Virginia Cybersecurity Challenge: 5G
Background Information

A new generation of wireless architecture arrives every decade

5G delivers up to 100 times the bandwidth of 4G, plus better reliability, less delay (latency), and connection to a higher density of devices

Gearing up for a 5G Connected World

Technology	3G	4G	5G
	Connecting humans	Connecting humans+devices	Connecting the world
Latency	300ms	~55ms	<10ms
High Bandwidth	1hr 3GB movie download	18min 3GB movie download	55sec 3GB movie download
Scale	Millions of devices	Billions of devices	Trillions of devices

Source: Accenture Analysis, OpenSignal

Source: Accenture

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5G requires extensive collaboration across multiple players

Not a single technology, but advances in spectrum availability, unified standards, and disaggregation of required equipment

Foundational technology
5G standards development: Design, analysis, implementation, and testing

5G Chipset makers → Device manufacturers → Infrastructure developers → Network operators

End user
Consumer and business

Utilities   Manufacturing   Healthcare   Auto & Transport   Retail   Agriculture
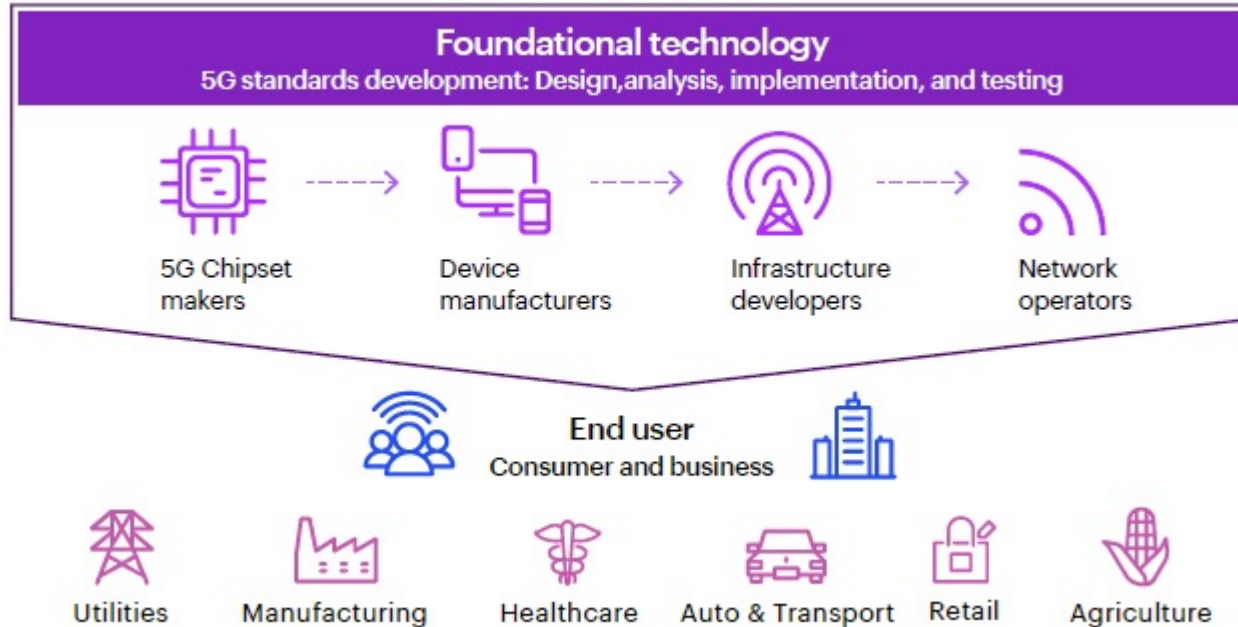
Source: Accenture Analysis

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5G promises a wide range of benefits

Source: Qualcomm
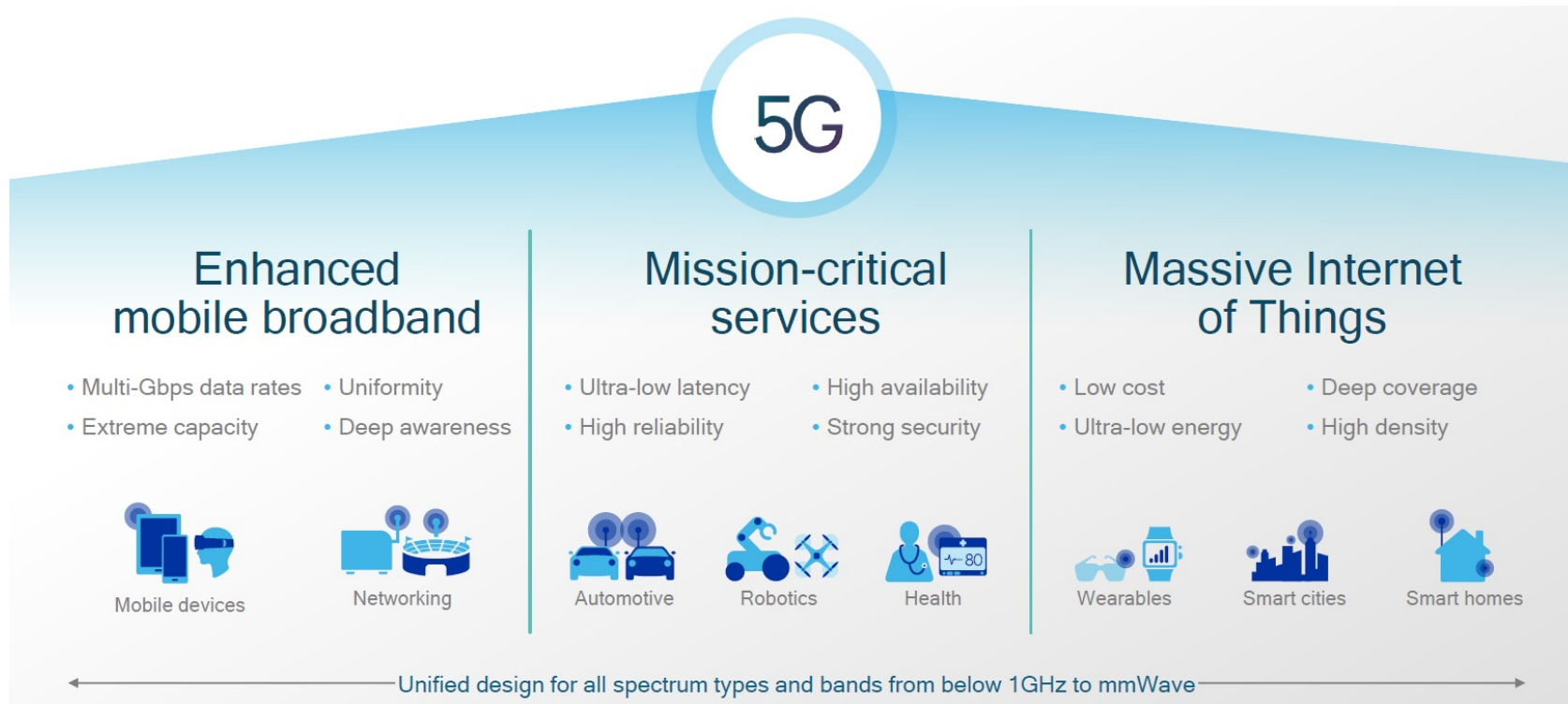
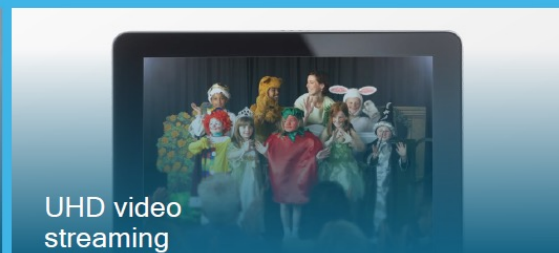# Enhancing mobile broadband

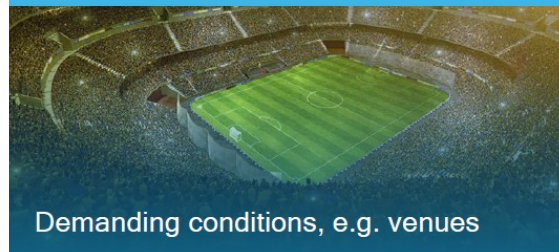Ushering in the next era of immersive experiences and hyper-connectivity

3D/UHD video telepresence

Tactile Internet

UHD video streaming

Demanding conditions, e.g. venues

Broadband 'fiber' to the home

Virtual reality

Extreme throughput
multi-gigabits per second

Ultra-low latency
down to 1ms e2e latency

Uniform experience
with much more capacity

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Enabling new mission-critical control services

Delivering ultra-reliable, ultra-low latency communication links

Autonomous vehicles

Robotics

Energy / Smart grid

Industrial automation

Aviation

Medical

High reliability
Extremely low loss rate

Ultra-low latency
Down to 1ms e2e latency

High availability
Multiple links for failure tolerance & mobility

Source: Qualcomm

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Connecting the massive Internet of Things

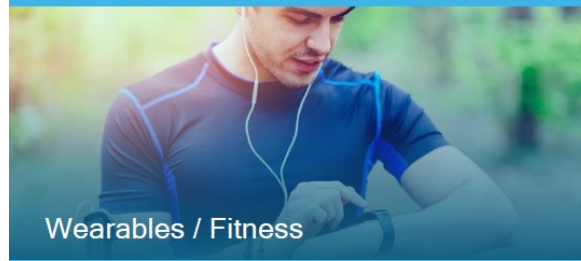Optimizing to connect anything, anywhere with efficient, low cost communications
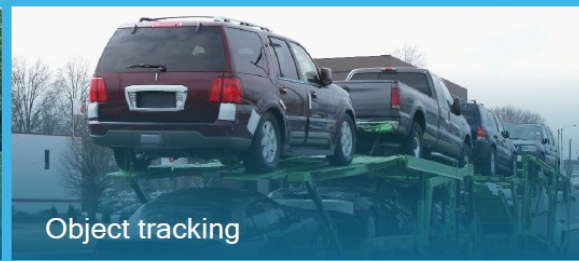
Smart cities

Smart homes

Utility metering

Wearables / Fitness

Remote sensors / Actuators

Object tracking

Power efficient
Multi-year battery life

Low complexity
Low device and network cost

Long range
Deep coverage

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Source: Qualcomm

5G is forecasted to drive $2.6T in US sales and 16M jobs, '21-'25 …

Select Findings

Manufacturing
5G-enabled factories can see up to **20-30%**[63] in overall productivity gains, including improvements of **50%** in assembly time, **20%** in asset life, and **90%** in defect detection.[69]

Retail
5G can enable rich video streaming experiences in the store, enabling up to **50%** increase in sales growth when combined with human-focused processes and XR visualizations.[89]

Healthcare
5G will allow more post-acute care to transition to remote, home-based models, where cost savings are greater than **30%** and drive better patient outcomes.[109]

Auto & Transport
New connected vehicle technologies have the potential to reduce the severity of non-impaired crashes by **80%**[132], save **$3.6 billion** in collision costs[131], and reduce traffic by **25%**.[141]

Utilities
Transmission line monitoring using smart sensors and drones can reduce wildfire risk, potentially **saving billions of dollars.**[169]

Source: Accenture Analysis

Industry	Highlighted use cases	Potential benefits		
		New end services/ product	Efficiency/ productivity	Resiliency
Manufacturing 5G technology unlocks the ability to sense and respond for manufacturers in the United States, facilitating efficient communications between people and machinery.	Factory floor automation and robotic process control		●	●
	Intelligent asset management		●	
	Connected worker		●	●
	Quality assurance		●	●
Retail 5G technology will create superior customer experiences and operating efficiencies in retail through innovative new offerings and the removal of key points of sales friction.	Digital store consultations	●	●	
	Frictionless store checkout		●	●
	Intelligent clienteling	●	●	●
	Automated surveillance		●	●

i   Economic analyses of digital services and cellular connectivity suggests that consumer surplus, the value consumers receive beyond prices paid for goods and services, is likely larger than sales and GDP impacts.

Healthcare 5G technology will allow more mobile/home care, better patient outcomes and more capacity and flexibility within the healthcare system.	Remote patient monitoring	●	●	●
	Virtual consultations and care	●	●	●
	Connected hospital	●	●	●
Auto & Transport 5G technology will enable smarter, safer, greener and more efficient transport from connected vehicles and transit infrastructure in the United States.	Enhance vehicle safety and automation	●	●	●
	Advanced fleet management and telematics services	●	●	
	New intelligent transportation systems	●	●	●
Utilities 5G technology will enable reliability, safety and affordability throughout the utilities infrastructure and workforce in the United States.	Intelligent grid	●	●	●
	Next generation workforce		●	
	Smart power plant		●	●

Source: Accenture Analysis

Source: Accenture