CTA U.S. Consumer Technology One-Year Industry Forecast, 2018-2023

Consumer Technology Association

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The Authoritative Source for Consumer Technology Market Research

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About Consumer Technology Association:

As North America's largest technology trade association, CTA® is the tech sector. Our members are the world's leading innovators — from startups to global brands — helping support more than 18 million American jobs. CTA owns and produces CES® — the most influential tech event in the world. Find us at CTA.tech. Follow us @CTAtech.

About CES:

CES® is the most influential tech event in the world — the proving ground for breakthrough technologies and global innovators. This is where the world's biggest brands do business and meet new partners, and the sharpest innovators hit the stage. Owned and produced by the Consumer Technology Association (CTA)®, CES features every aspect of the tech sector. CES 2023 will take place on Jan. 5-8, 2023. Learn more at CES.tech and follow CES on social.

Methodology

Twice each year since 1967, the Consumer Technology Association (CTA®) updates its forecast of more than 125 consumer technology products. This forecast serves as the benchmark for the consumer technology industry, charting the size and growth of underlying categories and the industry as a whole. This report is used by manufacturers and retailers in creating product development plans; financial analysts for sizing market opportunities; industry and general media for providing context in their coverage; government staff for understanding the scope of the industry to guide policy decisions; and CTA itself for highlighting the successes and challenges of the industry.

For each edition of the *CTA U.S. Consumer Technology One-Year Industry Forecast*, CTA requests member participation in a variety of ways. Some provide numeric forecasts via spreadsheet forms. Others contribute data through phone interviews, in which an analyst asks a series of questions about the size and direction of the industry. CTA also offers participation via online surveys.

Regardless of the submission method, participants submit their best estimates for the total industry size and growth in a series of categories for a five-year time period.

CTA's analysts then aggregate the responses and adjust them using year-to-date trending data from other quantitative and qualitative inputs, such as U.S. trade and tariff data. CTA analysts then conduct a peer review to finalize the data and to discuss industry trends. The results are estimates that reflect the broader industry sentiment. Hardware-related data within this report represents shipment volumes from manufacturers to U.S. dealers and installers. This includes both domestic production and imports of products to consumer-oriented sales channels, regardless of retail type, including distribution and direct-to-consumer and online sales. Software and services data within this report represents U.S. consumer expenditures on software and services.

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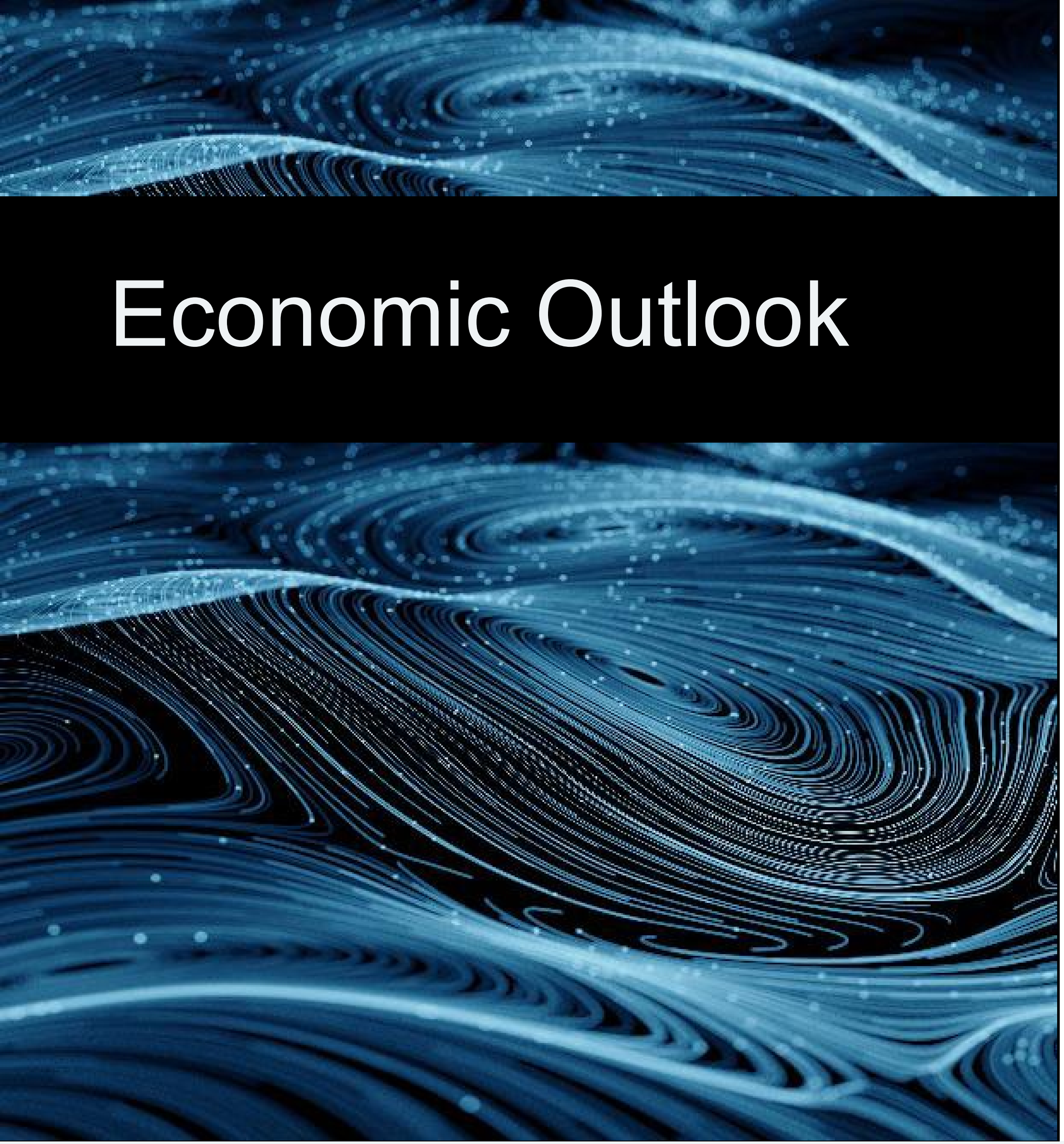

Economic Outlook

U.S. Economy Faces Challenges Ahead

As the last of the COVID travel restrictions ease up, the U.S. economy appears to be entering the long-heralded post-pandemic era. Yet this next stage will reflect continued and emerging fundamental social and macroeconomic disruptions that will impact the growth of the U.S. economy.

At the forefront, inflation stands as the most significant and pressing headwind in 2022 and for the years to come. By the close of May 2022, consumer prices were up 8.6% compared to May 2021 per the U.S. Bureau of Labor Statistics, marking the largest 12-month increase since the period ending in December 1981. In fact, according to CTA research, 68% of Americans believe inflation is the most important issue facing them and their household, regardless of political affiliation. The sustained high prices across a variety of goods, including food and energy, are reducing discretionary spending, and the vast savings accumulated by households during pandemic lockdowns are already dwindling. As such, JPMorgan CEO Jamie Dimon has forecasted that U.S. consumers may only have about six to nine months of extra savings left.

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Economic Outlook

Consequently, pricing pressures and shrinking savings are already souring consumer sentiment and transforming current spending habits. According to the University of Michigan Consumer Sentiment Index, June 2022 saw the lowest consumer sentiment at 50.2 since regular tracking began in the 1970s, marking a 14.4% slide from May. The growing economic cooldown is already readily apparent in the housing market, in which fewer home builds are occurring, mortgage rates are rising, and sales of existing homes are falling, with more declines expected.

In line with this cratering of consumer confidence and slowdown in the U.S. economy, American consumers have pivoted their spending away from technology purchases toward travel and entertainment (up 54% from 2021 per digital advertising platform Cardlytics) in what increasingly feels like the last gasp before the plunge.

Beyond the U.S., international supply chain disruptions also have contributed significantly to inflationary pressures. While the United States works to firmly push COVID-19 into the rearview mirror, China's continued implementation of "zero-COVID" lockdown measures is still impacting global supply chains, with the amount of cargo en route to the U.S. 30% lower than it was a year ago. While this could be in part the result of decreasing demand as U.S. consumer discretionary spending declines, shutdowns of ports of origin for goods in China are creating the significant bottlenecks driving up prices and wait times.

Additionally, the ongoing chip shortage is continuing to create supply-demand imbalances and higher prices.

This confluence of domestic and international headwinds toward the U.S. economy will only continue to create disruption as the war between Russia and Ukraine continues to wreak havoc on European markets, complicated relations with Middle Eastern petrostates affect fuel markets and a contentious U.S. midterm election cycle exacerbates the underlying weaknesses in the domestic and global economies.

Ultimately, this points to a U.S. economy that is likely headed toward a recession in the coming quarters or year. Based on the latest figures from the Bureau of Economic Analysis, U.S. gross domestic product (GDP) slid 1.5% in Q1 and is likely hovering around 0% in Q2, putting the U.S. well on the brink of an official recession. The continued implementation of aggressive rate hikes by the Federal Reserve is likely to seal the fate of another recession.

Consequently, the back half of 2022 will likely be marked by American consumers curbing their spending in the face of continued higher prices and diminished savings. In turn, we could see a sustained recession into 2023, as the U.S. economy still relies on about 75% of its GDP from consumer spending. As such, the key determinant to navigating and reaching the end of the coming recession will be how soon inflationary pressures can be relieved for consumers.

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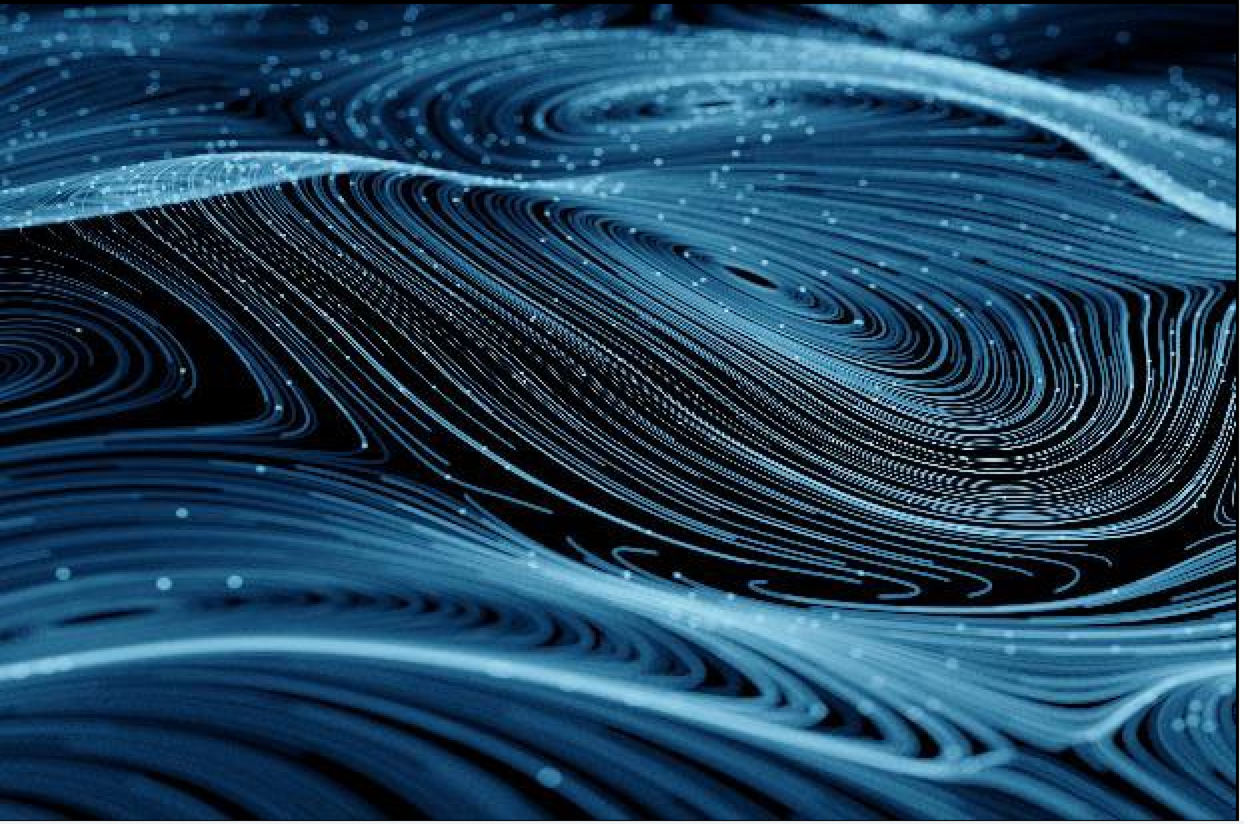
Trend Highlights



Industry Revenue Growth on Pause After Two Record Years

CTA's industry outlook in January was cautiously optimistic that consumer spending would sustain itself long enough to push the consumer technology industry past a symbolic half-trillion-dollar milestone in 2022, despite supply chain challenges and inflation. In retrospect, CTA's outlook was not optimistic enough. With 2021 fully accounted for, the industry surpassed the milestone last year, rising to $504 billion.

The new outlook for 2022 accounts for world events in the past six months that have put downward pressure on CTA's original projections for the year. Major hardware categories such as laptops and TVs, which were expected to decline, are now seeing steeper drops than originally forecasted. Supply chain constraints, exacerbated by China's zero-tolerance COVID lockdowns are aggravating shortages in smart appliances and vehicles. And heightened inflation, due in part to fuel and other commodity prices that spiked after the Russian invasion of Ukraine, is reducing discretionary consumer spending on tech products.

In a rare occasion in the history of this publication, CTA is predicting a decline in industry revenue in 2022. The industry will amount to $503 billion in retail value, down 0.2% from 2021. Putting this into full context, the industry is well above pre-pandemic levels, when it totaled $452 billion in 2019. Underlying this year's total, hardware revenues will see a 1.4% decline, while software and streaming spending will rise 3.5%.

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Trend Highlights

From the consumer's perspective, many people may feel as though they are getting "back to normal" as their balance of at-home and out-of-home activities returns to pre-pandemic levels to a large degree. From the manufacturer's perspective, getting back to normal is near-impossible, given the circumstances. Chip supply and logistics challenges are causing companies to focus more resources on maintaining supply lines and sourcing materials. Where supplies have been short, companies have had to re-engineer products to accommodate what's available at any given time. Some firms are leaning more toward premium products, where margins are more rewarding, such as with televisions. Others are diversifying product lines to address new demographics (e.g., smartwatches for children). And in some cases, manufacturers have not been able to meet market demand for the latest models and technologies due to supply bottlenecks (appliances and advanced driver assistance system [ADAS] tech).

Companies that can get their product onto retailer shelves or into e-commerce warehouses are seeking recurring revenue streams after the initial product purchase. Subscription services are key revenue generators that have seen phenomenal growth in recent years. Some hardware manufacturers are using free service packages — ranging from a few months to a year — to sweeten the deal on a new product purchase. This is most notable among video and streaming services but is also being seen with fitness equipment and home security equipment. These services add considerable value to the customer experience while guaranteeing a built-in window of customer engagement opportunities for the manufacturers and service providers. Software and services spending in the U.S. this year, which includes gaming, video and audio streaming, apps and consumer cloud services, will reach nearly $127 billion, up 3.5% over 2021. Hardware revenues are seeing a decline this year, due largely to decreases in tech that performed well during the pandemic, such as laptops, tablets and televisions. Luckily, the industry includes a wide variety of technologies, some of which will offset declines elsewhere.

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Trend Highlights

Areas of Growth in 2022

5G

Consumers are well into the 5G upgrade cycle, with 73% of smartphones incorporating the technology this year. Wireless providers are also making inroads into the fixed broadband market and will have installed 5G home broadband modems in an estimated 1.5 million-plus households by the end of 2022. Meanwhile, enterprises are beginning to use 5G equipment to better manage business operations and industrial processes, and municipalities are deploying it in smart city initiatives.

Smart Home

Although a cooling housing market may create headwinds for smart home tech in the coming year, this segment includes a variety of devices with many applications that can help make home life more convenient, safer and more secure. Consumers are expected to gravitate toward energy-efficient products like smart thermostats and smart lighting while energy prices remain high. Smart home revenues will reach $23.8 billion this year, 3% over 2021.

Gaming

Home gaming consoles and accessories are making steady gains this year, despite constant supply constraints, with consumers quickly snapping up every console that hits retailer shelves. The $6.3 billion that gaming consoles will generate this year could be higher if manufacturers could make more product. Meanwhile, gaming software and service spending is one of the largest components of CTA's forecast. Consumers will spend $51.6 billion (growing 1%) on gaming downloads, in-game purchases and subscription gaming services in 2022.

Health Tech

A perennial trend in CTA's outlook, health tech continues to expand its footprint in the industry as consumers pay closer attention to their health and fitness goals and use tech for better outcomes. Smartwatches, fitness trackers and connected exercise equipment are among the biggest contributors to growth in the category, but connected health monitoring devices offer opportunities for companies helping consumers track chronic conditions like high blood pressure and diabetes. Overall, the category will generate $13.4 billion this year, up 4% over 2021.

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Trend Highlights

Top Five Hardware Products

($ Billions)

When addressing the trajectory of the consumer tech hardware industry, it is useful to look at the heavy hitters. The top five largest revenue generators will account for over half of hardware revenues in 2022 (54%), and their influence is felt throughout the industry, whether one looks at the accessories, peripherals, software or services affiliated with each. A decreasing proportion of these top five in overall hardware revenue suggests consumers could be tightening their budgets and focusing more on updating their existing tech with accessories.

	2021	2022e	2023p
Smartphones	74.5	76.7	78.8
Laptop/Notebook PCs	46.3	40.9	39.3
Factory-Installed Automotive Technology	14.6	15.1	15.7
LCD TV	17.3	14.5	12.8
Tablet PCs	16.2	14.1	13.2
Top Five total Wholesale Revenue	**168.9**	**161.2**	**159.7**
Total Hardware Revenue	**298.2**	**294.0**	**293.3**
Top Five as % of Total Hardware	**56.6**	**54.8**	**54.4**

Runners-Up: Five more notable hardware categories that carry significant weight on the industry bottom line in 2022:

Desktops ($11.6 billion)
Wireless earbuds ($8.7 billion)
Smart appliances ($7.5 billion)
Smartwatches ($6.6 billion)
Home gaming consoles ($6.3 billion)

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2022e: CTA estimate; 2023p: CTA projection

Trend Highlights

Top Five Hardware Products by Revenue

Smartphones remain the largest influencer of consumer tech hardware revenues, making up 26% of the market. More than 155 million smartphones will ship to the U.S. this year, approximately 1% more than in 2021. Wireless providers continue to offer attractive promotional deals on handsets to lock in long-term contracts as they compete for subscribers in this nearly saturated market.

Laptop revenues will decline by over $5 billion this year (-12%), to $40.9 billion, with consumers and enterprises purchasing 10% fewer units this year (69 million). However, laptops remain the PC of choice, and shipments will be well above the pre-pandemic level, which stood at 53 million in 2019.

LCD displays have two record-setting years behind them, which has pushed demand this year below pre-pandemic levels. More than 36 million LCD TVs will ship this year, down 18% from 2021. They suffer not only due to diminished TV demand but also from competition with OLED screens, which are making inroads via traditional OLED panels and newer QD-OLED technologies. This competition will heat up over the next few years. Overall, LCD displays will generate $14.5 billion in revenues this year.

Factory-installed automotive tech, much like the overarching automotive manufacturing market, cannot catch a break. Vehicle production is suffering from gridlock in supply lines, in addition to inflationary pricing that is reducing consumer demand. Despite these challenges, a growing portion of new vehicles includes ADAS Level 1 and Level 2 technologies, which will boost the value of factory-installed automotive technology to more than $15 billion this year, up 3% over 2021.

Rounding out the top five revenue generators, **tablets** also contribute to industry revenue reductions, coming down 13% over 2021, to $14 billion. Tablets face some competition from laptops, but they fill a need for lower-cost computing power with ample app abilities and are the most mobile of the PC devices.

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Trend Highlights

Emerging Tech

Inclusion Criteria

1. Revenue must surpass $100 million in the coming year (2023).
2. The product must see at least 15% revenue growth in the coming year.
3. The product must have been introduced to the forecast within the past five years (since 2017).

	Revenue ($ Millions)			Growth (%)	
	2021	2022e	2023p	2022e	2023p
OLED TV	3,051	3,273	4,585	7	40
Portable Gaming Consoles	768	1,008	1,419	31	41
Smart Light Bulbs (Including Kits)	496	610	757	23	24
PSAP Devices	294	453	642	54	42
5G Home Gateways	194	490	680	152	39
Connected Switches, Dimmers and Outlets	138	171	203	25	18
Sports Technology	103	128	155	24	21
Augmented Reality Headset/Eyewear	78	111	188	43	70
Emerging Technology Revenue ($)	**5,121**	**6,244**	**8,628**		
Emerging Technology Revenue Growth ($)		**1,123**	**2,384**		
Emerging Technology Revenue Growth (%)		**21.9**	**38.2**		

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2022e: CTA estimate; 2023p: CTA projection

Trend Highlights

Emerging Tech

Smart Home

If the American behavior or sentiment of upgrading and protecting their home wasn't important before the pandemic, it definitely is now. According to CTA's 24th Annual U.S. Ownership & Market Potential Study, 2022 will see a host of new smart home product owners, with first-time buyer percentages increasing from the previous year for all smart home products, demonstrating that households continue to look for new tech upgrades. CTA expects homeowners to continue to upgrade their homes, especially to maximize their energy efficiency. Smart energy management products, such as lightbulbs, switches and thermostats, are all expected to see double-digit growth in unit shipments to dealers for 2022 and 2023. Consumers are also looking to upgrade the internet speed in their homes with 5G gateways. As providers continue to roll out their 5G networks, more Americans will be looking to make the switch.

Health

Another American behavior that may have changed forever is the focus on our health, both physically and mentally. Technology has helped Americans in a variety of ways, but none more important than beginning to track our behaviors and bodies. Connected health monitors, smartwatches, fitness trackers and especially sports technology are all vital to tracking and then understanding our health. Once Americans understand their health, how it changes and what causes it to change, they can then choose to do something about it. Connected exercise equipment remains an incredibly young industry that is still trying to catch up to the workout-at-home craze ignited by the pandemic. Overall, CTA estimates that all wearables/health equipment will generate more than $13 billion in shipment revenues, with products such as sports technologies, over-the-counter hearing aids, connected health monitors and exercise equipment expected to see double-digit growth in unit shipments over the next two years.

Entertainment

At the forefront of Americans' minds during the pandemic, and likely to have changed behaviors forever, was the need for entertainment. Streaming services are beginning to make headway in the market, but gaming is still the true king and has proven it is going nowhere. Cloud gaming is in its beginning stages, but with the metaverse around the corner, virtual reality (VR) and augmented reality (AR) headsets could one day become the controllers of choice. In the short term, cloud gaming will allow for gamers to take their games anywhere with just a simple attachment to their smart devices. How Americans see and hear their entertainment is also reaching a crossroads, most notably in terms of display technologies. 4K digital displays will remain the top dog for the foreseeable future, but CTA projects that OLED, not 8K, displays will be the next big display disruptor. CTA estimates that by 2026, a little more than 9 million OLED sets will be shipped to the U.S.

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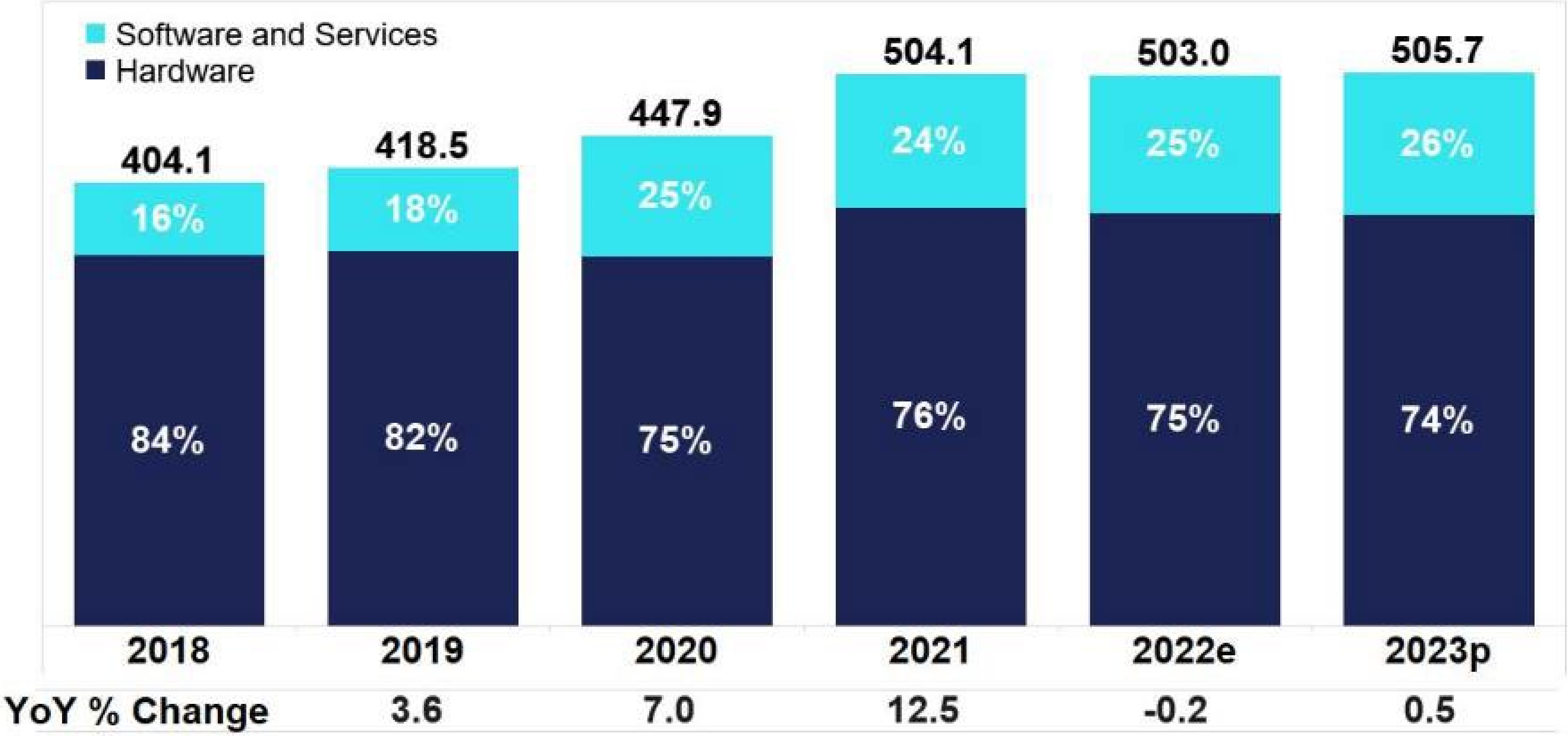
Total Consumer Technology

Retail Revenue

($ Billions)

Services Growth
- 2022: 3.5%
- 2023: 2.8%

Hardware Growth
- 2022: -1.4%
- 2023: -0.3%



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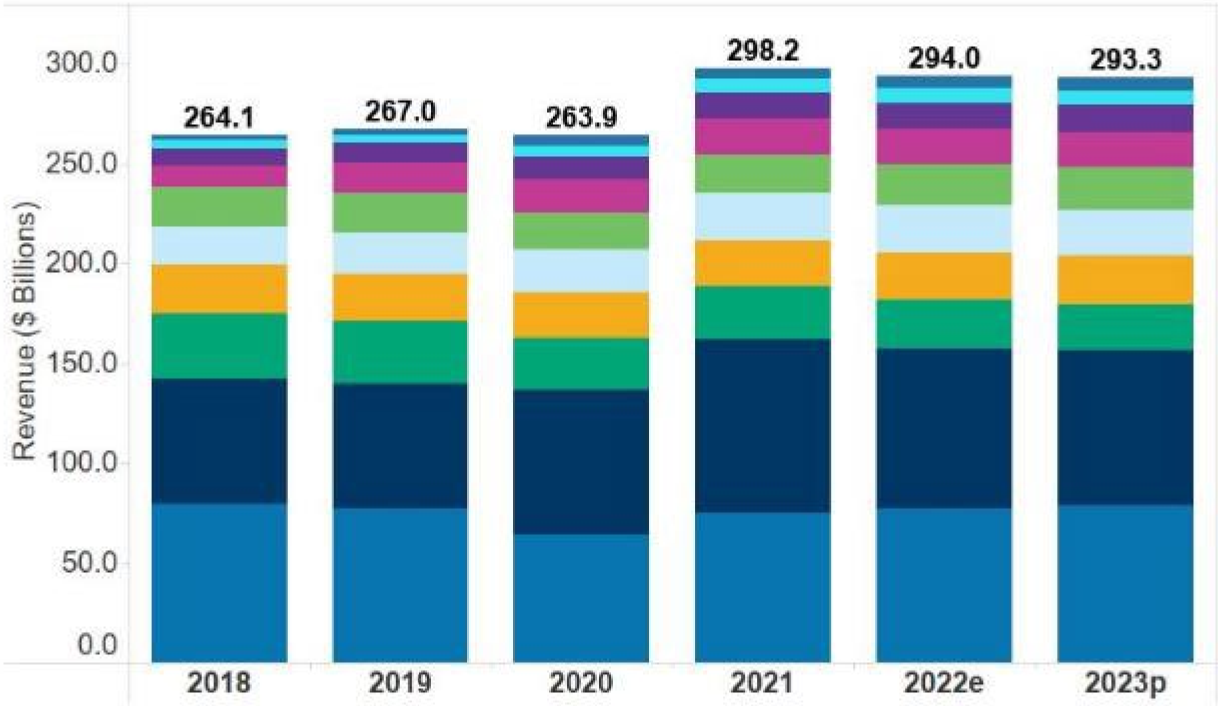
2022e: CTA estimate; 2023p: CTA projection

Total Consumer Technology

Hardware Revenue

($ Billions)

	2018	2019	2020	2021	2022e	2023p
Accessories and Media	24.5	23.5	22.7	23.3	23.8	23.9
Audio Technology	11.1	15.0	16.8	18.2	17.6	17.5
Automotive and Mobility	19.4	20.3	18.4	19.5	20.3	21.0
Computing	62.8	62.7	72.5	86.9	80.6	77.3
Electronic Gaming	4.6	4.1	5.0	6.9	7.3	7.3
Mobile and Wireless	79.6	77.1	63.8	74.9	77.0	79.0
Smart Home	19.7	20.6	21.0	23.2	23.8	23.5
Toys and Recreation	2.4	2.7	5.3	5.7	6.2	6.6
Video Technology	32.2	31.2	26.7	26.8	23.9	23.3
Wearables	7.7	9.9	11.6	12.9	13.4	13.8
Grand Total	**264.1**	**267.0**	**263.9**	**298.2**	**294.0**	**293.3**



Note: All hardware-related figures in this publication represent wholesale values of shipments to U.S. dealers, except where noted otherwise.

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2021e: CTA estimate; 2022p: CTA projection

Glossary of Terms

Average Unit Price (AUP)/Average Wholesale Price (AWP): All prices reflected in the book are in terms of wholesale value. This is the price a dealer/retailer would pay to the manufacturer before discounts and incentives. Calculated by: Annual Unit Sales/Annual Revenue.

Consensus: CTA employs a consensus methodology in deriving its industry forecasts. This methodology involves soliciting inputs from companies involved in the consumer technology industry for their expectations for the size and growth of the total industry this year and for each of the next five years. These estimates are then blended and adjusted based on year-to-date trends in CTA's shipment data program (CE MarketMetrics) and other qualitative inputs. The results reflect the consensus view of the broader marketplace.

Consumer Channels: CTA data only reflects shipments that are destined for consumer use. Government, business and institutional sales are excluded unless otherwise specified. See Dealers for more information.

Dealers: CTA's shipment data represents manufacturer sales to any and all types of consumer channels, referred to as dealers for the purpose of this report. This includes general electronics superstores, specialty stores, computer and office specialty stores, online retailers, mass merchants, club stores, high-end retailers, 12-volt specialty, custom installers, discounters, department stores, drug and grocery stores, distributors and wholesalers and direct-to-consumer sales.

Dollars: The total revenue value of the unit shipments captured by manufacturers, based upon the wholesale price paid by dealers. See Average Unit Price (AUP) for more information.

Estimated Sales: Data for the current year is labeled as an estimate since it is often based on year-to-date shipment volumes. Indicated by an "e" after the year in charts.

Factory to Dealer Shipments: See Shipments.

Household Penetration: Represents the percentage of U.S. households that own at least one unit of the product in question. Also referred to as the incidence rate.

Incidence Rate: See Household Penetration.

Inflation: The figures in this report reflect actual pricing and are not time-adjusted for inflation or deflation.

Installed Base: Represents the actual number of individual units of a particular product that are owned across the U.S.

Manufacturer to Dealer Shipments: See Shipments.

Original Equipment Manufacturing (OE/OEM): In some cases manufacturers build finished goods that will be sold under another company's badge or brand. These manufacturers are thus said to have an OE relationship to another brand. CTA data does not capture these shipments unless otherwise specified.

Percent Change: An expression of the difference between a volume or price in 1-year period compared with the previous year period. Calculated by: [(Year B / Year A) – 1].

Projected Sales: Data for and beyond the current year is labeled as a projection, as it projects into the future beyond the current data collection period. Indicated by a "p" after the year in charts.

Retail Sales: Sales to consumers. CTA tracks sales to dealers. The only retail figure that we publish is for the industry total (derived from using an industry average retail markup of 28%).

Sales to Dealers: Wholesale sales to U.S. consumer channels. Note: all data within this report represent shipment volumes from manufacturers to U.S. dealers.

Shipments: All sales-related data shown in this report represents manufacturer to U.S. dealer shipments of finished goods. They include both domestic production and imports but are exclusive of OEM product, unless otherwise specified.

U.S. Only: All shipment data reflects products sold only through U.S. consumer sales channels.

Units: The number of individual items of a particular product that are shipped to dealers during the given time period.

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Product Definitions

360° Cameras: A camera with a 360-degree field of view in the horizontal plane, or with a visual field that covers (approximately) the entire sphere.

4K Ultra HD Blu-ray Players: A Blu-ray player that can play 4K Ultra HD Blu-ray discs.

4K Ultra HDTVs: Sum of all displays that are capable of at least 8 million active pixels, with at least 3840 horizontally and at least 2160 vertically.

5G Home Gateways: Home gateways with an embedded 5G wireless transceiver.

5G Smartphones: Smartphones with an embedded 5G wireless transceiver.

Action Camcorders: Hands-free action cameras are designed for capturing point-of-view footage.

Aftermarket Advanced Driver Assistance Systems (ADAS): Includes aftermarket blind spot detection, lane departure warning and collision warning systems.

Aftermarket Autosound Equipment: Aftermarket tape decks, CD players, amps, equalizers and speakers. Includes satellite radio receivers.

Aftermarket Computer Monitors: Computer monitors sold separately from a computer tower or complete computer system.

Aftermarket Computer Software: Revenues generated by aftermarket consumer purchases of Windows or Mac software sold separately from a personal computer. Includes purchases of packaged software, digitally downloaded software and subscription-based software purchases. Excludes enterprise software, PC games and software that is pre-installed on PCs.

Aftermarket Marine Audio: Includes marine speakers, head units and amplifiers.

Aftermarket Vehicle Security: Vehicle security devices, keyless entry systems and vehicle tracking systems sold separately from a vehicle. Beginning in 2014, Radar Detectors were included in aftermarket vehicle security.

Apps: Revenues generated by consumer purchases of iOS and Android apps. Does not include in-app purchases or recurring in-app subscription fees.

Audio and Video Accessories: Includes carrying cases, cables, chargers and cleaning kits. Does not include headphones after 2005.

Audio Components: Includes home receivers, amplifiers, tuners and speakers, turntables, soundbars and signal processors.

Augmented Reality Headset/Eyewear: Device that is primarily designed to be worn on, in or around the eyes whose primary method of use includes input visible to the user via some display technology. AR devices typically display information and/or virtual objects in addition to the user's vision of the physical world.

Batteries: Cells that provide electric current for consumer technology products. Includes primary batteries (D, C, AA, AAA), specialty batteries and rechargeable batteries.

Bluetooth-Enabled Speakers: Wireless speakers that receive audio signals via Bluetooth.

Blu-ray Players: Home component Blu-ray players; excludes Sony PlayStation models.

Cable Set-Top Boxes: A device with the primary function of receiving television signals from a cable provider to a consumer's television.

Cables: Audio/video cables.

Camcorders: Standard standalone camcorders.

Compact Audio Systems: Devices that integrate the functions of a multi-component home stereo system (does not include MP3 docking capability).

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Product Definitions

Computer Components: Components for use in personal computers, including processors, memory sticks, optical drives, internal storage drives and power supplies.

Computing Accessories: Includes carrying cases, cables, chargers, keyboards, mice and cleaning kits.

Connected Home Technologies: Includes IP/Wi-Fi cameras, connected thermostats, smart smoke detectors and CO detectors, smart home systems, smart locks, connected switches, dimmers and outlets and digital assistants.

Connected Exercise Equipment: Includes any exercise equipment with the ability to interface wirelessly with a mobile-app and/or includes screen that provides on-demand fitness routines or other content to enhance the exercise experience

Connected Switches, Dimmers and Outlets: Home lighting switches, dimmers and outlets that can be controlled via smartphone or tablet.

Connected Thermostats: Electronic, programmable and self-learning Wi-Fi-enabled thermostats that optimize heating and cooling of homes and businesses to conserve energy.

Corded Phones: Landline telephones that are connected to the base station with a cord.

Cordless Phones: All cordless landline telephones.

Dash Cameras: A digital camcorder that is mountable on a vehicle's dashboard or on the rearview mirror. Includes models with dual lenses.

Desktop 3D Printers: Desktop printers that can make a 3D solid object of virtually any shape from a digital model. Sold through consumer channels or directly to consumers from the manufacturer.

Desktop PCs: A personal computer (PC) in a form intended for regular use at a single location.

Digital and Non-Digital Memo Recorders: Device that records voice/audio memos.

Digital Cameras: Digital cameras, including point-and-shoot, replaceable lens, mirrorless and DSLR models.

Digital Combinations: Sum of all digital sets with built-in video source unit including DVD, Blu-ray, DVR.

Digital Direct-View TV: Digital direct-view sets and monitors.

Digital Imaging Accessories: Includes carrying cases, cables, chargers and cleaning kits for digital imaging products.

Digital Photo Frames: A picture frame that displays digital photos without the need to print them or use a computer.

Digital Projection TV: Digital rear projection sets and monitors.

Digital Storage: Blank computer media (CD-R, CD-RW, DVD-R, DVD-RW), external hard drives, flash media (SD cards), USB thumb drives and network attached storage.

Digital Video Recorders (DVRs): A set-top box that records video in a digital format to a disk drive or other local or networked mass storage device.

Drones: Unmanned aerial vehicle (UAV) with flight controlled either autonomously by onboard computers or by the remote control of a pilot on the ground or in another vehicle. Sold through consumer sales channels.

DVD Players (Any Type): Includes standalone standard, Blu-ray and 4K ultra-HD Blu-ray players. Does not include other devices that may include DVD player, such as gaming consoles and combo TVs.

Electric Scooters: Scooters that are battery powered.

Electric Bikes: Bicycles that are battery powered or assisted.

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Product Definitions

Electronic Gaming Consoles: Portable and home game consoles.

Electronic Gaming Software: Includes physical and digital game purchases for consoles and personal computers, and recurring subscription fees for online gaming services. Excludes downloadable content within games and game apps for mobile devices. Definition expanded in January 2018.

E-readers: Standalone electronic devices designed primarily for reading digital books or magazines.

E-toys: Electronic educational devices, handheld electronic games, analog radio-controlled vehicles, other battery-operated vehicles, robots and electronically controlled action figures, musical instruments and karaoke machines. Does not include home robots.

E-toys that are STEM: E-toys that are designed to help children learn concepts in science, technology, engineering or math.

Factory-Installed Automotive Technology: Represents wholesale value of head units, amplifiers, navigation systems, telematics, rear-seat entertainment and ADAS technologies installed in new vehicles at the factory.

Family Radio Service Devices: Family radio devices that operate in the 462 and 467 MHz frequencies in the ultra high frequency (UHF) band.

Fax Machines: Stand-alone fax machines (not fax modems). Includes sales of multi-function (print, scan, copy, fax) units.

Fitness Activity Trackers: Fitness and activity tracking devices include wearable devices that use sensors to measure or track movement, activity levels and/or certain vital signs. Included devices may or may not feature GPS or GPS capabilities. These devices contain at least one or more of the following sensors: pedometer, accelerometer, altimeter/barometric pressure sensor, or heart rate monitor. Activity trackers that are designed to be worn on the wrist and that use a rudimentary, low-resolution display technology (e.g. FitBit), and that do not fit under the definition of smartwatches are also included in the fitness and activity trackers category. These devices may or may not communicate with a smartphone or other portable device. Activity trackers DO NOT possess the ability to make or receive phone calls either directly or through a connected device.

Front Projection: Total shipments of front projectors. Includes pico projectors.

Full HDTV (1080p): Sum of high-definition sets capable of 1080p resolution from all display technologies.

Health and Fitness Technology: Fitness and activity tracking technology. Includes devices that contain pedometers, accelerometers, altimeters, barometrics pressure sensors, heart rate monitors and sport-specific activity trackers.

Home and Clock Radios: Home radios including table, clock, headset, multiband and portable radios.

Home Gaming Consoles: Stand-alone, non-portable game consoles such as Xbox One/One S, Sony PS4/PS4 Pro and Nintendo Switch (not Switch Lite).

Home Network (Wired or Wireless): Home communications network that allows multiple devices to connect with each other and the internet.

Home Robots: Includes autonomous robots often used for indoor/outdoor household chores including robotic vacuum cleaners, floor-washing robots and lawn mowers.

Home Theater System/Surround: A home theater system includes at least the following products connected together in the same room: a television 40 inches or larger, an audio/video receiver, video components such as DVD player or VCR and an audio system with five or more speakers (optional subwoofer) designed to recreate the movie theatre experience.

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Product Definitions

Home Theater-in-a-Box: Integrated home theater package that "bundles" together components.

Installed Home Technologies: Home automation technologies that are typically installed by a professional installer. Includes structured wiring, lighting controls, multi-room audio video systems (wired), climate systems and whole house controllers.

IP/Wi-Fi Cameras: Video camera that can send and receive data via a computer network and the internet. Includes baby monitors that communicate over Wi-Fi/IP.

IPTV: A device whose primary function is to broadcast the TV signal through the IP protocol to a consumer's television.

Laptop Docking Stations: Device that allows laptop to connect simultaneously to peripherals such as mice, keyboards and monitors.

Laptop/Notebook PCs: Includes notebooks, netbooks and convertible PCs.

LCD TV: Total shipments of liquid crystal displays including CFL and LED sets.

Mesh Wi-Fi Systems: Wireless home network equipment designed to establish a consistent, strong Wi-Fi signal throughout a home. Also known as home mesh networks. Typically includes a hub that connects directly to a modem and one or more nodes that extend Wi-fi coverage.

Mobile Video Devices: Includes all in-vehicle entertainment systems and components. Includes aftermarket video source units and displays (e.g., system-in-a-bag, in-dash DVD players, overhead monitors, mobile DSS receivers, dash cameras, etc.).

Modems/Broadband Gateways: Home broadband gateways and modems. Includes units with or without built-in Wi-Fi. Includes gateways/modems shipped to broadband providers. Does not include 5G gateways/modems.

NEXTGEN TV (ATSC 3.0) Receiver Boxes: NEXTGEN TV (ATSC 3.0) converter in set-top box form factor. Typically connects to television via separate HDMI cable.

OLED TV: Total shipments of DTV sets using organic light emitting diode (OLED) technology.

Other Smart Home Systems/Sensors: All other smart home combination packages and sensors.

Personal Computer (Any Type): All personal computers including desktops, laptops and tablets.

Personal Sound Amplification Products (PSAPs): Hearing devices that are designed primarily to amplify ambient sound. Includes devices that will be included in the U.S. Food and Drug Administration's regulations outlining a definition for over-the-counter hearing aids, which was finalized October 19, 2021.

Pet Tech: A connected device that is used to monitor, entertain, feed or track household pets, typically controlled by a smartphone.

Portable CD Equipment: Portable CD equipment including personal portable and CD-equipped boomboxes.

Portable Gaming Consoles: Portable or handheld game console devices such as Nintendo 3DS, Sony PS Vita and Nintendo Switch Lite.

Portable Media Players: A portable device that plays back digital audio or video files. May include touch screen and the ability to run apps.

Portable Navigation Devices: A battery powered, GPS-based navigation device that is portable. Does not include navigation devices that are built into vehicles.

Printers: Computer printers designed for home use. Includes laser, inkjet, bubblejet, dot matrix and multifunctional printers. Does not include enterprise printers.

Rear View Cameras: Aftermarket rear view backup cameras and kits; may include monitor.

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Product Definitions

Satellite Radios: All Sirius-XM receivers.

Satellite Set-Top Boxes: A device that receives television signals from a satellite dish to a consumer's television.

Smart Appliances: Refrigerators, dishwashers, washing machines, dryers with built-in connectivity that enables notifications and remote control through a mobile app.

Smart Displays: Smart speakers that include a touchscreen.

Smart Door Locks: A door lock that can be controlled with a smartphone or tablet.

Smart Doorbells: Doorbells that send and receive data via a computer network and the internet. Typically include video camera and are typically controlled through mobile app.

Smart Home Security and Monitoring Systems: Smart home systems packaged with two or more different types of smart home devices. Packages may include video cameras, motion detectors, open/close sensors, alarms and hub devices.

Smart Light Bulbs (Including Kits): Light bulbs that send and receive data via a computer network and the Internet. Typically controlled through mobile app. Includes packages with multiple light bulbs.

Smart Smoke Detectors and CO Detectors: Connects to mobile devices as well as sounds an alarm when smoke/carbon monoxide is detected.

Smart Speakers: Wireless speakers that can receive voice commands and enable interactivity with a digital assistant, excluding those with built-in displays.

Smart TVs: Sum of all DTVs that have consumer-oriented apps loaded on the set that deliver internet-based content through an internet connection.

Smartphones: Wireless handsets that employ an operating system (e.g., Android, iOS) and can use apps.

Smartwatches: A smartwatch is any wearable device that invokes the design of a traditional timepiece and that is designed to be worn on the wrist. The device displays alerts via some form of display which may or may not have touch capabilities and typically communicates directly with a mobile phone, tablet or other computing device. A smartwatch may also assist the wearer in placing or answering telephone calls to/from a connected device and may feature on-board hardware necessary to make and receive calls (e.g., an embedded cellular radio). Other features may include GPS capabilities and/or monitoring of vital signs via one or more embedded sensors.

Soundbars: Home theater speaker system in a single cabinet that simulates surround sound.

Sports Technology: Device that tracks and analyzes performance and activity for a specific sport.

Stand Alone Caller ID Devices: Stand-alone and integrated (with corded or cordless phone) telephone answering devices that display the caller's phone number.

Standalone Wi-Fi Routers: Basic Wi-Fi routers that are not whole home Wi-Fi solutions and that do not include a modem. May include Ethernet ports.

Standard DVD Players: First generation DVD players that play standard DVDs. Does not include Blu-ray or 4K UHD Blu-ray players.

Standard Wireless Telephones: Wireless handsets that employ a proprietary operating system. Also known as feature phones.

Streaming Media Players: A set-top box that allows consumers to use an HDTV set to view content that originates from limited internet services or a local network. Includes Roku, Apple TV, etc.

Streaming Sticks / Dongles: Streaming media player in stick or dongle form factor. Typically connects to HDMI of television directly or with short (less than 6-inch) cord.

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Product Definitions

Subscription Music Streaming Services: Consumer expenditures on subscription streaming music services that deliver on-demand music and audio content over the internet for a monthly or annual subscription fee. Includes revenue attributable to consumer subscription fees for streaming music, including all subscription fees for pure-play music streaming services and a portion of subscription fees for streaming services that are add-ons to other services such as in the case of SiriusXM's All Access or Mostly Music packages. Does not include revenues generated through advertising on internet radio services.

Subscription Video Streaming Services: Consumer expenditures on subscription streaming video services that deliver on-demand or linear video content over the open internet for a monthly or annual subscription fee. Does not include revenue from traditional pay TV programming distributed via cable or satellite.

Tablet PCs: Mobile devices operated by a touch screen larger than 6.6 inches.

Total DTV that are HDMI 2.1-enabled:TVs that fit the required specifications of HDMI 2.1 features.

Video Game Accessories: Includes carrying cases, cables, chargers, controllers and cleaning kits for video game systems.

XR Headset/Eyewear: includes any device that is primarily designed to be worn on, in, or around the eyes and whose primary method of use includes input visible to the user via some display technology. This category includes devices such as Oculus Rift, Lenovo Mirage Solo, HTC Vive, Microsoft HoloLens and "smart" contact lenses. Completely passive VR devices like Google Cardboard are not included unless they include an actively powered input device in the box. Merely having an NFC sensor is not sufficient to make an otherwise passive device active.

Whole Home Wi-Fi Solutions: Wireless home network equipment designed to establish a consistent, strong Wi-Fi signal throughout a home. Also known as home mesh networks. Typically includes a hub that connects directly to a modem and one or more nodes that extend Wi-fi coverage.

Wired Earbuds: Audio listening hardware that is worn in the ear canal. Includes tethered earbuds and true wireless earbuds.

Wired Headphones: All wired over-ear or on-ear headphones.

Wireless charging pads: Charging device that transfers power to a device wirelessly.

Wireless Earbuds: Includes devices that CTA previously defined as hearables, such as earbuds that track heart rate and activity levels.

Wireless Headphones: Includes devices worn on the ear or around the ear; does not include earbuds.

Wireless Phone Accessories: Includes carrying cases, cables, chargers and cleaning kits for digital imaging products.

Wireless earbuds that are tethered: Earbuds or in-ear headphones that receive audio signal via Bluetooth. Audio jack not included. Includes cable or band that connects the earbuds together.

True Wireless Earbuds (TWS): Earbuds or in-ear headphones that receive audio signal via Bluetooth. Audio jack not included. Earbuds are not connected to each other with a cable or band. Includes devices that CTA previously defined as hearables, such as earbuds that track heart rate and activity levels.

Wired headphones that are on-the-ear: Wired headphones that are worn on the ear.

Wired headphones that are around-the-ear: Wired headphones that are worn around the ear.

Wireless headphones that are on-the-ear: Wireless headphones that are worn on the ear.

Wireless headphones that are around-the-ear: Wireless headphones that are worn around the ear.

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