Session 3

Addressing a Fast-Changing Technology Ecosystem: New Opportunities, Challenges, and Regulatory Environment

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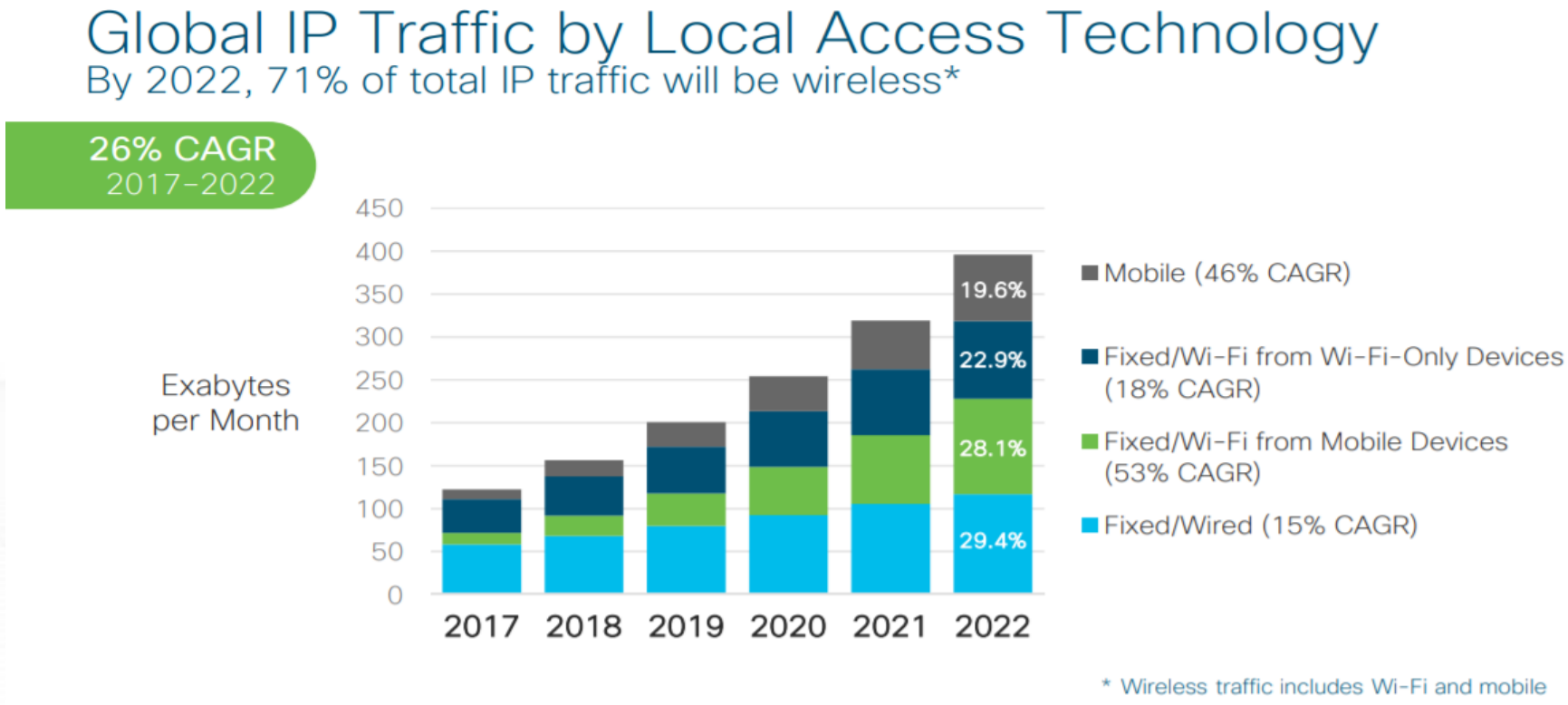
DYNAMIC SPECTRUM ALLIANCE

The Dynamic Spectrum Alliance (DSA) is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all.

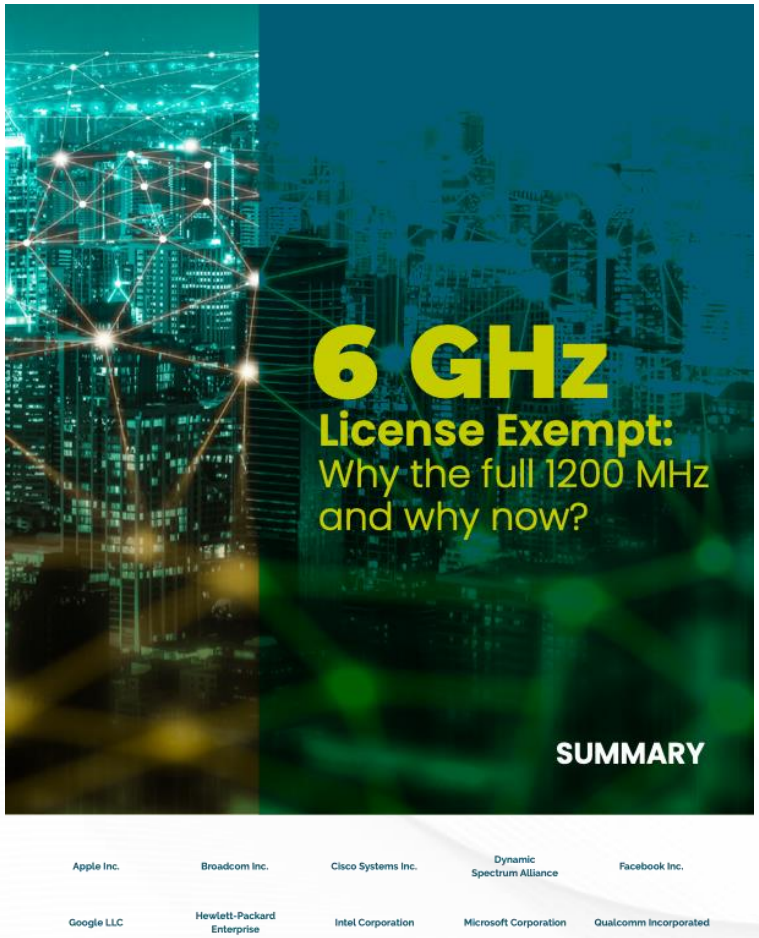
Wi-Fi is Essential to Broadband

- **Wi-Fi is the primary method by which people access the internet**

2022: 51% of all IP traffic over Wi-Fi



And the 6 GHz band is Essential to Wi-Fi



Available at:
Dynamic Spectrum Alliance webpage

http://dynamicspectrumalliance.org

A. The Gigabit Imperative: current and future use cases driving demand, density and high bandwidth

Today

Two stream client device

Data rate = 574 Mbps (40 MHz channel)

Data Rate = 1.2 Gbps (80 MHz channel) or 2.4 Gbps (160 MHz channel)

WiFi 6E in 1200 MHz

Two stream client device

- Wide channels deliver the high-bandwidth content users demand while maintaining the ability to share spectrum with other license-exempt transmitters
- Lack of wider channels create a detrimental impact on real-time voice and video services, and high-bandwidth immersive services such as AR/VR/MR will be starved of sufficient capacity
- Multiple 160 MHz wide channels cannot be implemented on existing 2.4 GHz and 5 GHz spectrum allocations, which are too fragmented, and which were allocated in an era of now-outmoded generations of RLAN technology
- In addition to home and office networking, Wi-Fi is essential for cellular offload and location applications
- Global trends in technology and equipment are making Wi-Fi a central pillar of global initiatives to expand connectivity to underserved communities and boost economic growth

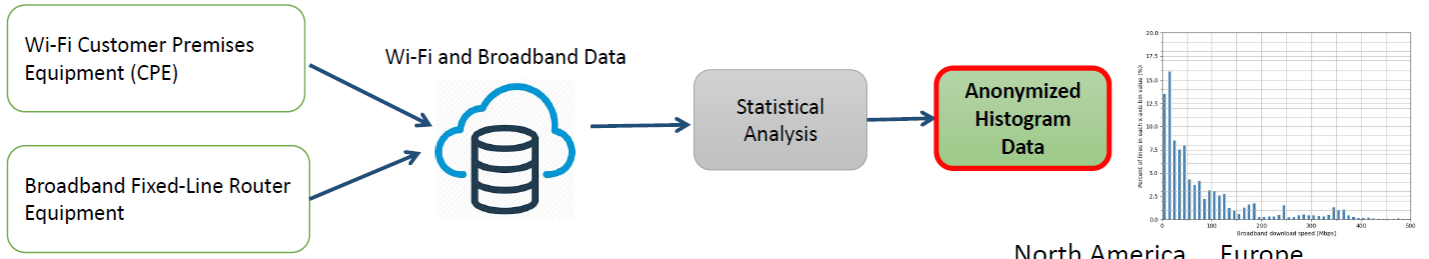
Content courtesy of Aruba

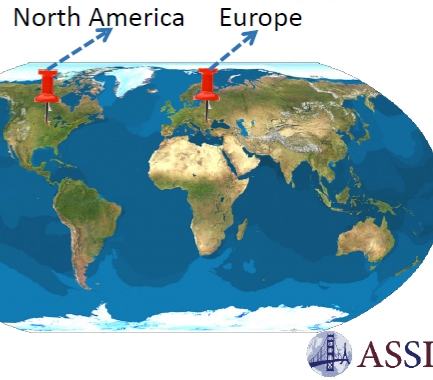
B. An allocation of 500 MHz in lieu of the full 5925-7125 MHz is not sufficient

ASSIA Data Collection and Aggregation

ASSIA Data Collection

- Performance metrics
- Diagnostic parameters
- Network status & test



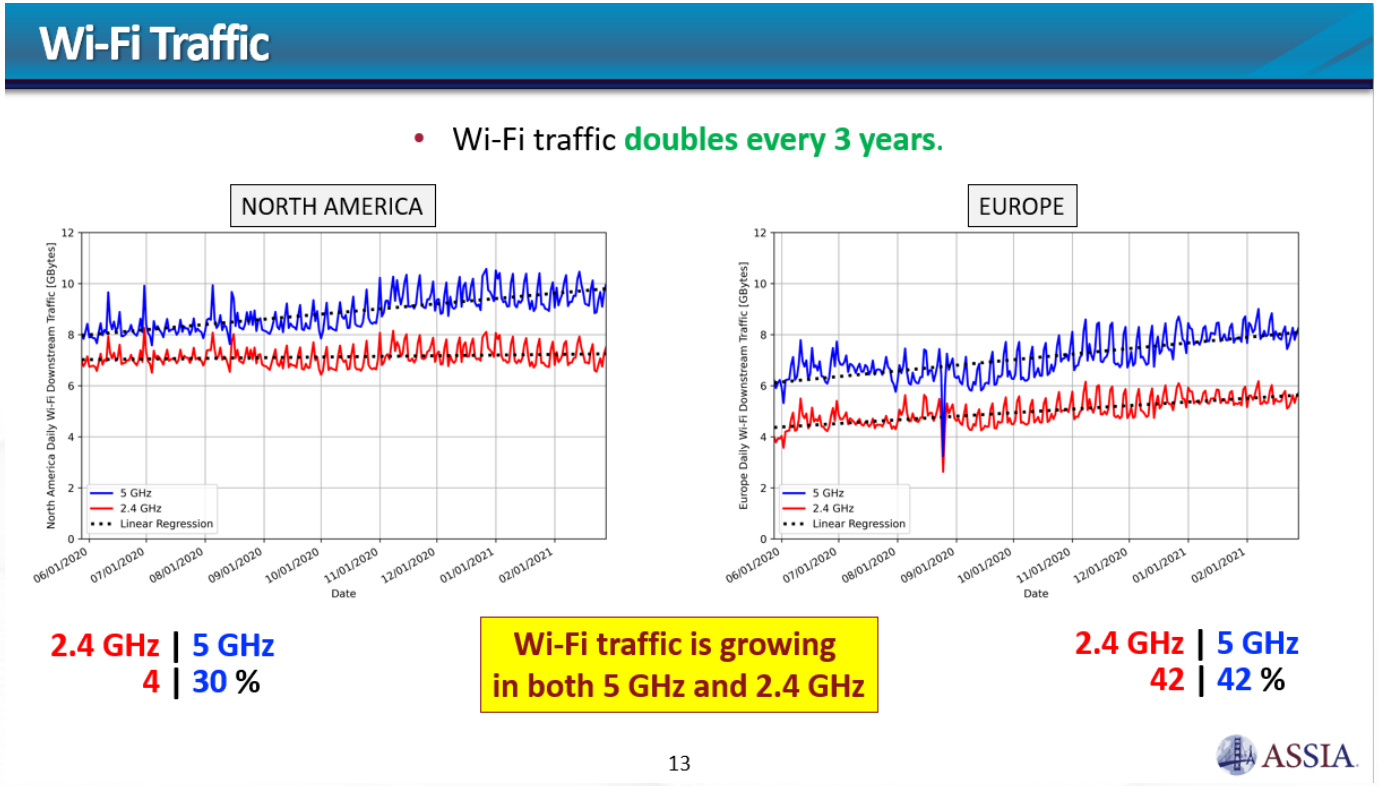


- Millions of lines in North America and Europe
  - ~40 Global ISP's (most have >1M links)
  - ISP operational-expense reduction is main use

ISPs invest in Wi-Fi because their customers' QoE is significantly impacted. Consumers fault the ISP for poor Wi-Fi!

B. An allocation of 500 MHz in lieu of the full 5925-7125 MHz is not sufficient

- 1200 MHz to attend growing demand for wireless capacity (seven 160 MHz channels).
- Long term vision, planning for Wi-Fi 7 (320 MHz bandwidth channels) and future spectrum requirements.



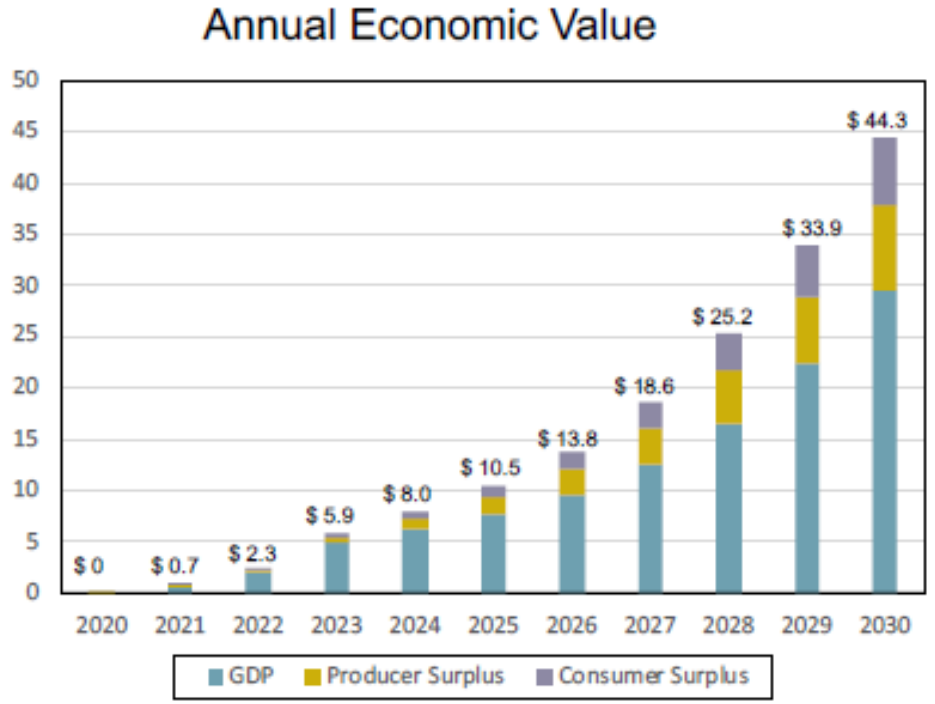
More information at http://dynamicspectrumalliance.org/resources/

C. Social and economic benefits flow from designating the full 6 GHz band to unlicensed use

Studies about Brazil, Mexico, Colombia, Peru and others have been conducted by Telecom Advisory Services LLC.

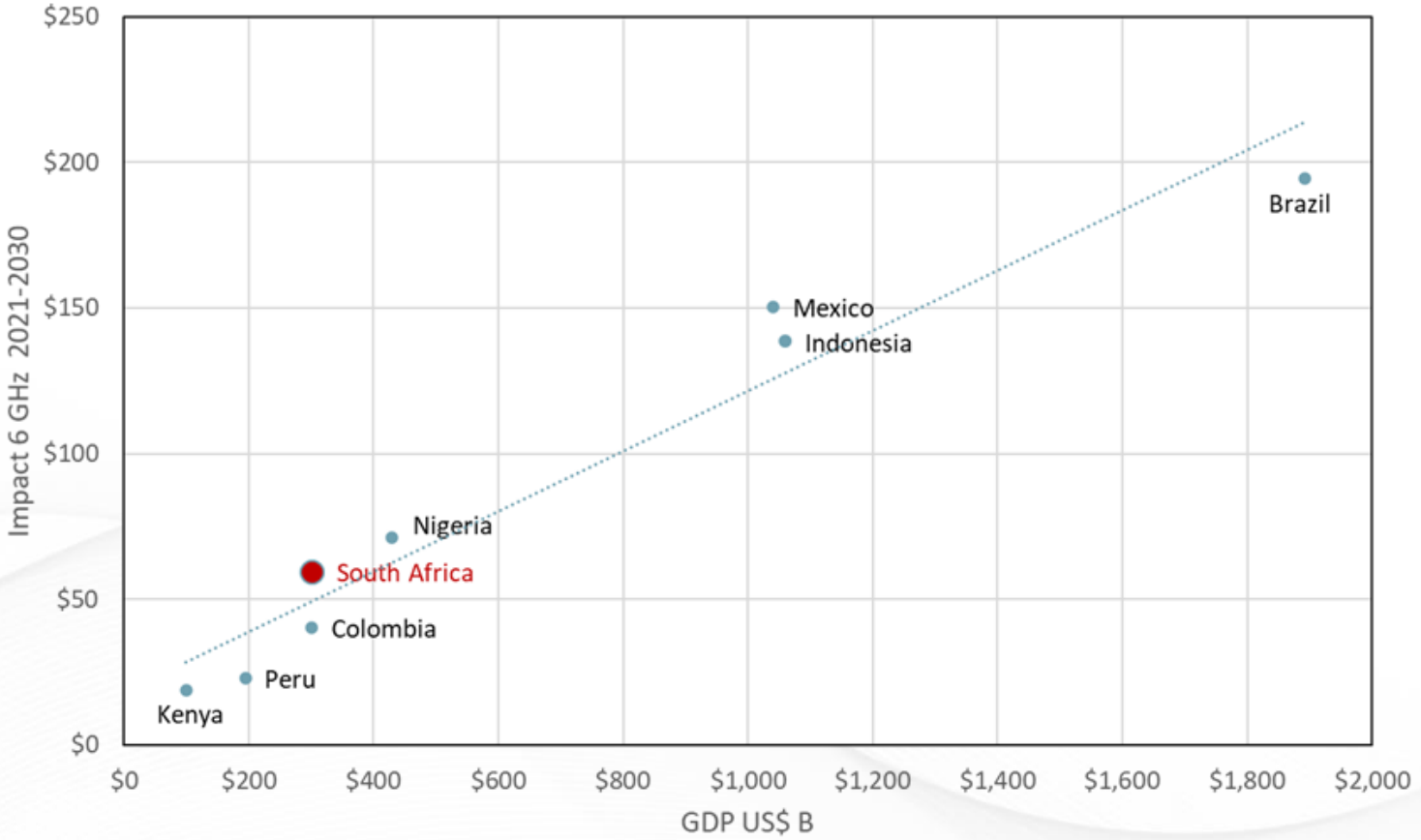
In the case of Brazil, the cumulative economic value between 2020 and 2030 associated with allocating the 1200 MHz in the 6 GHz band amounts to US$ 112.14 billion in GDP contribution, US$ 30.03 billion in producer surplus to Brazilian enterprises, and US$ 21.19 billion in consumer surplus to the Brazilian population.

To wait until 2024, would lead to the loss of this economic contribution and would have an opportunity cost of US$ 16.94 billion.



Source TAS

C. Social and economic benefits flow from designating the full 6 GHz band to unlicensed use



Country	Impact 2021-2030 (% 2030 GDP)
South Africa	19.70%
Kenya	18.91%
Nigeria	16.60%
Mexico	14.45%
Colombia	13.43%
Peru	11.71%
Brazil	10.28%
Indonesia	13.06%

Source TAS

D. Large Opportunity Cost of Inaction

One ANATEL commissioner explained that "…considering the moment that we are in right now, considering the pandemic, considering the need for connectivity for everyone for the recovery of the economy, considering all of that, we understood that **we could not wait** until 2024 or 2027 to start using this frequency band. That's so important. We decided to start using it right now, because **right now we have the equipment, we have a Wi-Fi 6E ecosystem**."

"[T]he entire 6 GHz band can help address the critical need for providing additional spectrum resources for unlicensed operations…. **Repurposing large portions of the 6 GHz band for new licensed services would diminish the benefits** of such use to the American public."

"Delaying the release of the spectrum … would **hinder access to affordable broadband services** for Canadians in rural and urban areas and would **negatively impact the opportunities for innovation**."

"[T]he existing mid-bands for exclusive IMT use (e.g., 3 GHz) have robust ecosystems already as well as superior propagation characteristics. **If mobile operators want to access the 6 GHz band, they can do so on a license-exempt basis using NR-U** (which 3GPP has defined as band n96)."

What Regulators are Saying

"Most importantly, as explained in the Notice and in this Order, we believe that providing new opportunities for unlicensed operations across **the entire 6 GHz band can help address the critical need for providing additional spectrum resources for unlicensed operations**. Making the entire band available for these unlicensed operations enables use of wide swaths of spectrum, **including several 160-megahertz channels as well as 320-megahertz channels, which promotes more efficient and productive use of the spectrum**, and would also help create a larger ecosystem in the 5 GHz and 6 GHz bands for U-NII devices."

"ISED continues to be of the view that releasing **the entire 1200 MHz of spectrum will immediately unleash the full potential of the 6 GHz RLAN technology**. Moreover, making the full 6 GHz band available for licence-exempt use as soon as possible **will maximize the social and economic benefits** that Canadians will derive from this spectrum. The increased demand for broadband Internet and, consequently, the spectrum required to support Wi-Fi enabled devices and applications for remote working and virtual learning, has been demonstrated over the past year with the COVID-19 pandemic. **Notably, current Wi-Fi capacity and speeds are the main constraint, even in homes with high-speed wireline connections, when a family unit is utilizing numerous Wi-Fi enabled devices. This discrepancy will only become more amplified as available wireline speeds increase**. The additional licence-exempt spectrum will provide the improvements needed in Wi-Fi throughput for homes and businesses and reduce congestion between neighbours living in close proximity. The additional spectrum will also support the ability for small wireless Internet service providers to provide **cost-effective enhanced broadband connectivity in rural and remote areas."**

"Importance of WLAN use in the Kingdom and **substantial amount of Wi-Fi traffic**, which was **exemplified during the COVID-19 lockdowns**, and the **emergence of a promising device ecosystem that can be taken advantage of starting from 2021**."

E. Wi-Fi technology, standards, and interoperability are all in place today, ready for regulatory action

Wi-Fi 6E — More than 70 Wi-Fi 6E devices have already been certified by the WFA (**entire band**).
https://www.wi-fi.org/product-finder-results?sort_by=certified&sort_order=desc&certifications=1335

"Nearly **20% of all Wi-Fi 6** device shipments will support 6 GHz by 2022."
https://www.wi-fi.org/beacon/the-beacon/quarterly-update-july-2021-wi-fi-6e-devices-driving-technology-innovation

"We have shipped over 700 million Wi-Fi 6 devices … Wi-Fi 6E delivers another layer of excitement on top of Wi-Fi 6." *Connected by Broadcom*, July 20, 2021, https://lnkd.in/gJXFWHV

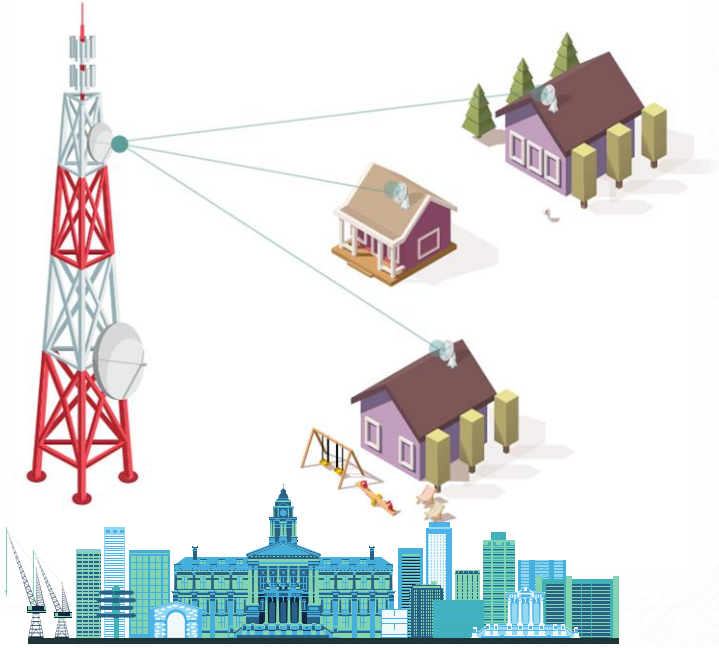
Addressing the Full Range of Use Cases: Consumer, Residential, Enterprise, IoT, etc…

Some Examples of Wi-Fi 6E Chipsets, Modules, and Devices

F. With the right regulatory framework, FS and FSS incumbents can continue and grow their primary licensed uses

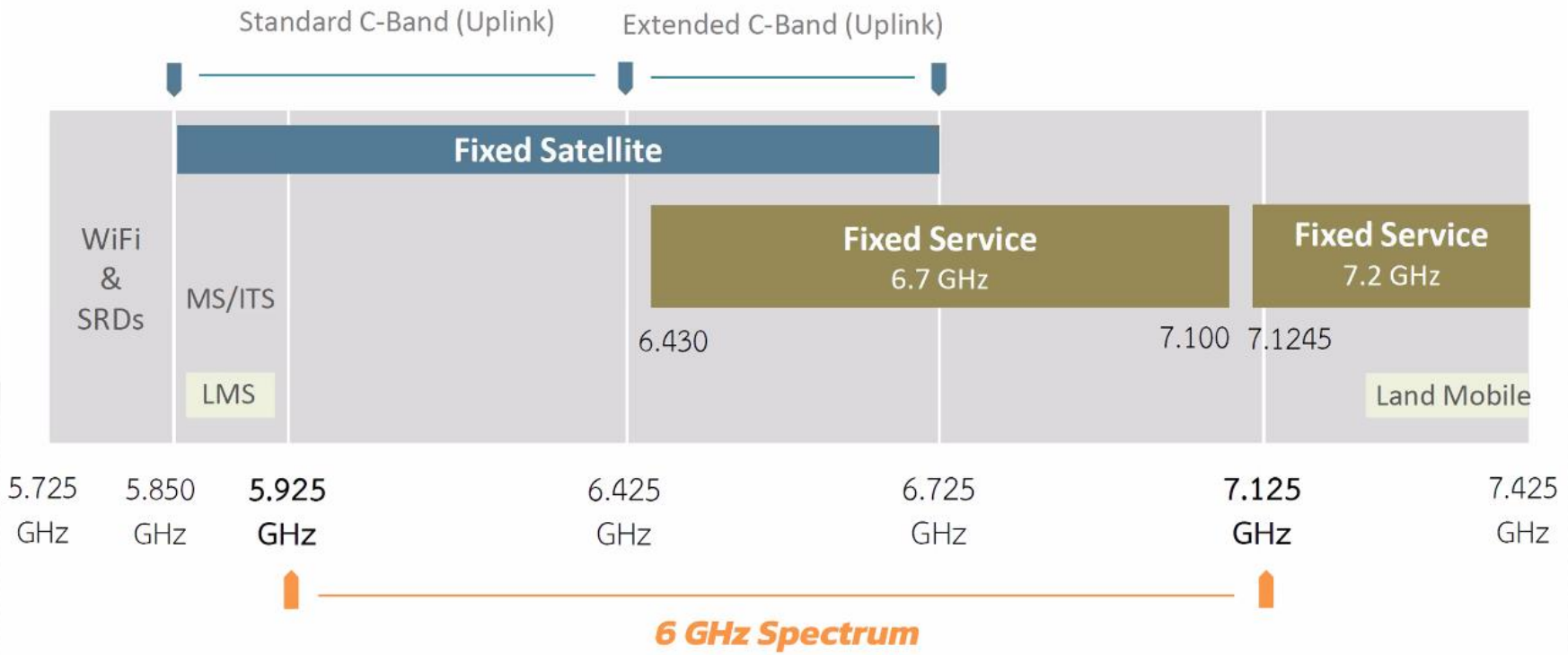
VERY LOW POWER (VLP)

LOW POWER INDOOR (LPI)

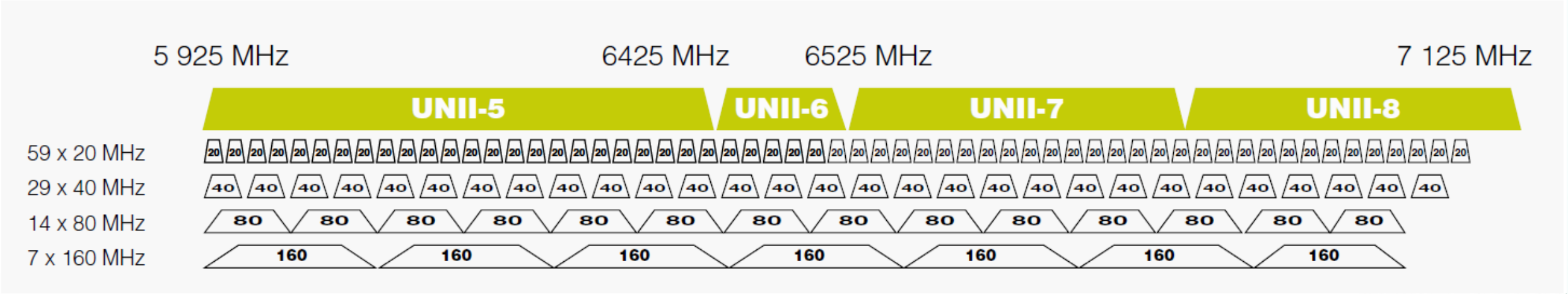


STANDARD POWER (SP)

F. With the right regulatory framework, FS and FSS incumbents can continue to thrive in the band and coexist with WAS/RLAN unlicensed devices



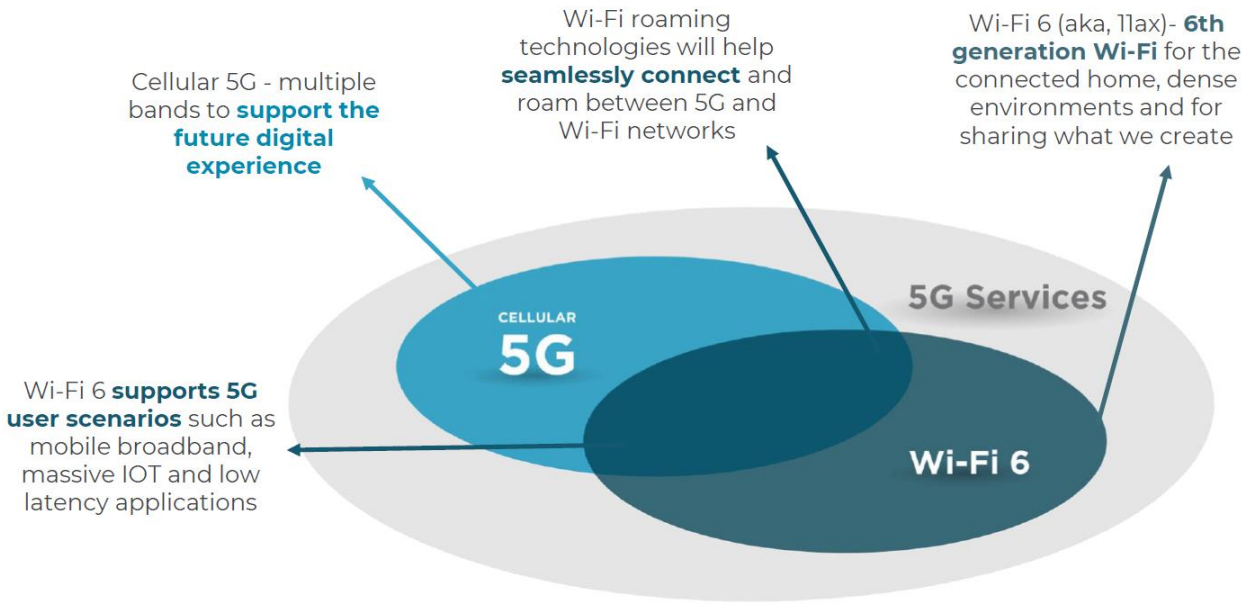
F. Coexistence considerations



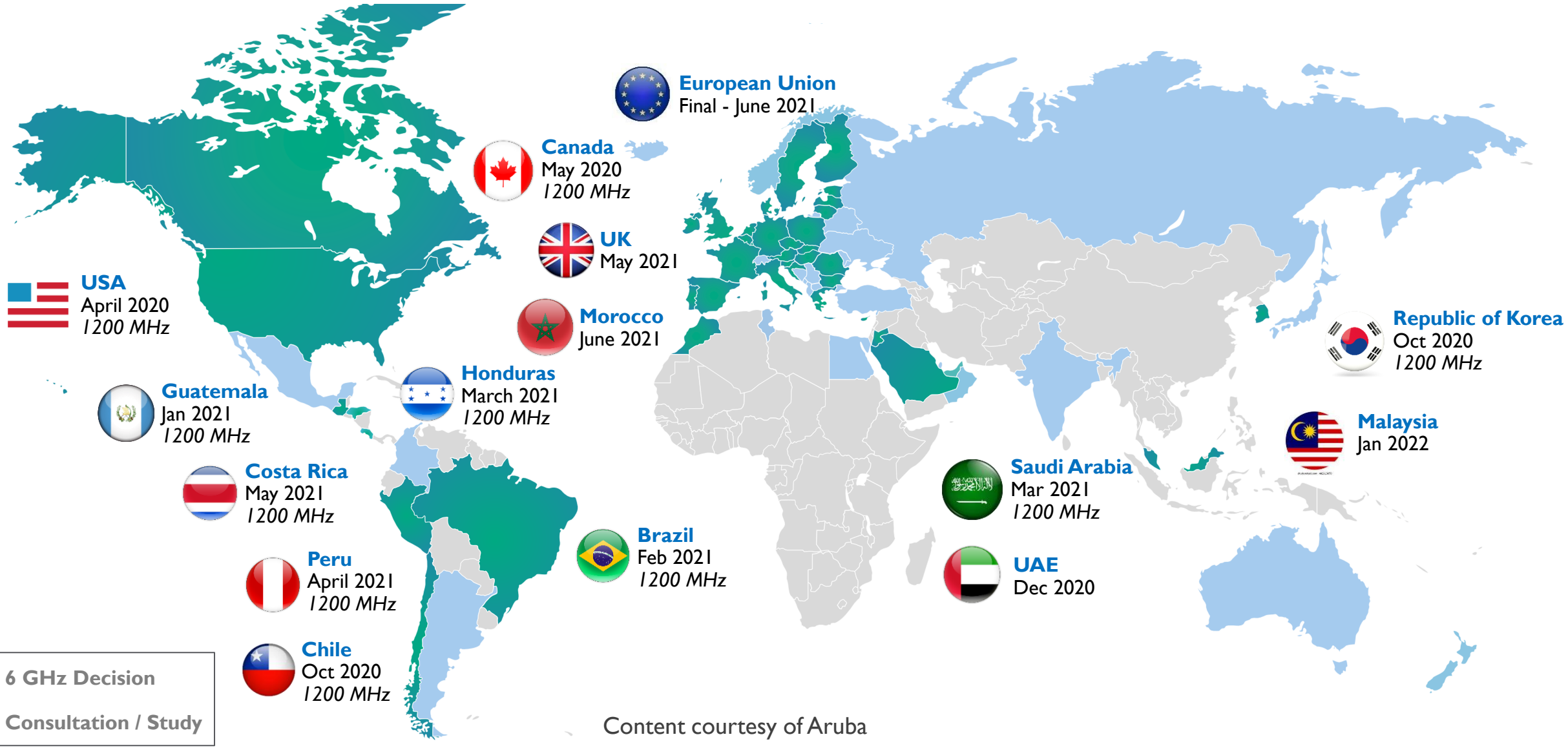
- LPI and VLP RLANs can coexist with existing incumbent services in the band.
- Standard Power RLANs can coexist with incumbents using Automated Frequency Coordination (AFC).

G. Permitting license-exempt technologies throughout the full 6 GHz band is the best way to support both future growth and innovation in 5G through 5G offloading, backhaul, and NR-U

WLAN/RLAN will carry offload from cellular 5G technologies. This will lower the costs of network deployment for mobile operators and for edge investment by neutral host and third-party providers. It will also **lower costs for consumers**.



Powerful 6 GHz Global Momentum



Content courtesy of Aruba

WRC-23 Preparation

WRC-23 Agenda, Item 1.2: to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7025-7125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution COM6/2 (WRC-19);

Resolution COM6/2 (WRC-19), resolves 2: to conduct and complete in time for WRC-23 the sharing and compatibility studies (including studies with respect to services in adjacent bands, as appropriate) with a view to ensuring the protection of services to which the frequency band is allocated on a primary basis, without imposing additional regulatory or technical constraints on those services, and also, as appropriate, on services in adjacent bands, for the frequency bands:

- 3 600-3 800 MHz and 3 300-3 400 MHz (Region 2);
- 3 300-3 400 MHz (amend footnote in Region 1);
- 7 025-7 125 MHz (globally);
- 6 425-7 025 MHz (Region 1);
- 10 000-10 500 MHz (Region 2),

According to discussions during CPM-23 (CPM23-1/11(Rev.1)), the ITU-R working group responsible for agenda item 1.2 is the WP 5D and the contributing groups are [WP 3K, WP 3M, WP 5A, WP 5B, WP 5C].

WRC-23 Preparation

- A global IMT harmonization could only be expected in 100 MHz of the band, from 7025-7125 MHz
- Only region 1 is studying the upper part of the band (6425-7025 MHz)
- Administrations in region 2 and 3 decided not to study the 6 425-7 025 MHz segment and can move forward enabling unlicensed access in the complete 6 GHz band (1200 MHz)

http://dynamicspectrumalliance.org/wp-content/uploads/2021/06/DSA-2021-Summit_Keynote_Mario-Maniewicz.pdf

THE TIME TO ACT IS NOW

CONCLUSION

DSA
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UNLICENSED ACCESS TO THE 6 GHz BAND

1. Wi-Fi is crucial for digital transformation and tech leadership in Thailand.
2. 1200 MHz to attend growing demand for wireless capacity and new use cases. Meeting increased demand for Internet access considering the COVID-19 situation.
3. Multiple 160 MHz/320 MHz wide channels cannot be implemented on existing 2.4GHz and 5 GHz spectrum allocations.
4. Long term vision, planning for Wi-Fi 7 and future spectrum requirements.
5. Economic benefits even if there are no licensing fees.
6. Global momentum to make the entire 6 GHz band available for unlicensed use.
7. Chipsets and equipment already available.

UNLICENSED ACCESS TO THE 6 GHz BAND

8. Efficient use of the spectrum: Incumbent services can continue to thrive in the band and coexist with WAS/RLAN license exempt devices (such as Wi-Fi 6E).
9. Enabling wireless innovation and new use cases for people and companies (ex. AR/VR, further automation, manufacturing, etc.).
10. Neutrality: RLANs can work with any backhaul – mobile network, cable, fiber, fixed wireless access, satellite, having all 1200 MHz available will support competition across platforms and providers.
11. Allowing different stakeholders to deploy gigabit class networks.
12. Immediately realizable benefits.