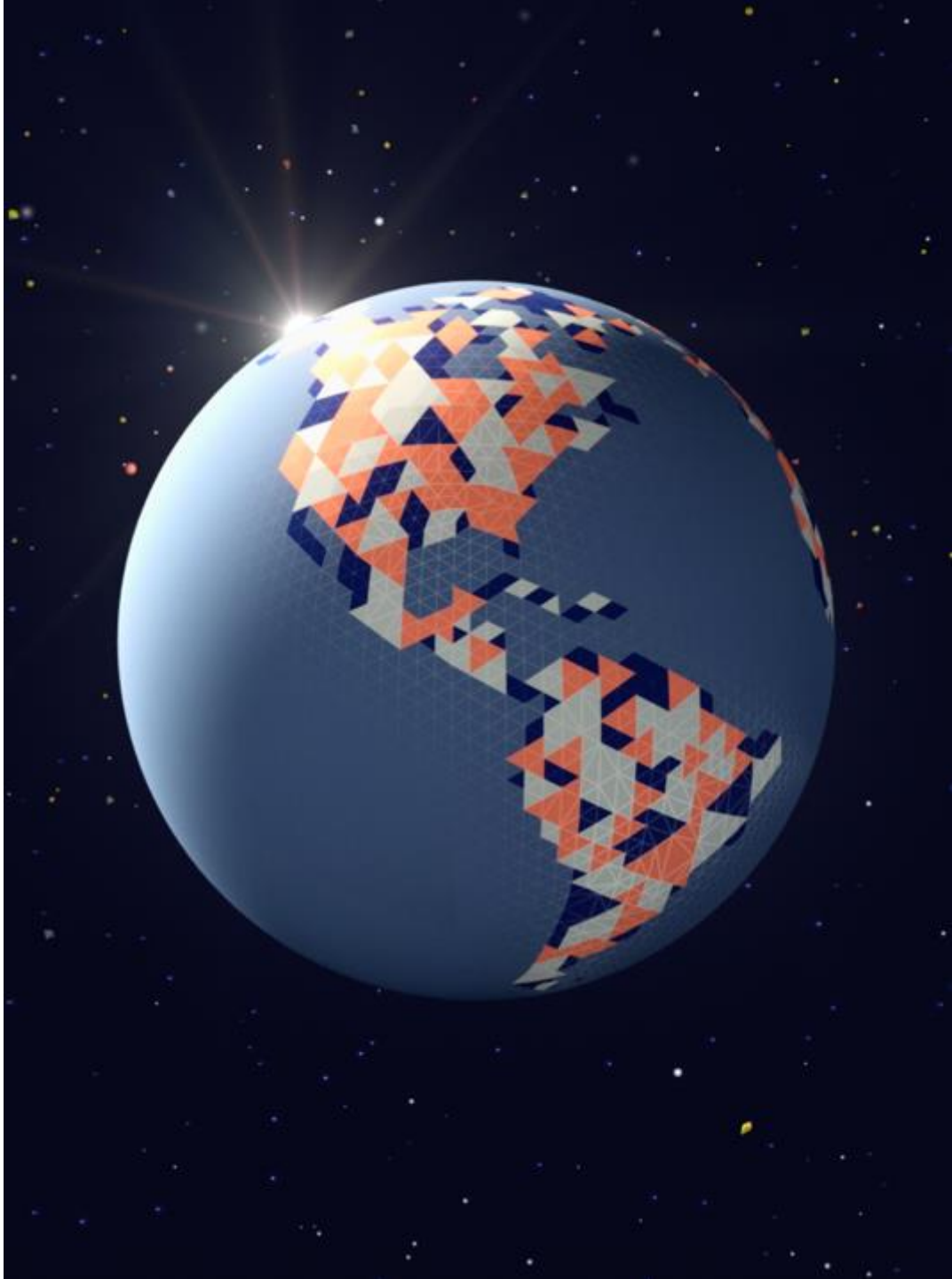
Spectrum Access Policy in mmW Frequencies

A Primer

ISART 2017

Overview

- Spectrum Access Schemes
- Striking a Balance
- Spectrum Frontiers Access Policies
- International Perspective



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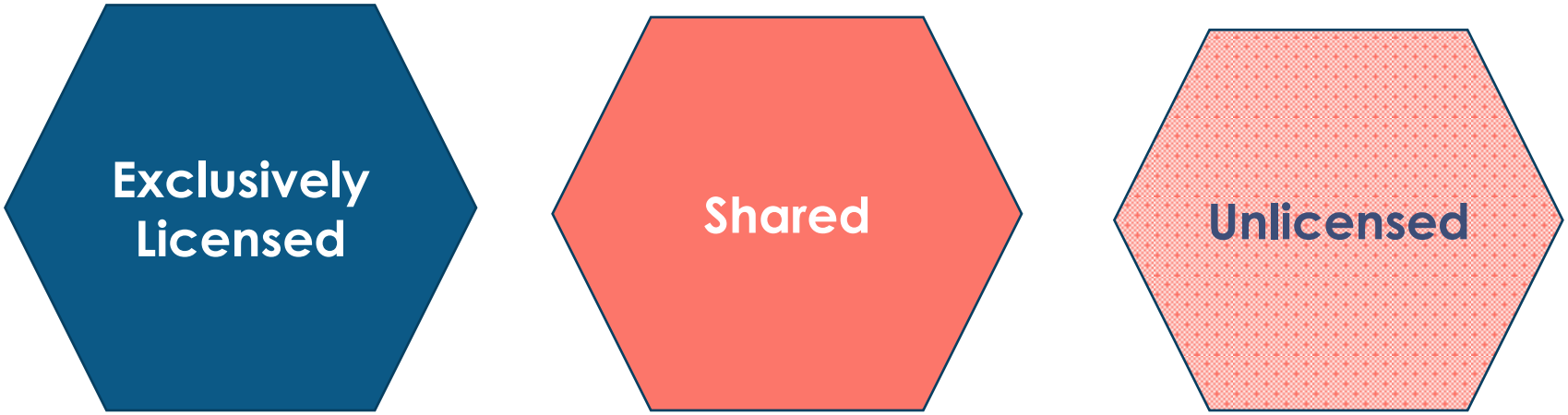
Spectrum Access Approaches



Exclusive Licensing – Benefits / Costs

Exclusivity

- **Predictable network planning and investment environment**

High QoS

- **Interference free environment aides robust network operation and performance**

Highest Power

- **Usually permitted to operate at much higher power, allowing wide-area deployments, etc.**

…BUT

- **Very high barrier to entry (cost of spectrum / exclusivity) and illiquid access to excess spectrum capacity**

Shared Access – Benefits / Costs

Lower Barriers

- Shared spectrum has very low barriers to entry – usually a requirement to register transmitter locations for coordination

Diversity of Uses

- Lower barriers means more utility for different uses – fixed, mobile, IoT, industrial PLUS fed/non-fed

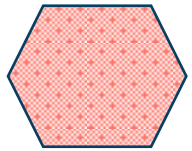
Higher Power

- Can still operate at higher power than unlicensed, and sometimes at the same power as exclusively licensed

…BUT

- No right to exclude and more local versus wide area deployment

Unlicensed Access – Benefits / Costs



Lowest Barriers to Access

- Low cost access to spectrum drives massive scale and ecosystem

Even Greater Diversity of Uses

- Low cost means the use cases are infinite – think current Wi-Fi connected IoT devices

Distributed Network Management

- Interference is managed at the edge with built in protocols designed to maximize the utility of the spectrum at the local level

…BUT

- More difficult to manage QoS in congested environments; low power means utility limited for some applications

Getting the Mix Right

Regulatory Goals

- Ensure delivery of new services to consumers / users across country
- Stimulate economic activity
- Remove / reduce / avoid barriers to investment and deployment

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Spectrum Characteristics

- Physical properties of the specific band
- Quantity of spectrum available
- Commercial incumbents
- Federal incumbents
- Uses in neighboring bands

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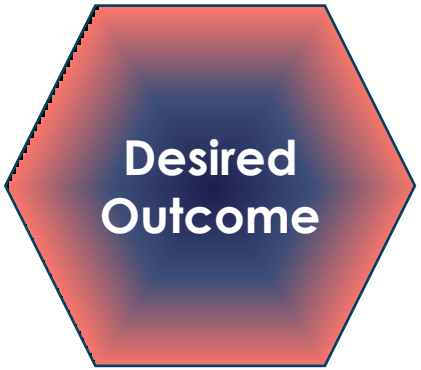
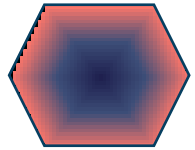


Spectrum Frontiers – Spectrum Access Policies



A Mix of Access Schemes

- **Exclusively Licensed – 3,250 megahertz**
- **Unlicensed – 7 gigahertz**
- **Shared – 600 megahertz**

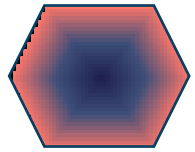
With More to Come

- **Another 17 gigahertz proposed for licensed access in FNPRM**

And Don’t Forget Satellite . . .

- **Much of the millimeter wave spectrum is shared with the Fixed Satellite Service, which is also experiencing an increase in spectrum demand**

Spectrum Frontiers – Getting the Mix Right



5G is Still Evolving

- There is no global consensus or industry standard, although work is underway

And Speed to Market is Important

- The theory is that making “5G” spectrum available quickly will drive significant economic activity

So a Balance of Access Schemes Makes Sense

- The relative predictability that the wireless industry will invest if spectrum is available + unpredictability about what other tech or services might emerge, means diversity of access options is important

But Industry Positions Differ on the Right Balance

The International Perspective

Starting High and Low

- **Many countries are starting their “5G” spectrum exploration in mid-band – between 3 and 6 gigahertz**
- **Some are starting with the millimeter wave bands, and Canada has a consultation seeking comment on an identical division of access schemes as the U.S.**

And Waiting for ITU Action

- **Most countries traditionally follow allocation decisions coming out of World Radio Conferences, and many will likely do the same for 5G**
- **But the global race to capitalize on whatever economic activity might come from 5G may have some thinking about acting sooner**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