BIT Session 3:
5G Strategies for Airports

Moderator:
Eduardo Valencia, Vice President, Chief Information Officer, Minneapolis-St. Paul Metropolitan Airports Commission

Speakers:
Aura Moore, Deputy Executive Director, Chief Information Officer, Los Angeles World Airports
Dr. Derek Peterson, Chief Technology Officer, Boingo Wireless
Richard Van Wijk, Global Aviation Practice Lead, Nokia

TPA19
TAMPA 2019
AIRPORTS COUNCIL INTERNATIONAL – NORTH AMERICA
ANNUAL CONFERENCE AND EXHIBITION
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#AIRPORTS19

Wireless spectrum is not a valuable resource, it's a vital one.

For some organizations, wireless has become the "fourth utility;" a resource that's as vital as power, water and heating/cooling. As the vitality of wireless spectrum has increased, it's become clear that data demand is limitless; yet, this crucial resource is also a very finite (and increasingly scarce) one.

Source: CBRS Alliance

SESSION GOALS

- Premise: Wireless connectivity is strategic for airports & big venue owners/operators
- Big changes are coming impacting wireless services and connectivity options
- Change is coming, not just in the cellular space, but also in Wi-Fi and a new service called Citizens Broadband Radio Service (CBRS)

- **Panel's goal** is to pique your interest, level-set a bit and frame up the discussion for our Airport wireless ecosystem

PANELISTS

Richard Van Wijk – Aviation Practice Leader, Nokia

- Over 25 years of experience in Telecommunications business development & consultancy
- Contracted the first LTE Air to Ground Aviation project and private LTE networks for Airports in Europe

Dr. Derek Petersen – CTO, Boingo

- Visionary CTO with two decades + experience architecting and deploying award-winning wireless solutions
- Pioneering 5G, Wi-Fi and CBRS
- Board member CBRS Alliance, Wireless Broadband Alliance, MulteFire Alliance and New IP Agency

Aura Moore – Deputy Executive Director – CIO, Los Angeles World Airports

- Over 25 years of experience with telecommunications planning at the City of Los Angeles and delivering large-scale airport technology projects
- Credited with modernizing technology infrastructure and enhancing the LAX guest experience

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LET'S SET THE STAGE

- Before turning it loose, let's set the stage from a tech perspective and frame up a couple of concepts and a baseline for CIOs:
  - 5G
  - Wi-Fi
  - CBRS – Private LTE

- I'm just a recovering economist turned CIO
- The thoughts are mine not those representing ACI or MSP

It’s all about the Spectrum, Baby!

UNITED STATES FREQUENCY ALLOCATIONS

THE RADIO SPECTRUM

RADIO SERVICES COLOR LEGEND

AERONAUTICAL MOBILE
AERONAUTICAL MOBILE SATELLITE
AERONAUTICAL RADIONAVIGATION
AMATEUR
AMATEUR SATELLITE
BROADCASTING
BROADCASTING SATELLITE
EARTH EXPLORATION SATELLITE
FIXED
FIXED SATELLITE
INTER-SATELLITE
LAND MOBILE
LAND MOBILE SATELLITE
MARITIME MOBILE
MARITIME MOBILE SATELLITE
MARITIME RADIONAVIGATION
METEOROLOGICAL
METEOROLOGICAL SATELLITE
MOBILE
MOBILE SATELLITE
RADIO ASTRONOMY
RADIODETERMINATION SATELLITE
RADIOLOCATION
RADIOLOCATION SATELLITE
RADIONAVIGATION
RADIONAVIGATION SATELLITE
SPACE OPERATION
SPACE RESEARCH
STANDARD FREQUENCY AND TIME SIGNAL
STANDARD FREQUENCY AND TIME SIGNAL SATELLITE

ACTIVITY CODE

FEDERAL (NGF) ONLY
FEDERAL/NON-FEDERAL SHARED
NON-FEDERAL (NG) ONLY

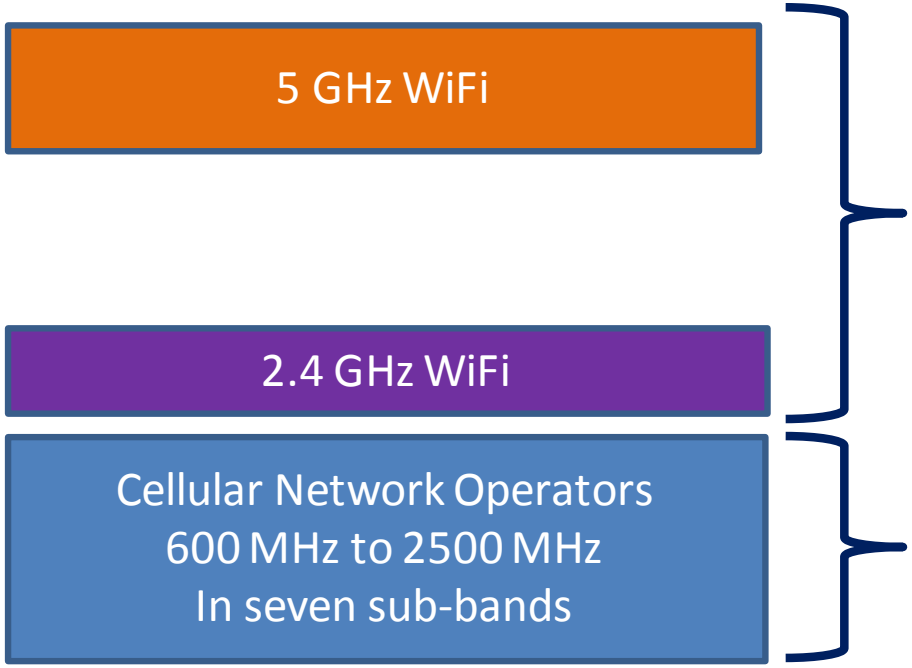
ALLOCATION USAGE DESIGNATION

SERVICE	EXAMPLE	DESCRIPTION
Primary	FIXED	Capital Letters
Secondary	Mobile	1st Capital with lower case letters

U.S. DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Office of Spectrum Management

JANUARY 2016

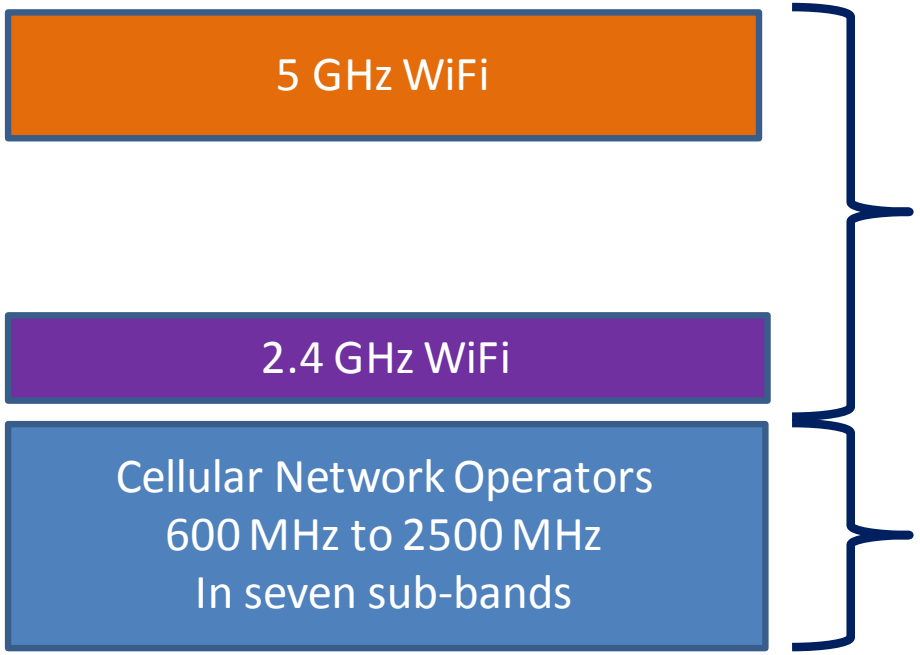
TODAY'S SPECTRUM, TODAY'S SERVICE



- 802.11ac is now called "Wi-Fi 5"
- Unlicensed spectrum
- Widely deployed, we all get benchmarked on it
- Access points support both bands; known support and service options
- Struggles with dense and high capacity areas – not seen as secure

- 3G and LTE 4G
- Licensed and protected spectrum
- Verizon, AT&T, T-Mobile and Sprint, normally via DAS @ Airports
- Widely deployed
- Lower frequencies penetrate material better
- Service benchmark is streaming video

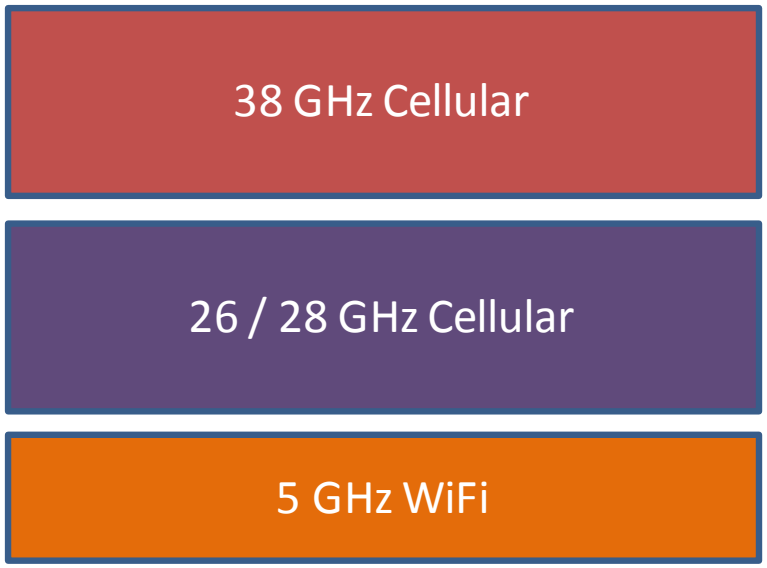
TODAY'S SPECTRUM, TOMORROW'S SERVICE



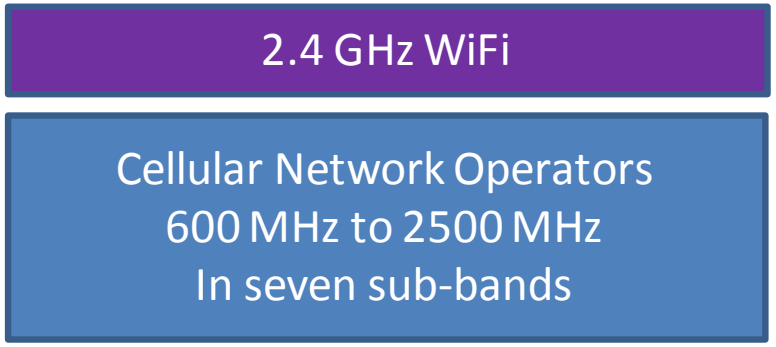
- Still Unlicensed
- New 802.11ax standard will be called Wi-Fi 6
- Wi-Fi 6 is much better at high capacity in dense network settings
- Wi-Fi 6 is quite ideal for airport terminal needs

- 4G LTE here to stay: estimated to be around for another decade
- 4.5G will offer many 5G-like features
- Extends the life of DAS
- 5G "New Radio" will rollout in this band

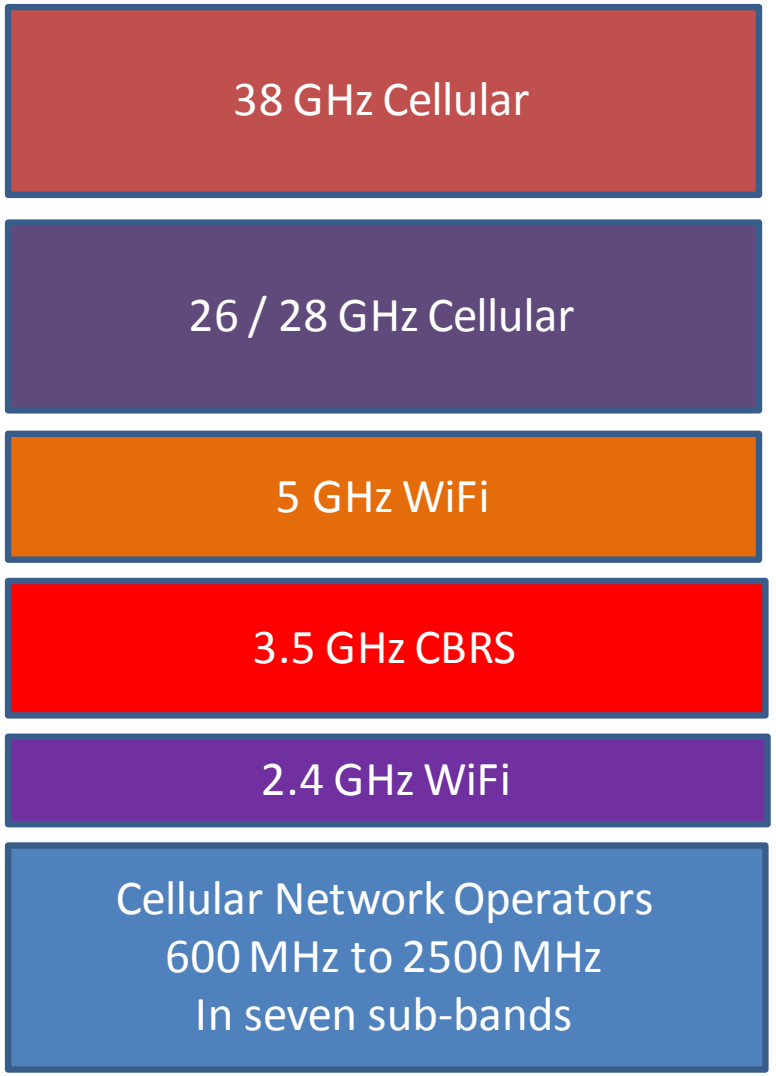
NEW SPECTRUM – 5G



- 5G Realm
- Licensed and protected spectrum
- Verizon, AT&T carrier space
- These very high frequencies are called “millimeter wave”
- Very wide-band + high frequencies will lead to “stunning” data throughput
- Very short range; difficult penetrating objects
- Perfect for line-of-site areas with minimal physical barriers
- Carrier specific approaches; no common antenna approach available



NEW SPECTRUM - CBRS



- Unlicensed (but coordinated) spectrum
- Requires a subscription to a "sniffing network" that protects legacy users (needs coordination to setup)
- Very fast, private, low latency & secure
- Wi-Fi easy, LTE good

KEY CONSIDERATIONS

- Overall, think about it in terms of an overarching **wireless ecosystem**
- **Wi-Fi**
  - Take a look at what Wi-Fi 6 has to offer; it is designed to perform well in dense environments for increased demand.
  - Consider upgrading, whether is run by you or 3rd party provider
- **Cellular**
  - Existing 4G DAS networks and outdoor sites can be easily upgraded to 4.5G aka LTE Advanced Pro.
  - 4G here to stay due to performance and equipment refresh
  - 5G is on its early stages, has blazing potential, enables commercial use cases including self-driving vehicles, and *big* IoT
  - 5G will require new infrastructure; no neutral host options at this point
  - Consider talking to your carriers about their 5G plans & rollout intentions.

KEY CONSIDERATIONS – CONT.

- **CBRS**
  - Valuable new spectrum, available for citizens to *leverage*.
  - Potential game changer for in building coverage options
  - LTE performance, Wi-Fi Simplicity
  - Outstanding technical attributes including speed, throughput, latency, security, quality of service and control
  - Commercially available options are here and growing
  - Consider your options. Depending on situation it can potentially be leveraged for exclusive airport use.
- **CBRS use cases for airports:**
  - Private LTE network for secure use by airport personnel and operations (voice, video, machine)
  - Surveillance, automation, building management
  - Potential neutral host LTE to connect any handset with a CBRS chipset