutions:
  - SMART Communication (Philippines) – had over 440k subscribers on Canopy
  - Rise Communications (was JAB Broadband) – Mid- West US – over 200k subscribers.
  - NGI (Italy) over 100k customers on Canopy PMP450
  - Digicel PNG – over 1000 customers on Canopy (PMP100,430 and 450)
  - NBN Co – Australia – using 2.3GHz TD – LTE.

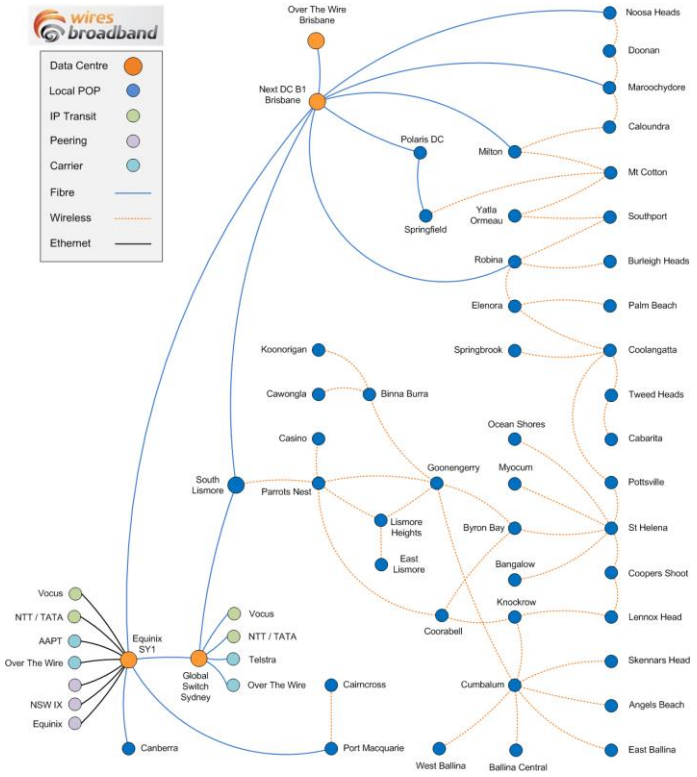
Allocation of 3.575GHz to 3.700GHz GHz for WAS

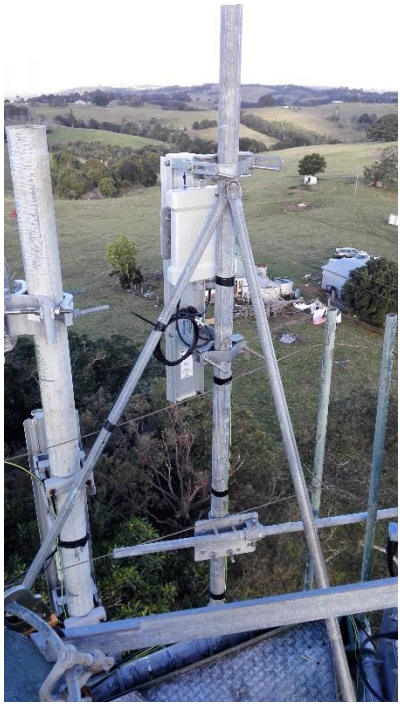


Transport and Main Roads QLD IoT (ITS) -3.65GHz

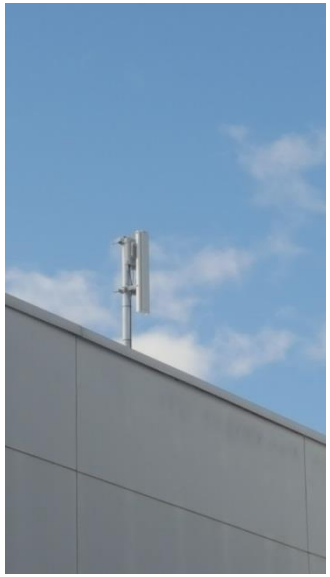


Effective High Speed Broadband in QLD Australia for Enterpise and Residential - 3.65GHz





High Speed Wireless Broadband in Tasmania – 3.65GHz



TasmaNet

Kordia – NZ – Rural Internet and Telemetry

The opportunity for Licenced 3GHz Spectrum for Fixed Wireless – Feedback from ITU

- 1. WRC-15 has allocated the **3.4-3.6 GHz** band worldwide to the mobile service and identified it for IMT. **This band can still be used for the fixed service**, which is also allocated worldwide. In both cases (mobile or fixed), interference into the receive earth stations in the fixed-satellite service is a challenge, especially in the Pacific Islands, where these earth stations are important.
- 2. WRC-15 has allocated the **3.3-3.4 GHz** band to the mobile service and identified it for IMT in 33 African countries, 6 Latin American countries and 6 Asian countries. This is likely to lead to the development of IMT equipment for the mobile market in these countries. Although no Pacific Island country is in the list, such countries may also use this band for IMT or **for the fixed service since this use is unlikely to cause harmful interference to the services of other countries.**
- 3. **From an international point of view, the allocation to the mobile service does not prevent regulators to allocate the band for the fixed service as well.**
- 4. **All agree that the spectrum is STRATEGIC for Pacific Governments to BRIDGE THE DIGITAL DIVIDE and allow service providers to invest with confidence and build infrastructure that is fit for purpose.**
- 5. Allocation for Fixed Wireless should be for TDD solutions and this would not limit TD-LTE.
- 6. **If we wish the ITU to make changes to the Radio Regulations to facilitate things for the fixed service, they suggest that it is driven by Aust, NZ and Pacific Island Regulators, in order to channel this proposal to the WRC through the regional preparatory process (APT).**

Consideration for ITU and Regulators in the Pacific Islands.

- 3.3 to 3.8 GHz band can be VERY valuable for FIXED WIRELESS Services in the Pacific.
- The bands should be allocated for TDD use with 10, 20 Channels and maybe even 30 and 40MHz channels. New Massive MU MIMO will allow 400+Mbps in a 20MHz channel next year.
- Both the lower 3.3GHz – 3.6GHz or upper 3.55GHz to 3.8GHz are applicable and parts of these bands should be formally defined and allocated.
- In many APAC countries, eg Philippines, India, Indonesia the 3.3GHz to 3.5GHz band was allocated for WiMAX, but in many cased as narrow paired FDD bands. NZ allocate the 3.5GHz channel for FWA and have been exploring and allowed the use for TDD
- The licensing costs should be kept low as possible to enable “Bridging the Digital Divide” and should not be used as an opportunity to raise money like the auctions for mobile broadband spectrum.
- The effective definition of licensed spectrum for FIXED services using radio frequency is CRITICAL for the economic development of the Pacific Region.
- USO should also be used to fund fixed wireless.

Summary

- Fixed wireless can play an important role in bridging the Digital Divide in the Pacific Islands.
- Fixed wireless can have a significant impact on the economies to the Pacific Island countries.

BUT

- Needs cost effective licenced spectrum to drive broader acceptance.
- Fixed Wireless should and must be treaded separately from mobile broadband and Wi-Fi
- Fixed Wireless in Unlicensed Bands is ok in remote areas, where there is sufficient spectrum in 5GHz and a low noise floor.