



Consumer
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CES 2019 Tech Trends

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Strategic Perspective on Tech Trends



Digital Age



Connected Age



NETFLIX

Data Age



Technology Trends at CES 2019

Ingredient Technologies

Consumers

In the Market

Voice Computing

Robotics

5G

Biometrics

Blockchain

Artificial Intelligence

Digital
Privacy/Security

Digital Assistants

AR/VR

Vehicle Tech

Digital Health

Resilient Technologies

Sports Innovation



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CTA.tech/SalesAndForecasts

5G – The Next Generation

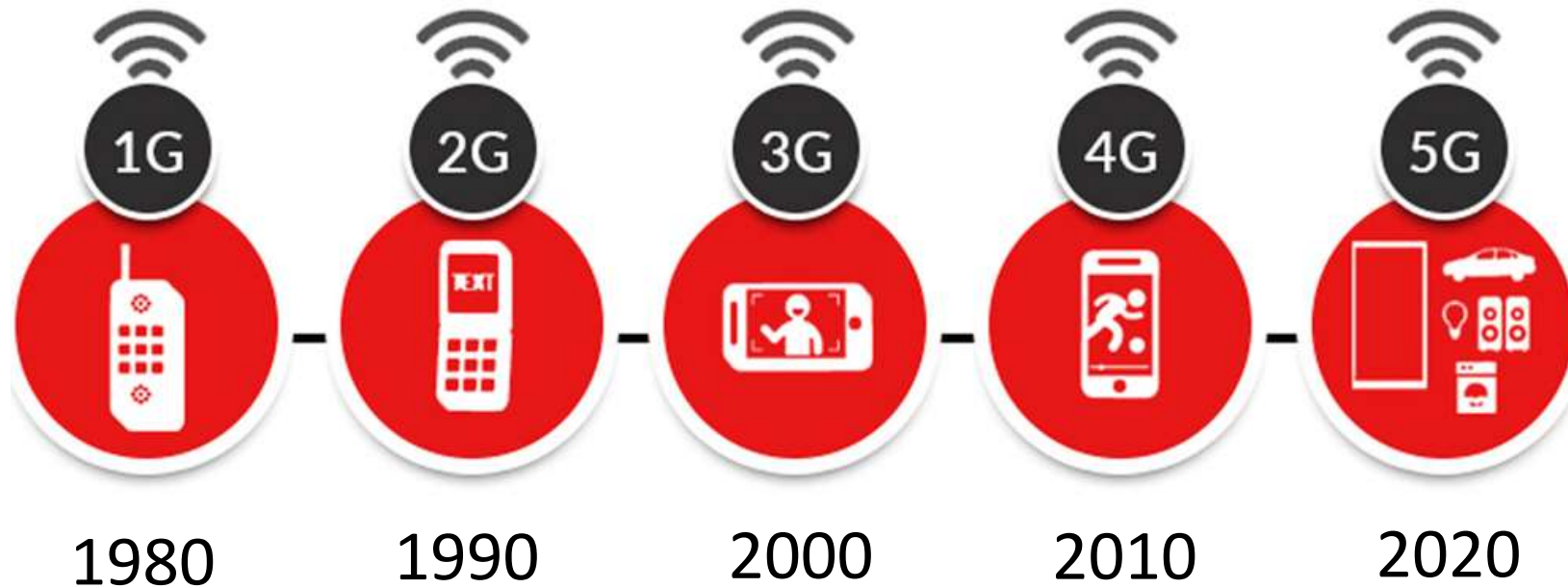


We spent the last 30 years connecting **people**.
We will spend the next 30 years connecting **things**.



Brian Modoff, EVP, Qualcomm

Source: The San Diego Tribune



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5G Development Underway Around the World

 China

 South Korea

 United States

 Japan


 中国电信
CHINA TELECOM


 SK telecom


 AT&T


 verizon


 KDDI


 United Kingdom


 Germany


 France


 Spain


 Canada


 Australia


 vodafone


 BT


 Deutsche Telekom

 orange

 Telefonica

 Shaw

 ROGERS

 Telstra

5G Narratives at CES 2019

Carrier Initiatives



Fixed Wireless BB



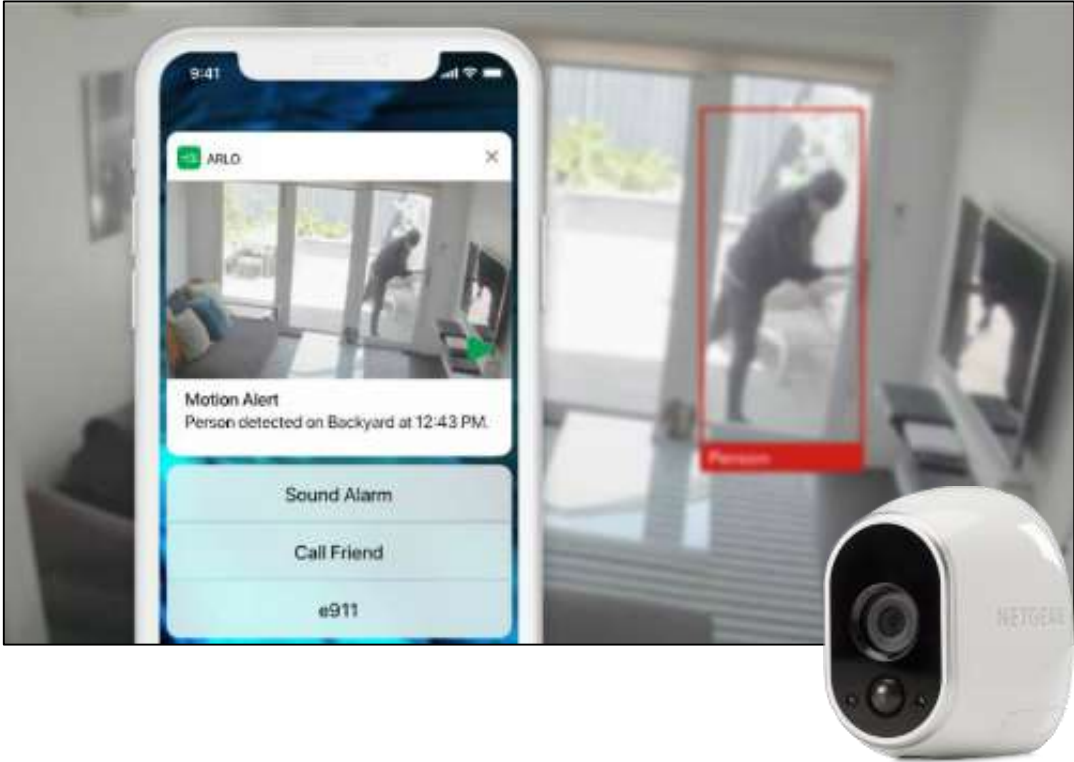
5G Devices



Smart Home's Next Trend: Interoperability + Intelligence



Security cameras usher in the new era of intelligent imaging



Artificial Intelligence at CES 2019

The New IoT: The Intelligence of Things

Processors and Chips



Embedded A.I.



Machine-Learning



Digital Assistants



works with the
Google Assistant



amazon alexa



Three Truths About Voice/AI

- 1 Digital Assistants are going into everything**
Devices, Appliances and Cars
- 2 Support for Digital Assistants has become table stakes**
Services, Brands, Commerce
- 3 Voice is quickly becoming the 'go to' interface**
Major impact on Smart Home, A/V and more

Digital Assistants: More Vessels for the Genie





Amazon Alexa:
Nearly 60,000 Skills
20,000+ Compatible Devices

Voice: Talking to Tech



Search bar with microphone icon and "Search by voice" button. Below the bar are buttons for "Google Search" and "I'm Feeling Lucky".



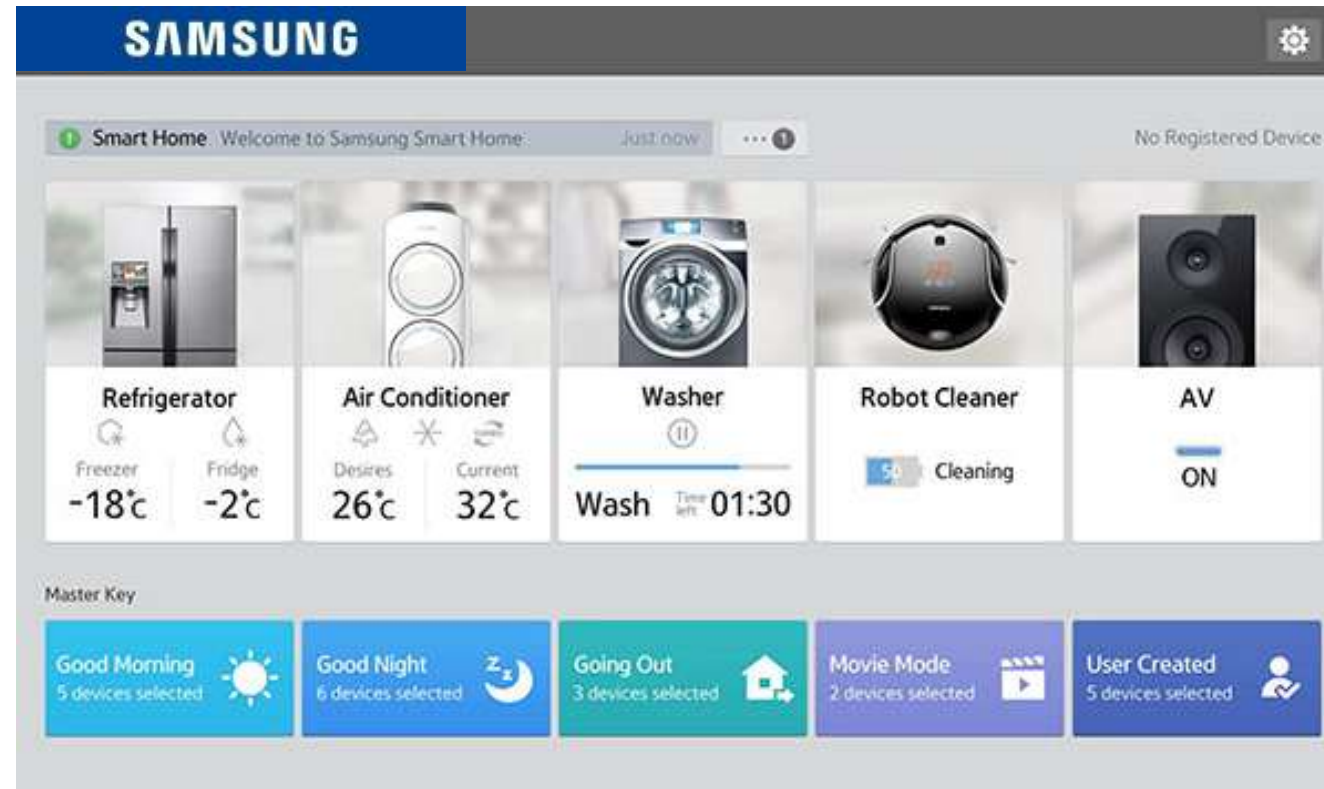
Digital Assistants: Shifting Consumer Behavior

U.S. Online Adults

	% Used
Ask questions (general Internet search)	63
Check the weather	58
Listen to music/radio/podcasts	50
Set a timer or alarm	45
Call someone	32
Check the news/sports	30
Send a message to someone	25
Search for recipes/cooking information	23
Check personal calendar	22

Source: CTA, Voice Shopping Study, August 2018

Is *this* the year of the smart appliance?



A.I. Perfecting Closed Captioning



“ If I had **stories** from the past ten years for my local station in Austin, Texas, I could **feed all of that** in beforehand. So, Watson Captioning would have local celebrities, local politicians, all that stuff ahead of time. ”

David Kulczar
Senior Product Manager
IBM Watson Media
Source: NScreenMedia

We're Beginning to Understand...



... the Limits of Automation

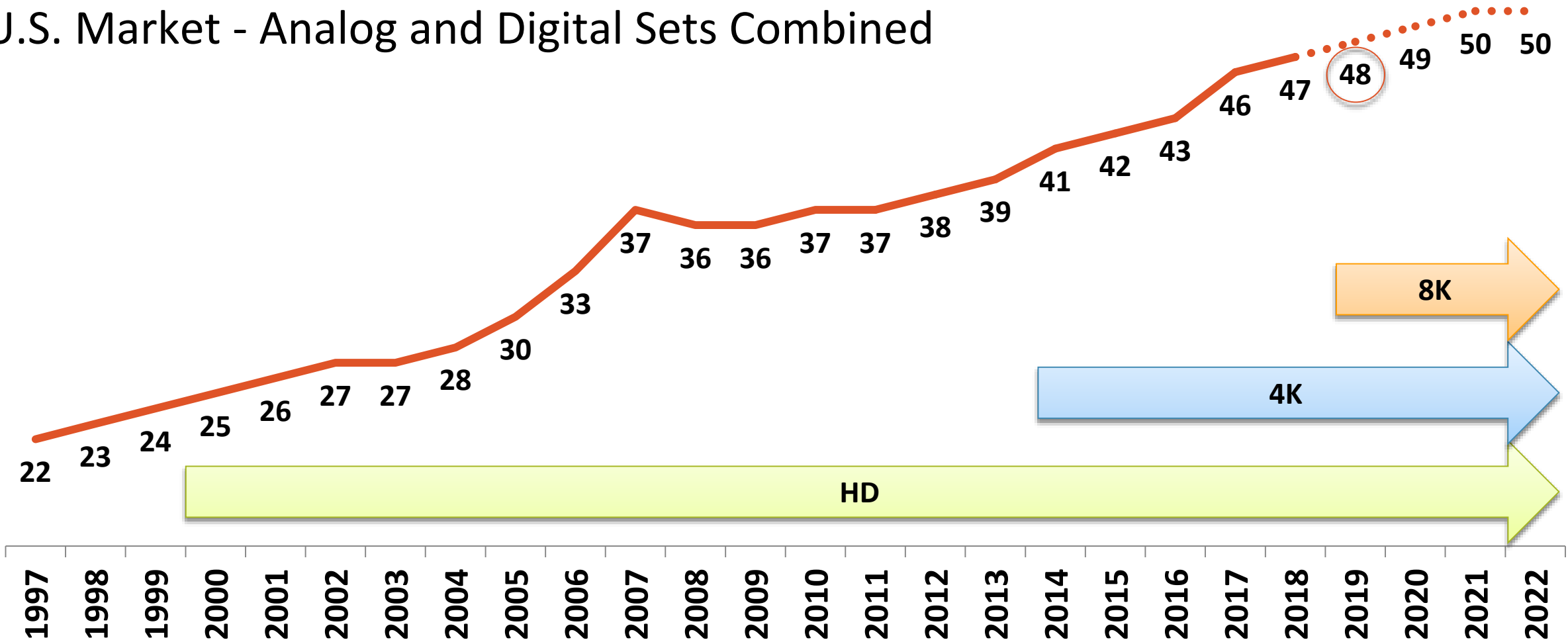
SAMSUNG

QLED 8K



LCD TV Average Screen Size (Inches)

U.S. Market - Analog and Digital Sets Combined



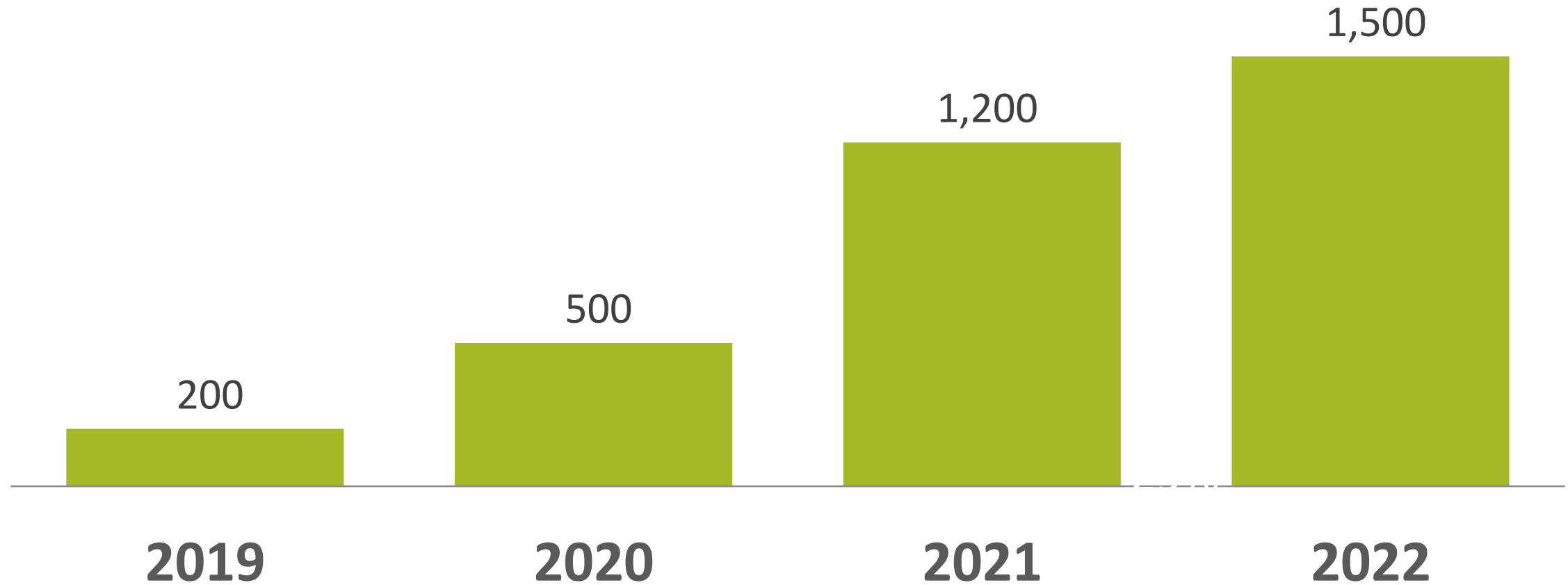
Source: CTA

8K Ultra HD: The Next Upgrade Path

Resolution Name	Horizontal x Vertical Pixels	Total Pixels	Screen Size Impact
720p	1,280 x 720	1M	All Sizes
1080p	1,920 x 1,080	2M	All Sizes
4K	3,840 x 2,160	8M	39" and Larger
8K	7,680 x 4,320	33M	65" and Larger

U.S. 8K UHD TV Shipments

Units in 000s



Source: CTA

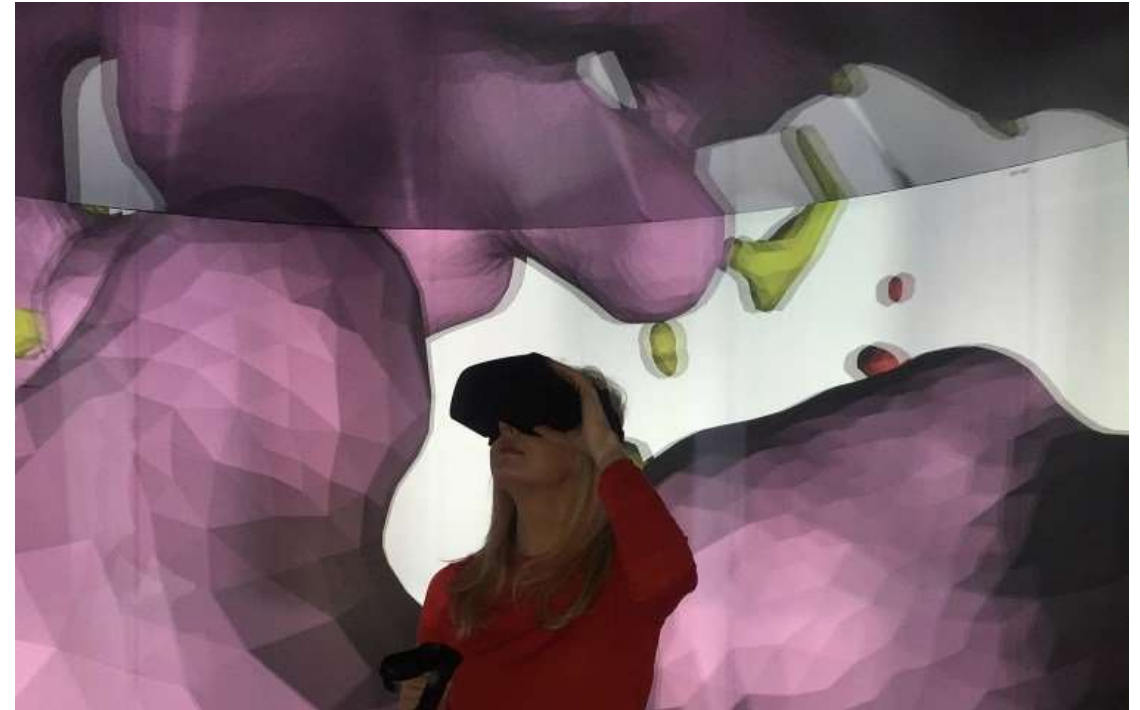
NHK Begins Super Hi-Vision Broadcast Trials

NHK

BS8K



Explore The Stars in VR





TESLASUIT

virtual reality reinvented

The world's first full-body haptic feedback,
motion capture, thermo controlled suit.



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Japan's VR Theme Parks – Come In and Plug In



- ACTIVITY
- LIVE
- ACCESS
- TICKET
- NEWS EVENT
- WAIT TIME
- FLOOR
- FOOD STORE
- FAQ

Language



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AR Hardware Developments

Lenovo Mirage
AR Headset



Vuzix
AR Glasses



AR Smart Mirrors



AR App Deployments Amplifying Experiences

Retail



AR/VR in Sports



Historic Sites and Museums



Audio 'AR' Emerges



AR/VR: Different Market Journeys



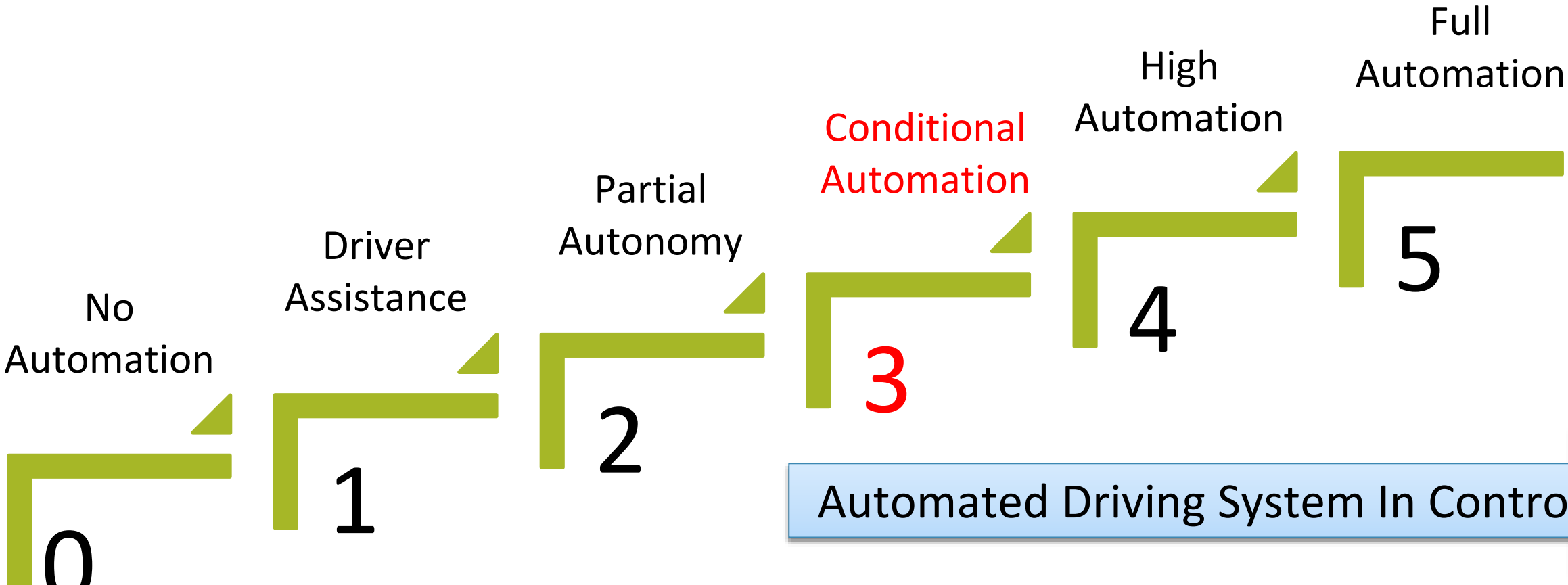
B2C to B2B



B2B to B2C



Levels of Self-Driving Technology



Human Driver In Control

Automated Driving System In Control

The Road to Self-Driving Vehicles



Robotaxi Reality



Self-Driving Fleets Take to the Streets



Company	GM (Cruise)	Ford (Argo AI)	Daimler/Bosch
Location	San Francisco, CA	Washington, DC	San Jose, CA
Date	Early 2019	Early 2019	2019

Billions of Dollars ... Millions of Miles

Major Investments in Self-Driving Technologies

- Ford \$1 billion investment in Argo AI
- Toyota \$1 billion investment in Toyota Research Institute
- GM \$581 million to acquire self-driving car start-up, Cruise Automation
- GM \$500 million investment in Lyft
- Volvo \$300 million joint venture with Uber
- Uber \$680 million to purchase Otto
- Intel \$15.3 billion to buy Mobileye
- Hyundai \$1.7 billion in R&D



Vehicle Tech Trends at CES 2019

Future of Mobility



V2X Communications



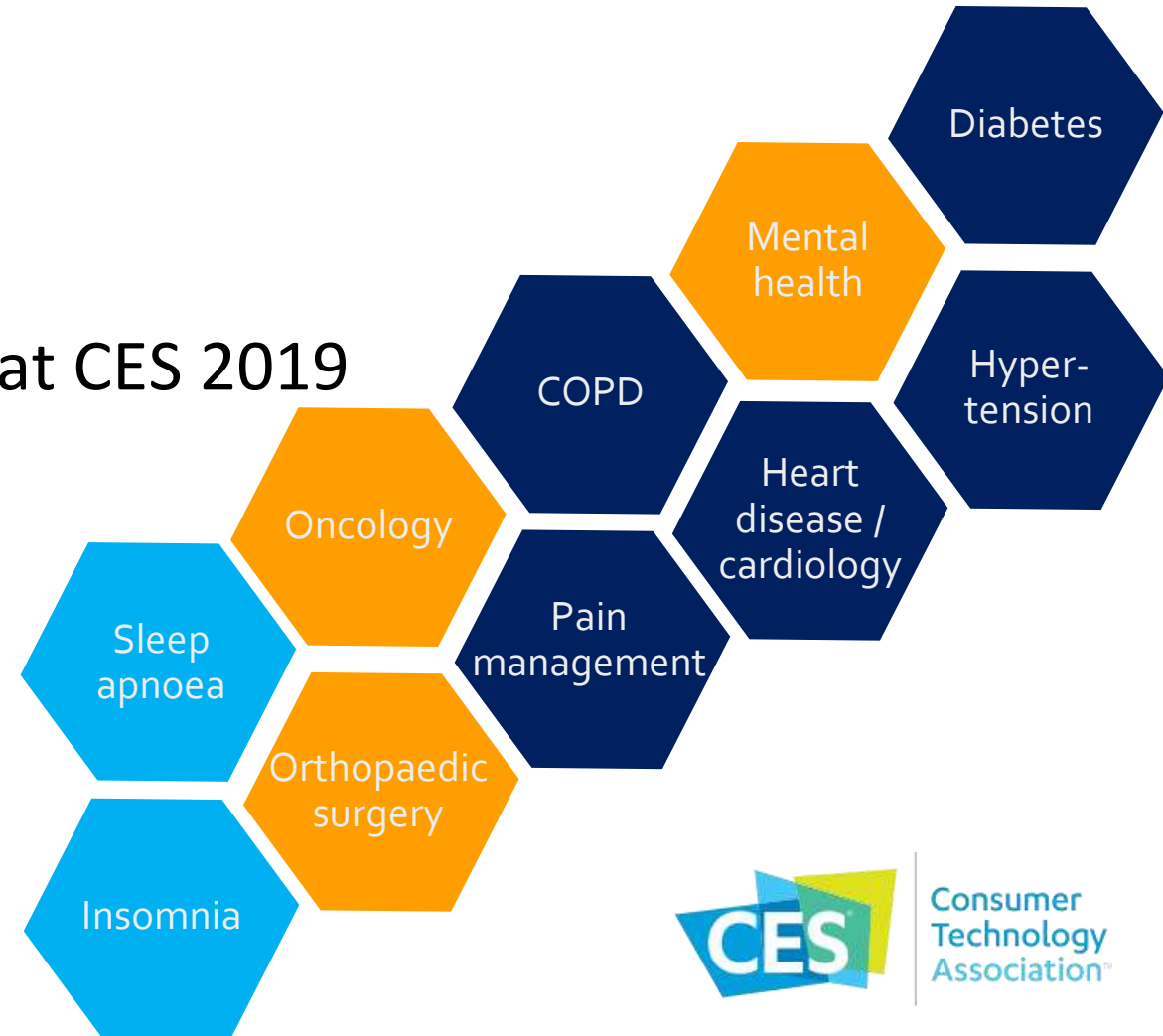
Electric Vehicles



Digital Therapeutics & Remote Patient Monitoring

Harnessing Technology to Impact Health

- Enhancing traditional medical practices
- Encouraging behavioral change
- Serve as stand-alone direct therapy
- **NEW** Accredited CME Program Launching at CES 2019



Digital Health at CES



OMRON
HeartGuide™



Resilient Technologies at CES 2019

Cyber Resilience



Emergency Preparedness



Disaster Recovery



Public Alert Systems



Anti-Terrorism



Consumer Devices





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