

airheads

TECH TALK *LIVE*

aruba
a Hewlett Packard
Enterprise company

Wireless Update, Fall 2019

Onno Harms, Product Manager WLAN
September 19, 2019

#ArubaAirheads

Wireless Update, Fall 2019

Market trends affecting our wireless products and roadmap

- **Wi-Fi 6** is gaining momentum
 - Many AP announcements since 2017, multiple shipping products now (mostly mid-range and high-end)
 - Client devices: Samsung GS10 (Feb 2019) and Note 10, Intel chipsets for laptops, and now Apple iPhone 11
 - The Wi-Fi Alliance (WFA) has kicked off its Wi-Fi 6 certification program (9/16/2019)
- Will **5G cellular** take over the (wireless access) world?
 - It will enable and improve many compelling use-cases. Wi-Fi will be a critical component of that
- Everything is moving to the **cloud**
 - Well, maybe not everything
- Do more at **the edge**
 - Process, filter & reduce data, apply policies, take actions, etc. But not everything can be done at the edge
- **IOT is everywhere**, with devices using every imaginable access technology to get on the network
- Need to have Machine Learning (**ML**) and Artificial Intelligence (**AI**)
 - Lots of marketing here, but offering great opportunities for security, network optimization and debugging
- The need for **security** remains critical, threats are everywhere
 - Especially in relation to IOT



Wireless Update, Fall 2019

What will Wi-Fi 6 deliver (features and value)?

- A bunch of **new and exciting features**, mostly focused on efficient use of the air interface in multi-AP deployments
 - Orthogonal Frequency Division Multiple Access or OFDMA (spectrum slices; as narrow as 2MHz)
 - Improved MU-MIMO (up to 8 clients, adding uplink; both are optional)
 - Spatial Reuse (or BSS coloring)
 - TWT and 20MHz-only
- Increased **peak data rate** (why should you care?)

– 9.6Gbps	Maximum from the standard	HE160 / 8SS	
– 4.8Gbps	Maximum from current AP chipsets and products	HE160 / 4SS, or	HE80 / 8SS
– 2.4Gbps	Maximum from current client devices	HE160 / 2SS	
– 1.2Gbps	Maximum using realistic channel BW	HE80 / 2SS	

 - That's per client. AP can use MU-MIMO and/or multiple radios to deliver much higher "aggregate rates"
- Much **improved average and aggregate performance** (expected: 4x) in dense deployments
 - Hard to prove, but easy to demonstrate
- Opportunity to deliver better QoS to more clients simultaneously (voice, video)
 - Optimize this by tweaking the "scheduler" for specific environments, users, applications

Wireless Update, Fall 2019

Aruba's Wi-Fi 6 position and products

- We believe **Wi-Fi 6 offers great value** to the typical Aruba wireless customer
 - Very high density deployments, delivering a great experience to large numbers of wireless users and devices
 - Optimized support for a broad range of devices, applications and needs
 - Setting a new bar for peak performance, while also effectively supporting (large numbers of) low-bandwidth devices (IOT)
 - Delivering optimized connectivity with security, power-efficiency and control
- As always, we're early to market with new technology. It's in **our DNA!**
- Delivering **standards-compliant** and **differentiated** products, that deliver the **full value** of Wi-Fi 6:
 - No shortcuts or compromises, no false announcements or half-baked products just for bragging rights
 - We're not bolting 802.11ax radios onto existing AP platforms, but designing the new products from the ground up
 - Exploiting the baseline capabilities of the standard to optimize Wi-Fi for the enterprise environment
- **Aruba is building a broad portfolio**
 - **Launched the 510 Series last November, added 530 and 550 Series in April, and introducing the 500 Series now**

Wireless Update, Fall 2019

Aruba's Current Wi-Fi 6 Portfolio – Campus

- **500 Series (AP-504 and AP-505): Entry-level 802.11ax (256/75)**
 - 2x2 + 2x2 radios, 1x 1Gbps Ethernet
 - BLE, 802.15.4, USB, unrestricted* from 802.3af POE (class 3)
 - IPM, deep-sleep mode
- **510 Series (AP-514 and AP-515): Mid-range 802.11ax (512/100)**
 - 4x4 + 2x2 radios, 1x 2.5Gbps + 1x 1Gbps Ethernet
 - BLE, 802.15.4, USB, unrestricted from 802.3at POE (class 4)
 - IPM, deep-sleep mode
- **530 Series (AP-534 and AP-535): High-end 802.11ax (1024/150)**
 - 4x4 + 4x4 radios, 2x 5Gbps Ethernet
 - BLE, 802.15.4, USB, unrestricted* from 802.3at POE (class 4)
 - IPM, deep-sleep mode, hitless failover (Smart POE)
- **550 Series (AP-555): Flagship 802.11ax (1024/150)**
 - 8x8 + 4x4 radios or 4x4 + 4x4 +4x4 tri-radio, 2x 5Gbps Ethernet
 - BLE, 802.15.4, USB, 802.3bt (class 5) or 2x 802.3at POE, reduced from 1x 802.3at
 - IPM, deep-sleep mode, hitless failover (Smart POE)



Wireless Update, Fall 2019

802.11ax Campus AP Platform Comparison Matrix

	AP-50x (BRCM)	AP-51x (BRCM)	AP-53x (QCA)	AP-555 (QCA)
5GHz radio (HE80)	2x2	4x4	4x4	8x8 or dual 4x4 (tri-radio)
5GHz radio (HE160)	N/A	160	80 + 80	80 + 80
2.4GHz radio	2x2	2x2	4x4	4x4
Dual-5GHz	No	No	No	Yes*
1024-QAM	Yes	Yes	Yes	Yes
Max number of clients per radio	256 (75)	512 (100)	1024 (150)	1024 (150)
Peak datarates (2.4GHz, 5GHz)	574Mbps / 1.2Gbps	574Mbps / 4.8Gbps	1.15Gbps / 2.4Gbps	1.15Gbps / 4.8Gbps
Peak datarates (HE20 2.4GHz, HE80 5GHz)	287Mbps / 1.2Gbps	287Mbps / 2.4Gbps	574Mbps / 2.4Gbps	574Mbps / 4.8Gbps
DL-OFDMA	Yes	Yes	Yes	Yes
UL-OFDMA	Yes	Yes	Yes	Yes
DL-MU-MIMO	Yes	Yes	Yes	Yes
UL-MU-MIMO	No	No	Yes	Yes
Max no. of RUs (HE80)	8	16	37	37
Wired ports	1x 1Gbps	1x 2.5Gbps + 1x 1Gbps	2x 5Gbps	2x 5Gbps
Peak power (excl. USB)	11.0W	20.8W	26.4W	38.2W
POE-PD (typical)	Class 3	Class 4	Class 4	Class 5/4
Size & weight (internal antenna variants)	160 x 161 x 37 (mm) 500g	200 x 200 x 46 (mm) 810g	240 x 240 x 53 (mm) 1270g	260 x 260 x 58 (mm) 1570g

Wireless Update, Fall 2019

802.11ax Feature Phasing

	AP-51x 8.4.x	AP-51x 8.5.x	AP-51x, AP-50x 8.6.x		AP-53x/555 8.5.x	AP-53x/555 8.6.x
DL & UL OFDMA *	no	yes	yes		no	yes
DL MU-MIMO *	no	no	yes		no	yes
UL MU-MIMO	Not supported	Not Supported	Not Supported		no	no (future)
160MHz	yes	yes	yes		no	yes
BSS Coloring *	no	no	yes		no	yes
TWT *	no	no	yes		no	yes
TxBF *	no	no	yes		no	yes
BLE (int)	yes	yes	yes		yes	yes
Zigbee (int)	no	no	yes		no	yes
Spectrum	no	no	yes		yes	yes
Mesh	no	yes	yes		no	yes
WPA3 *	yes	yes	yes		yes	yes
WIDS	yes	yes	yes		yes	yes
Deep sleep (Green AP)	yes	yes	yes		yes	yes
Max # assoc. clients	230	230	512		512	1024
Tri-radio mode	Not supported	Not supported	Not supported		no	yes (AP-555)

Wireless Update, Fall 2019

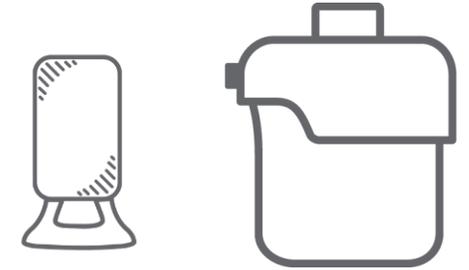
802.11ax Campus AP POE power restrictions

- AP-50x (1x POE)
 - 802.3af POE (class 3): no USB
 - 802.3at POE (class 4): unrestricted
- AP-51x (1x POE)
 - 802.3af POE (class 3): not supported without IPM, unrestricted with IPM
 - 802.3at POE (class 4): unrestricted (reduced USB power budget)
 - 802.3bt POE (class 5): unrestricted
- AP-53x (2x POE)
 - 802.3af POE (class 3): not supported
 - 802.3at POE (class 4): some restrictions (USB, second Ethernet), unrestricted with IPM
 - 802.3bt POE (class 5): unrestricted
 - Dual 802.3at POE (*Smart POE*): unrestricted
- AP-555 (2x POE)
 - 802.3af POE (class 3): not supported
 - 802.3at POE (class 4): serious restrictions (same capabilities as AP-53x on 802.3at POE)
 - 802.3bt POE (class 5): unrestricted
 - Dual 802.3at POE (*Smart POE*): unrestricted

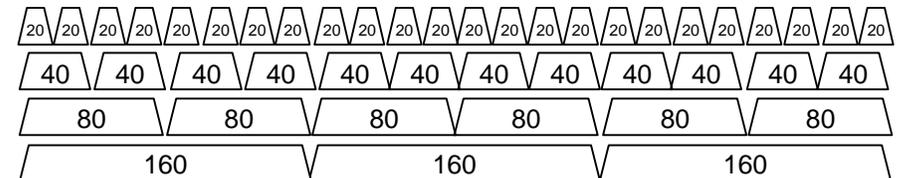
Wireless Update, Fall 2019

Aruba's Wireless Infrastructure – What else is coming

- Completing the **Wi-Fi 6 product portfolio** in 2020
 - Hospitality Access Points
 - Hardened / Industrial Access Points
 - Outdoor Access Points
- Later: adding support for **6GHz and more cool features** (like uplink MU-MIMO)
 - Requires new hardware
 - Waiting for regulatory rules to change (unpredictable timelines)



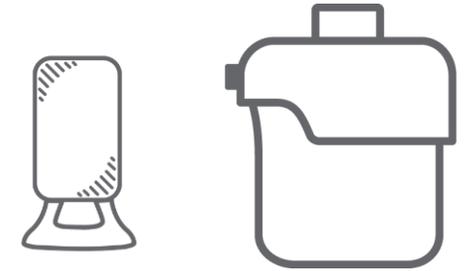
24 x 20 MHz
12 x 40 MHz
6 x 80 MHz
3 x 160 MHz



Wireless Update, Fall 2019

Aruba's Wireless Infrastructure – What else is coming

- Completing the **Wi-Fi 6 product portfolio** in 2020
 - Hospitality Access Points
 - Hardened / Industrial Access Points
 - Outdoor Access Points
- Later: adding support for **6GHz and more cool features** (like uplink MU-MIMO)
 - Requires new hardware
 - Waiting for regulatory rules to change (unpredictable timelines)
- And much later still: **Extreme High Throughput** or EHT is coming (802.11be)
 - Probably not before 2023
- Will **60GHz** ever be used as an access technology (802.11ad, 802.11ay, WiGig)?
 - We hope so, and are exploring options and partners
- Expect lots of initiatives and improvements related to **IOT and Locationing**
 - We intend for the Aruba AP to be the only wireless device you need on your ceiling



Wireless Update, Fall 2019

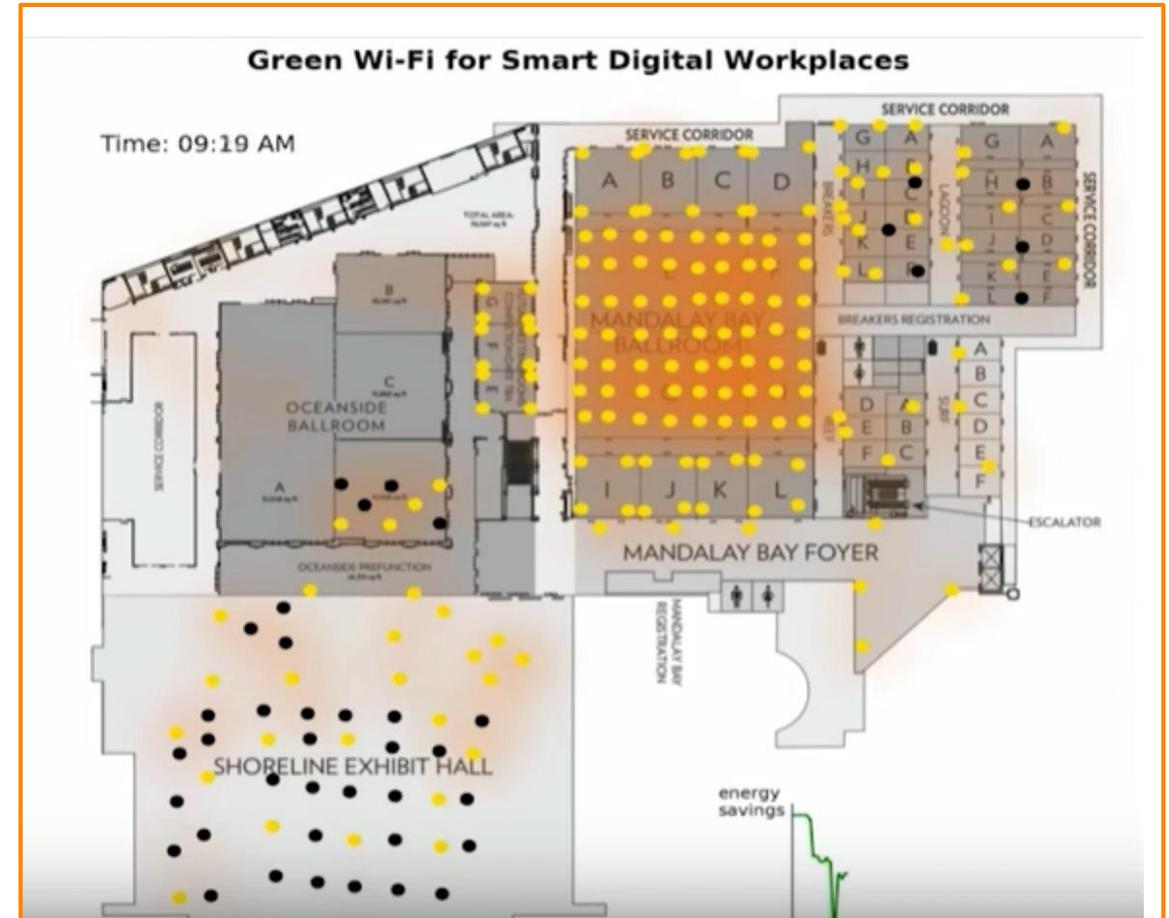
Aruba's Wi-Fi 6 position and products

- We're **not just adding Wi-Fi 6 support** (that's just the wireless evolution, tablestakes)
- It's **not even just the best version of Wi-Fi 6** for the Enterprise
 - Remember: not all implementations will be equal
 - We'll continue to exploit our understanding of the market and technologies, and our close cooperation with chipset vendors and other ecosystem partners, to deliver **differentiated and optimized** products and solutions
- There are other existing and new Aruba differentiators that matter
 - Cellular Coexistence through our **ACC feature (Advanced Cellular Coexistence)**
 - Getting the most out of a restricted power (POE) budget through our **IPM feature (intelligent Power Monitoring)**
 - Removing a potential wired bottleneck by supporting **Smart Rate (multi-gig) ports**
 - Offering POE powering flexibility through **Smart POE** (no forced upgrade to 802.3bt POE++)
 - Power-savings through support of **deep-sleep mode** on the APs and the GreenAP system feature (next slide)
 - Delivering a flexible **IOT gateway** platform (next slide):
 - Integrated radio technologies: Wi-Fi, BT/BLE, Zigbee, NFC
 - Support for multiple external dongles using USB
 - Partnerships and validated solutions with a large and growing number of IOT device/system vendors



Wi-Fi Goes Green for Digital Workspaces with the 5XX Series

- Built-in Green AP “**Deep Sleep Mode**” support in Aruba 5XX series.
- With the help of AI/ML, NetInsight will identify underutilized APs.
- These underutilized APs will be put to deep sleep mode ensuring sufficient coverage remains in the area.
- Up to 72% in power (from ~21W to 6W) can be saved.



Aruba Access Points as an IOT Platform



Wi-Fi 6
(802.11ax)



Bluetooth 5 &
BLE



802.15.4
includes
Zigbee



Custom
Protocols



Multiple radio access
networks (Multi-RAN)



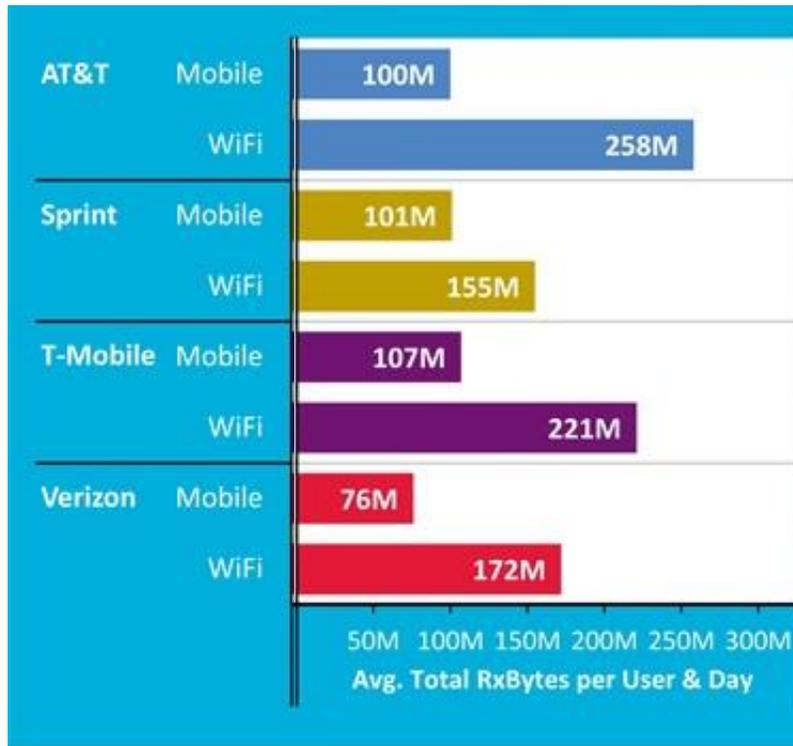
802.15.4 IoT
expansion radio
Coming soon

- Stream your IOT telemetry data to any destination
- Over 400 certified partners with more ever quarter
- Interoperability certifications are fully backed by complete QA suite, detailed solution, and API documentation

Perfect Storm for Wi-Fi Enablement of 5G Coverage

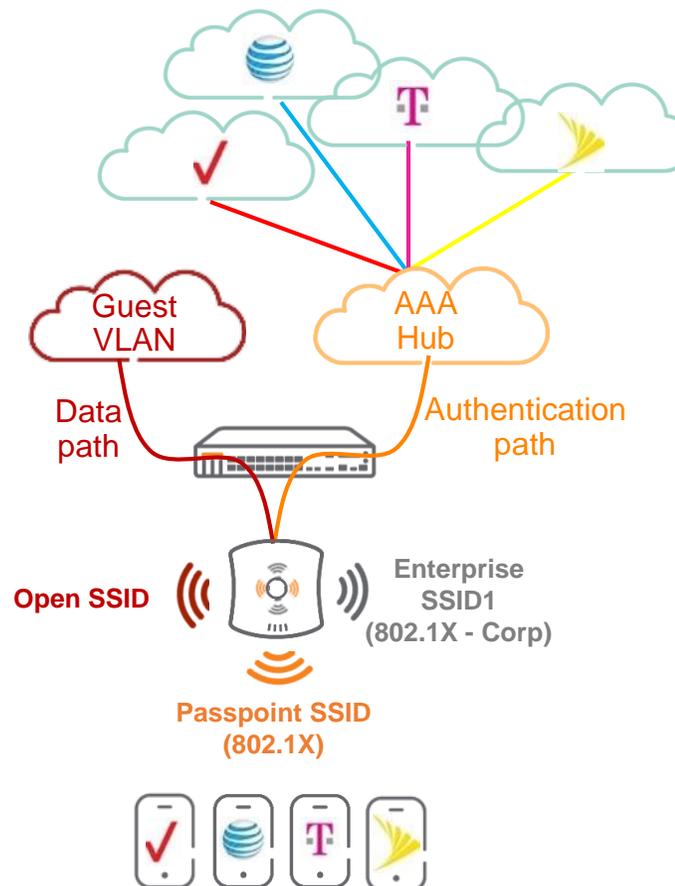
User-Driven Offload

Data Volume per user per day

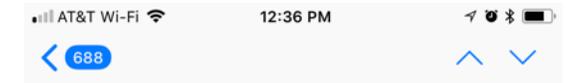


Source: P3 Group, Q4 2016

Passpoint Ecosystem



Wi-Fi Calling



Keep the conversation going with Wi-Fi Calling

Help minimize dropped calls due to indoor cellular coverage issues.

Easy to set up and use right from your smartphone settings

Works automatically when connected to Wi-Fi and cellular is limited

Already included and uses your same AT&T mobile number—no app required

Set up Wi-Fi Calling today!

Learn more

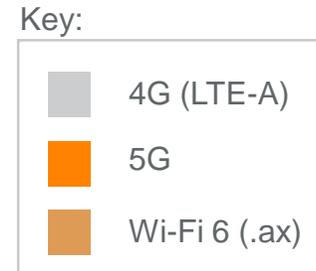
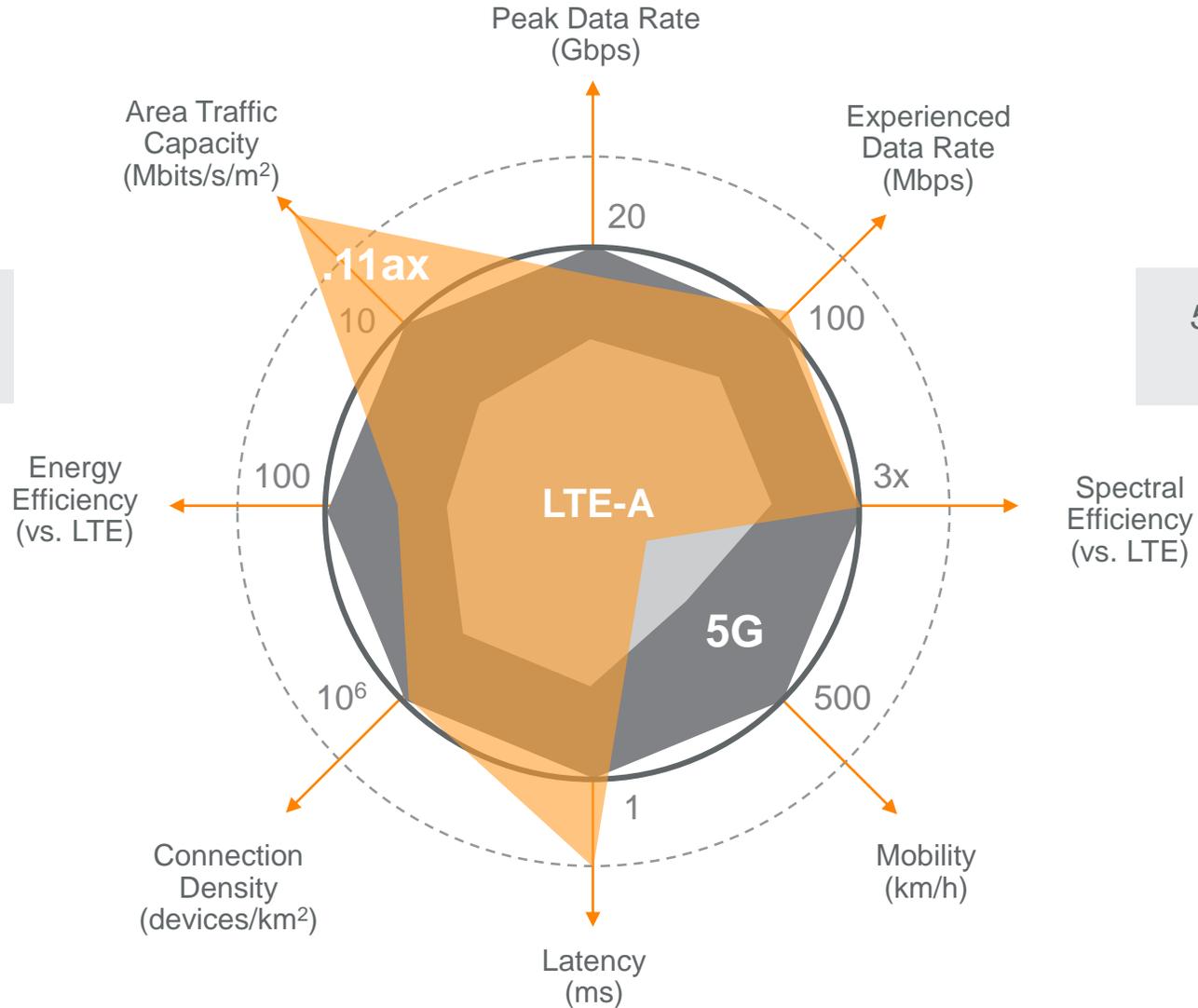


Wi-Fi 6 evolving in parallel with 5G

Complementary approaches

Wi-Fi for dense, high-capacity networking

5G for macro coverage and high-mobility



Source: WBA, Sept 2017

airheads

TECH TALK *LIVE*

Thank You