

## Taiwan expanding cooperation with international tech firms for AI development

**Bryan Chuang,**  
**DIGITIMES, Taipei**

The Taiwan government has just struck a deal with Nvidia for artificial intelligence (AI) development for the next decade, with officials stressing that the country will continue to expand partnerships with other tech giants for the same purpose.

The Ministry of Science and Technology (MOST) and Nvidia announced the partnership Monday just ahead of the start of Computex 2018, but that does not mean that Taiwan will stop seeking to team up with other international firms for the development of AI and deep learning, the officials said.

The officials maintained that Taiwan's researchers and academics have many other important partners in the AI area, such as Google, Synopsys, and Microsoft, which founded an AI R&D center in Taiwan earlier this year.

Partnerships with global players are essential to Taiwan's AI development, MOST minister Chen Liang-gee stressed. MOST hopes that international firms and Taiwan's researchers can jointly work on future technological development of AI, while the Ministry of Economic Affairs

will focus on forging partnerships between international and Taiwan-based enterprises to boost AI applications by industries in Taiwan.

MOST has sponsored the establishment of four AI research centers separately in four national universities and by introducing international firms' advanced technological strengths hopes that these centers can make academic breakthroughs to hike Taiwan's influence in international AI research and apply results of the research.

In response to concerns that international firms may seek unfair gains through collaboration with local partners, MOST officials explained that such partnerships set up through MOST are not aimed to use Taiwan-based R&D manpower to solve individual companies' problems or to save their R&D costs.

Instead, the collaboration will see international enterprises provide resources for local researchers to develop solutions based on their concepts and goals. If international enterprises want to capitalize on Taiwan-based R&D manpower in their technological development, they have to propose cooperative projects and sign contracts on R&D budgets and on

licensing of the R&D results, the officials indicated.

In addition to Nvidia, Cadence, Arm, Synopsys, Broadcom and Microsoft have cooperated with local academic and research organizations in developing AI technologies by donating hardware and/or software tools, providing silicon IP or recruiting local professionals, the officials said.

Taiwan is highly competitive in semiconductor, ICT hardware and some ICs, and has strong manufacturing capability, and these are long-term benefits for international enterprises to form partnerships for the development of AI in Taiwan, the officials emphasized.

2018 is the starting year for Taiwan to develop AI and the Taiwan government hopes to create an AI innovation ecosystem through cultivating AI talent, developing AI technologies, promoting development of AI-related industries and applying AI R&D results to various purposes.

Announcing his company's latest AI deal with Taiwan, Jensen Huang, founder and CEO of Nvidia, said "Taiwan was at the center of the PC revolution and now it is investing to play an important role in the next era of computing."



"With the essential infrastructure and tools, the rich talent in Taiwan's schools and industry will create world-changing breakthroughs in science and society," he added.

Taiwan's premier Willian Lai expressed enthusiasm for the collaboration, which he called essential to sharpening national competitiveness.

"Taiwan is committed to be an important global player in the AI ecosystem," Lai said. "Nvidia is the leader of AI computing in the world. By collaborating with Nvidia, we will gain the expertise and technical platforms to train AI talents, build the strongest AI ecosystem of both software and hardware, and further reshape the world with our own technologies and services of AI."

The collaboration is focused on five key areas: supercomputing infrastructure, research, training, startups and innovation.

Nvidia and Taiwan government agencies will co-invest to bring Nvidia's most advanced technology to Taiwan, including the new Nvidia HGX-2, which fuses AI and high performance computing into a single platform.

Nvidia Research, a global organization that includes some of the world's best computer scientists, will collaborate with Taiwan researchers and startups to exchange best practices.

Nvidia will expand its Deep Learning Institute (DLI) - which provides developers worldwide with hands-on training for beginning and advanced AI techniques - to train Taiwanese developers on the latest AI capabilities.

Government agencies and Nvidia will work together to help Taiwan AI startups through Nvidia's Inception accelerator program, which is helping over 2,800 young companies globally.

The AORUS logo is at the top left. Below it is a large, stylized image of a 32GB AORUS Built-In Optane Memory module. The text "32GB BUILT-IN" and "AORUS OPTANE MEMORY" are visible on the module. Below the image is the text "THE ULTIMATE COMBINATION".

intel CHIPSET Z370 inside	intel CORE i5 8th Gen	+	intel OPTANE MEMORY	→	intel CORE i5+ 8th Gen	intel CORE i7+ 8th Gen
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\* Requires eligible 8th Gen Intel® Core™ i5 and i7 processors installed with Intel® Optane™ memory.

A photograph of several AORUS Z370 Gaming Motherboards. Below the image is the text: "Take charge with AORUS Z370 Gaming Motherboards paired with world leading 8th Gen Intel® Core™ i7+/i5+ platforms." At the bottom is the GIGABYTE logo.

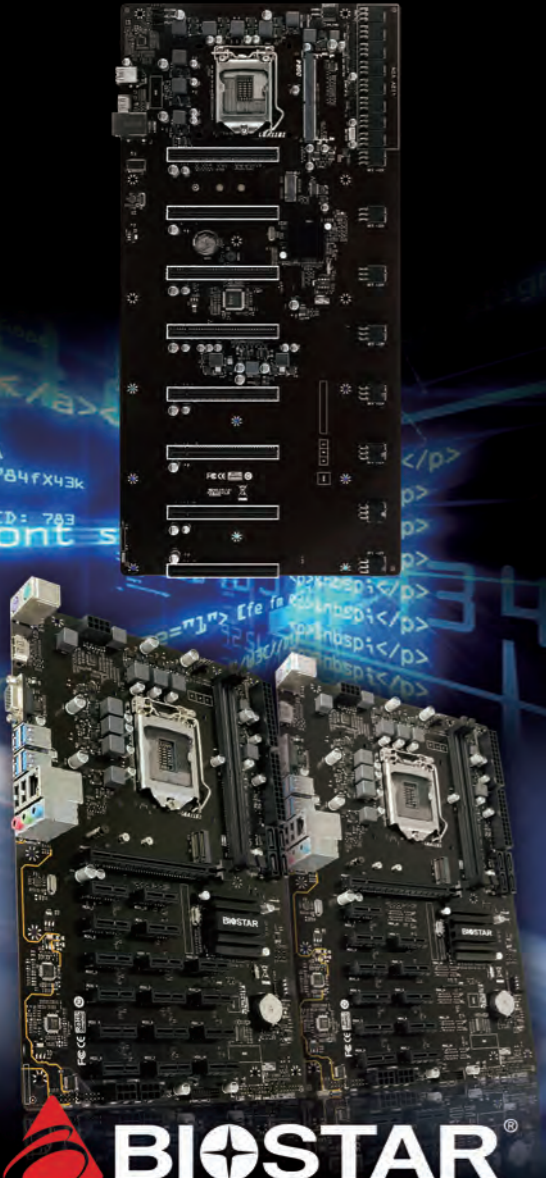

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The AORUS logo is at the top left. To its right is the text "TEAM UP. FIGHT ON." in large, bold, orange letters. Below the text is a large, detailed image of a gaming setup including a desktop PC tower, a monitor, a keyboard, a mouse, a headset, and a laptop. The setup is illuminated with red and orange lights. At the bottom right is the GIGABYTE logo.

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# India smartphone market taking off: Q&A with Prince Yun, Avnet president for Taiwan and South Asia

Julian Ho, DIGITIMES, Taipei

India witnessed sales of 132 million smartphones in 2017, with their penetration rate still much lower than that of feature phones, making the country a big market that cannot be ignored. But the India government is extremely eager to localize manufacturing in the country, with both quantitative and qualitative changes now fermenting in the India IT industry.

As regional sales president for Taiwan and South Asia at Avnet, Prince Yun recently talked to Digitimes about major economic policy changes in India, as well as opportunities and challenges in the India market.

**Q: India is an emerging country with significant demographic dividends. How will its major economic policy changes affect the deployments by electronics firms in the market?**

A: Let us start with India's economic development, now maintaining an estimate 6-8% in annual GDP growth. With a population of over 1.3 billion, India is racing with China to be the world's largest country by population, with sustained economic growth momentum.

I think that 2018 is probably the starting year for smartphones in India. In addition, infrastructures for power systems are also badly needed in India's national development process.

India market demand for smartphones is expected to officially surpass that for feature phones in 2018. This is mainly because the India government has moved to take actions to promote localized production of smartphones and related supply chains have also begun to respond

positively to the actions.

Usually, once government support has arrived, industrial development in any emerging country will get a drastic boost. In this regard, the most core support in India is the taxation system, in that tax reductions prompt supply chain partners to station in the country and tax exemptions encourage localized production, while import tariff barriers are also imposed to prompt electronics firms to develop complete localized supply chains in India.

In India, the past business model was for makers to purchase key peripheral parts and components, and assemble them abroad before the products were shipped back to India. But now the India government has set import restrictions starting with PCBs, imposing higher tariffs on PCBs already loaded with key parts and components. This is to break the established business model and make sure electronics makers must have local production plants in India, thus materializing the concept of "Made in India."

**Q: From the perspective of Avnet, what are the challenges and opportunities for deployments in the India market?**

A: It has been 20 years since Avnet entered the India market in 1998, and now it has a total of over 100 employees there, including 70-80 people in Bangalore, which leads the pack of IT hubs in India. In addition, we have 6-7 more footholds in India, including those in Delhi, New Delhi and Mumbai

I think India is a growing market. Avnet has maintained stable development in the market, and will not limit the expansion of its workforce. Now every quarter, I have to make inspection tours of all the footholds in India to

learn about their latest operating situations.

Besides huge market demand for smartphones needed to replace feature phones, IIoT (industrial Internet of Things) applications will be a market with explosive growth potentials. The demand for water meters or electricity meters in India is huge, as the country has millions of households. With wireless communication technologies, related public utility units could easily collect water and electricity usage data of household users to facilitate collection of proper water and electricity bills. This is exactly a concrete materialization case for IoT and big data tech applications, providing huge business opportunities.

**Q: How do you assess deployments in the ASEAN market, particularly Vietnam, which now highly interests businesses?**

A: Vietnam is really one of the fastest-growing emerging markets, mainly driven by robust demand for telecom infrastructure facilities, as state-run and military-run telecom operators there mainly adopt locally-supplied telecom equipment, promoting the rapid development of related supply chains.

Beyond the telecom industry boasting a relatively larger development scale, the electric vehicle (EV) production also involves a certain scale. At the moment, we can see leading electronics players have all set up sizeable plants in Vietnam, making the country a major electronics manufacturing base with lower entry threshold.

In Vietnam, Avnet has acquired some companies and enjoyed relatively fast business expansion in line with a stunning growth of

the market, which saw a CAGR growth of 30-40% in the past few years.

China is actively developing ADAS (advanced driver assistance systems), and electricity meters and power systems sold in the India and Thailand markets can also be applied to the vast China market for IoT applications.

While the US is an innovations-clustering market, Taiwan is still a leader in the world in IT and electronics manufacturing, and China will be catching up gradually. In the future, there will be made-in-India, made-in-Taiwan, and made-in-China products available in the markets. And it is foreseeable that these major emerging countries will continue to introduce more policies to promote localized production.

**Q: What changes will the global electronics industry experience in the eras of automotive electronics, 5G, IoT and AI? What are the business directions electronics components distributors should follow in the future?**

A: The Skynet developed in the science-fiction film "Terminator" is based on AI and IoT concepts that we talk about now, which will subvert many old ideas and logic and reduce a lot of repetitive work at enterprises.

Here we see opportunities in new business models. Usually, a semiconductor engineer does not necessarily understand mechanical structures, and we can provide a new business model by combining all the software, hardware and other components needed to make a terminal device. We have acquired many companies, and engineers from all affiliates under Avnet can provide innovative "maker" clients with many pieces



Prince Yun, Avnet president for Taiwan and South Asia

of advice on what parts and components they can buy, even if only 3-5 sample pieces, as long as the clients join our platform as members. This is a kind of e-commerce model, and it can help "maker" clients completely figure out from their original ideas all the necessary and accurate components needed to turn their ideas into physical production.

I believe, this integrated e-commerce channel involves a whole set of concepts based on which a workable ecosystem can be established for small- and medium-sized enterprises with high mobility, like most businesses in Taiwan now, particularly in the IoT era. For an electronic device, the development course has been set this way, starting from the development of ideas and product prototype, to trial production and then mass production. And after the e-commerce concept is incorporated into channel distribution of electronic components, the distribution scenarios are very likely to see wonderful changes. And then we have to further think about where the value of channel distributors lies, so as to turn more "design in" into "design win."

# Gateway to Asian IT market

## DIGITIMES helps you get there first

### Analysis of readers by region



Region	Percentage
Asia & Pacific	46%
North America	35%
Europe	16%
Other	3%

### by industry



Industry	Percentage (%)
Semiconductor	28
Distribution	25
Finance/ Market research / Media	15
Brand vendor	11
Industrial/ Automotive/ Data center	8
ODM	7
Telecom/ Networking	2
Other	4

### DIGITIMES value and strengths



Full industry coverage of Taiwan's IT and electronics industry



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Global reach

DIGITIMES, established in 1998, is a unique information source for readers who need to know about the supply side of the semiconductor, electronics, computer and communications industries. Daily coverage of Taiwan's IT companies and news from China and other regions provide a lifeline to industry professionals, channel players, investment analysts and media around the world.



DIGITIMES

# Xperi continues to bring forth innovative technologies, focusing efforts on three major areas including smart home and other markets

Press release

DTS, HD Radio and FotoNation, each mastering different technologies, merged together in 2017 along with InvenSense and Tesseracore to form Xperi Corporation to deliver innovative total solutions encompassing sound, digital broadcasting, computer vision and imaging, semiconductor packaging and IP licensing. Infused with diverse high-tech energy, Xperi plans its Computex 2018 exhibition centered on DTS Virtual:X technology, facial recognition for mobile devices, DTS Connected Radio and advanced driver monitoring systems.

According to Aaron Chen, Xperi's GM of business development in Taiwan and APAC, the company has established a three-year plan (2018-2020) to focus its developments on three major areas, including smart home, smart mobile and connected



Aaron Chen, GM of business development in Taiwan and APAC, Xperi, points out the company has highlighted three major areas - smart home, smart mobile and connected cars - as the strategic focus for 2018-2020.

cars. Among them, smart home has always been an area where DTS holds strong advantages and has accumulated abundant technological achievements, including DTS Virtual:X, featuring virtual 3D surround sound.

DTS Virtual:X turns any audio source into DTS:X-like surround sound and plays it back to present an immersive home theater sound effect. It enables an instant boost to sound bar performance and

seamlessly integrates with thin flat-panel TVs to take over built-in speakers and enhance the sound quality.

Engaging in DTS Virtual:X promotion starting in 2017, Xperi has received overwhelming response. Many leading sound bar and TV makers, including Vestel, Sony, Yamaha, Vizio and LG, as well as China-based TCL and Hisense, have decided to incorporate DTS Virtual:X in their products.

## Xperi works with leading smartphone makers to implement depth-based face recognition

Xperi puts great efforts into its FotoNation brand, targeting smart mobile devices with technologies that have enhanced the digital imaging capabilities in more than 3.3 billion devices worldwide. It is working with the smartphone maker with No. 1 sales in China to upgrade two-dimensional face ID to depth-based recognition.

For the smart automobile, DTS Connected Radio delivers an analog and digital AM/FM experience by pairing broadcast programming with IP-delivered content. DTS Connected Radio aggregates metadata directly from broadcasters around the world to deliver an enhanced visual experience in the vehicle. Multiple auto makers have expressed interest in DTS Connected Radio for future models. As many new car models now come with large

touch screens and can run apps, they will certainly be able to access Hi-Res streaming music and more content in a dynamic way.

With respect to achievements in driver monitoring systems (DMS), Xperi entered into an agreement with Japan-based Denso earlier this year to make FotoNation's DMS available to tier-1 Japanese automobile manufacturers. DMS solutions use image sensing technologies to monitor a driver's alertness to determine if the driver may be falling asleep and raise a warning to prevent an accident. DMS is also considered important safety equipment for self-driving vehicles.

Aaron Chen reiterates Xperi will highlight DTS Virtual:X at its Computex 2018 exhibition. The company plans to ramp up marketing efforts to promote FotoNation for the second half of 2018 as it looks to make the FotoNation brand as successful as DTS.

# Mavin Air-X 1st 10-hour mini earbuds supported by Qualcomm TWS technology



Press release

Mavin Incorporation, who has won the German iF Design Award, the Red Dot Design Award and the CES Innovation Product Design Award, will exhibit its latest products at Booth A0926 at Computex 2018.

Mavin customers describe Air-X as having the best audio quality and the most stable and reliable RF connection they have

Air-X, the world's 1st 10-hour mini TWS earbuds

ever tested.

After countless experiments and tests, Qualcomm and Mavin together have successfully developed the world's first earbuds, Air-X with 10 hours of play time (50 hours with pocket-size charging case, 10 minutes quick charge for 1-hour play time) in each 4.5g earbud.

Air-X is powered by Qualcomm's latest chipset that supports Bluetooth 5.0 and advanced aptX technology. It also supports voice assistant

(Siri, Google), 8th CVC (Clear Voice Capture), ANC (Active Noise Cancellation, Air-XN only) built-in to provide crystal voice call function and premium audio experience to users. More importantly, Mavin has solved the most common problems that consumers encounter with their wireless headsets, earphones and earbuds - the distance and angle of transmission between the playback devices. A patent designed antenna provides a long and wide-range signal reception.

Mavin also designs an ergonomic stabilizer and ear tips to secure Air-X into ears and provide comfortable wearing experience for all day long.

Starting from the design stage, Mavin constantly thinks how to give users a TWS headset with comfortable wearing, premium audio and stable connection. Air-X is the answer to the music lovers for daily use. Mavin's booth is at A0926, Hall 1, TWTC. For more information please visit: [www.mavinlife.com](http://www.mavinlife.com)

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DIGITIMES Research

China smartphone market and industry

China smartphone market

Digitimes Research’s study of the smartphone supply chain and market in China shows that first-quarter 2018 smartphone shipments to the China market fell below 90 million units, down 34% on quarter and 13.4% on year due to a number of reasons: there were fewer work days in February during the Chinese New Year holiday period; vendors attempted to deplete excess inventory accumulated from the fourth quarter of 2017; and sales of new Apple phones underperformed.

The top five vendors in terms of first-quarter market shares are Xiaomi, Huawei, Oppo, BBK (brand name Vivo) and Apple. Xiaomi introduced large-screen Hongmi 5 Plus (known as Hongmi Note 5 in overseas markets) priced around CNY1,000 (US\$157.07) in the first quarter, which boosted its shipments, so it was able to exhibit a smaller decline than the other China-based vendors in the first-quarter low season. Huawei experienced a more than 40% sequential decline as its shipments largely concentrated on older models in the first quarter, and it was unseated by Xiaomi. Oppo and BBK also mostly shipped older models in the first quarter so their shipments respectively fell by about 3 million units from the levels seen in the corresponding period of 2017, representing a more than 30% decline on a quarterly basis. Apple’s shipments also dropped 25.6% sequentially as the hype for new iPhones waned.

Digitimes Research estimates that China-based vendors will aggressively put new phones on the market in the second quarter of 2018, buoying total shipments. But they will still have difficulty catching up with the levels seen in the corresponding period of 2017. Apple will likely experience a more than 30% sequential decline in the second quarter as consumers will put off phone purchase until new models enter the market. As a result, it will be a challenge for international vendors to keep their share of the China smartphone market above the 10% mark.

Vendors

With sales of iPhone X and iPhone 8/8 Plus weakening, Apple’s first-quarter shipments showed a more than 20% decline. Samsung introduced flagship Galaxy S9/S9 Plus priced at CNY5,800/6,700 to China in mid-March, which had yet to have influence on its first-quarter shipments to the China market. The company expects its S9 series to spur shipments in the second quarter.

Huawei plans to debut flagship P20/P20 Pro with price tags CNY3,800/5,000 in the second quarter, which may put pressure on shipment performance of Samsung’s Galaxy S9 series. In the first quarter of 2018, Huawei focused efforts on sales of older models and depletion of channel inventory accumulated from the prior quarter, so its shipments fell

more than 40% sequentially.

First-quarter shipments by Oppo and BBK also concentrated on older models, resulting in an on-quarter decline of nearly 40%. Compared to the corresponding period of 2017, first-quarter shipments by Oppo and BBK fell three million units respectively, far more than Huawei’s on-year decline of 1.7 million units.

Market

China Mobile with the largest subscriber base as well as the most aggressive 4G subsidy plan has shifted its target toward IoT promotion in line with the China government’s goal to begin 5G commercial operation by 2020.

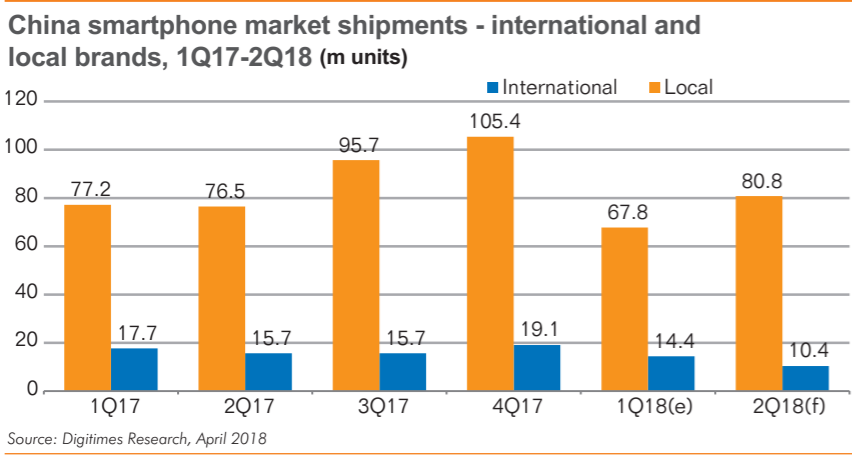
Smartphones already have an over 70% penetration in China, and there is no longer soaring growth arising from feature phone upgrade to smartphones. Top vendors with strong finances and more marketing resources are broadening their offerings to cover wider price ranges to tap the markets in rural areas with low-price models. These low-price smartphones from top-tier vendors are cannibalizing models from smaller brands and white-box suppliers. Smaller brands and white-box makers are being driven out of the market.

The top five vendors in the China smartphone market are respectively Xiaomi, Huawei, Oppo, BBK and Apple. Apple is the only international brand still remaining in the rankings. The competition between Huawei and Xiaomi is expected to intensify in 2018. Huawei will bring more phones in the CNY1,000 price range to the market, eroding small brands’ market shares.

Shipment breakdown

As the Chinese New Year holiday left the month of February with fewer work days for production and vendors were digesting channel inventory accumulated from the fourth quarter of 2017, first-quarter 2018 smartphone shipments in China arrived at 82.2 million units, down 34% on quarter and 13.4% on year. The shipments to China as a proportion to the global total lowered to 25.7%.

Compared to the corresponding period of 2017, China-based vendors experienced a 12.2% decline in smartphone shipments and international vendors an 18.6% decline, indicating international vendors are encountering increasing



challenges in their China operations.

Digitimes Research estimates second-quarter shipments to China will increase 10% on a quarterly basis to reach 91.2 million units, as China-based vendors aggressively roll out new phones on the market. However, the quantity will still fall short of the level seen in the corresponding period of 2017.

Shipments and market share of all vendors

The top five vendors in the China smartphone market are respectively Xiaomi, Huawei, Oppo, BBK and Apple in first-quarter 2018. They hold a combined 86.3% market share, slightly smaller than their share of 87.5% in the prior quarter (the same five vendors but with different rankings).

Xiaomi and Apple enjoyed rising market shares as their shipments declined at smaller rates compared to the other China-based vendors. Xiaomi’s market share expanded 1.4pp and Apple 1.8pp.

Huawei, Oppo and BBK experienced quarterly declines between 30% and 40% in first-quarter shipments so their market shares all dropped. Huawei’s share dipped 2.6pp to 18.6%. Shares held by Oppo and BBK each slid about 1pp to 17% and 16.4% respectively.

Digitimes Research estimates that top-ranked vendors in the second quarter will be Huawei, Xiaomi, Oppo, BBK and Apple.

Huawei, Xiaomi, Oppo and BBK launching new phones in late first quarter and early second quarter will likely boost their shipments to grow about 20%.

Apple may see its market share plunge 6pp below 10%, as sales of iPhone X and other new models remain weak and consumers hold out for next-generation Apple phones coming in the third quarter.

China telecom carriers

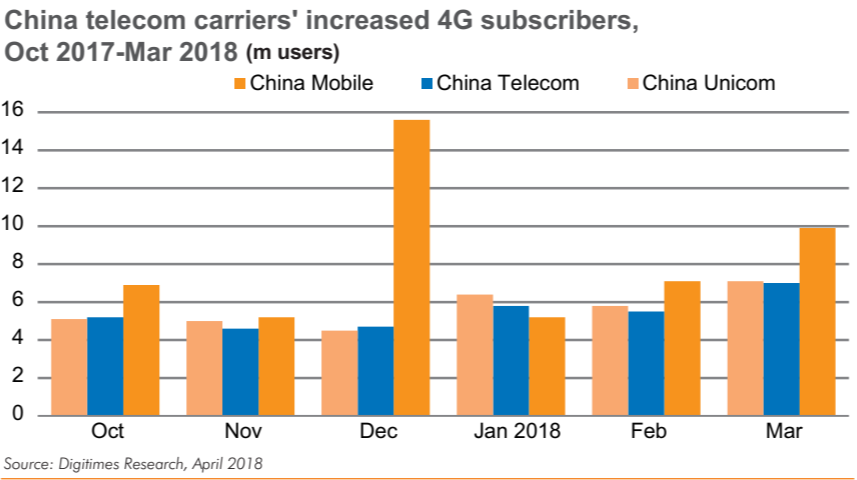
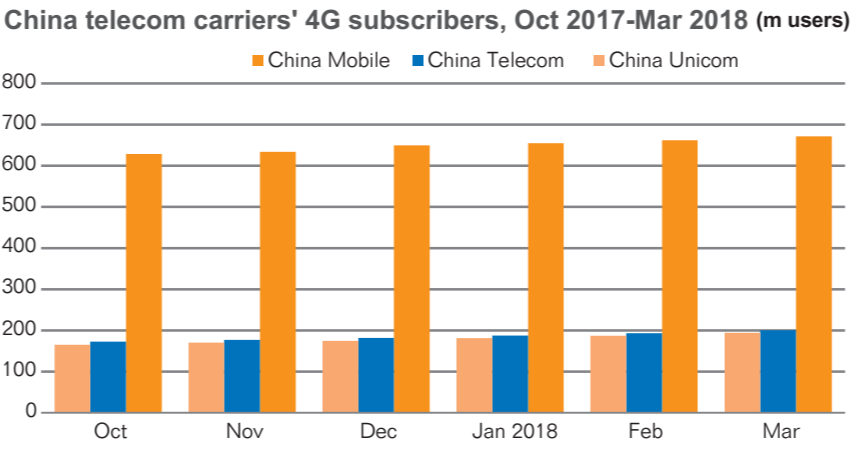
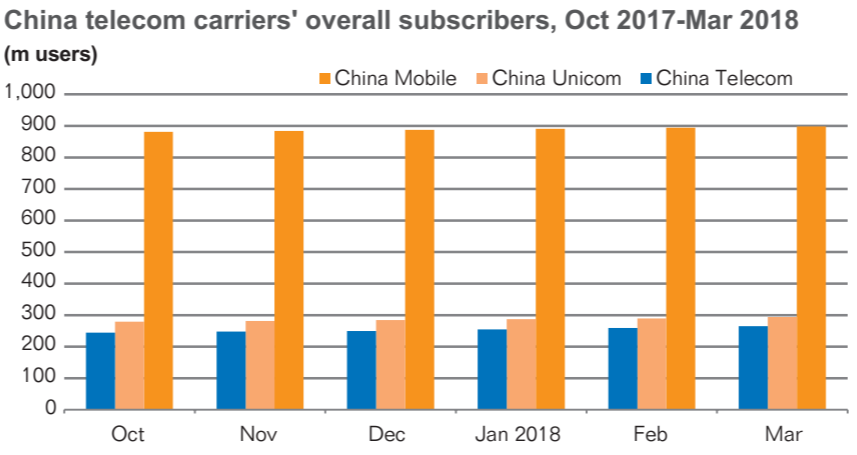
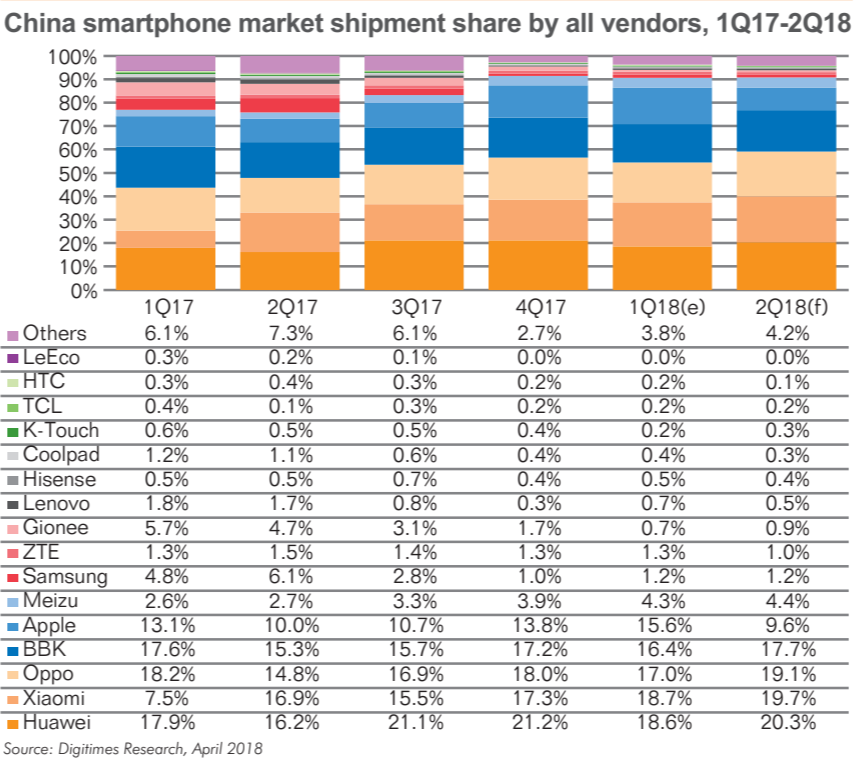
China Mobile, serving close to 70% of 4G users in the country, has been cutting its subsidy offers for 4G additions and gearing its subsidy promotion toward IoT services.

In comparison to first-quarter 2017, China Mobile’s 4G additions in 2018 only reached 22 million, down more than 30% and far below the number of 33 million new users added a year ago.

China Unicom and China Telecom are still making all-out efforts to add new 4G subscribers. However, as their combined user base is significantly smaller than China Mobile’s, their 4G promotion efforts will not be enough to turn things around for entry-level and low-end 4G phones made by white-box vendors or small brands.

China Unicom added 19.3 million new 4G users in first-quarter 2018, up 6% from the 18.2 million users added in the corresponding period of 2017.

China Telecom added 18.2 million new 4G users in first-quarter 2018, 2.4 million more than the 15.8 million



users added in the corresponding period of 2017.

China smartphone industry

China-based smartphone makers shipped a total of 141.1 million phones (including exports) in the first quarter of 2018. With the first quarter being a traditional low season along with the Chinese New Year holiday period where working days were fewer, China-based makers operating at considerable scales all exhibited a shipment decline of more than 30% on quarter except for Xiaomi. However, different from first-quarter 2017, at the end of which there was no sign of order ramp up, most supply chain vendors this year have begun early inventory preparation for product launches by Huawei, Xiaomi, Oppo and BBK (brand name Vivo) in the second quarter.

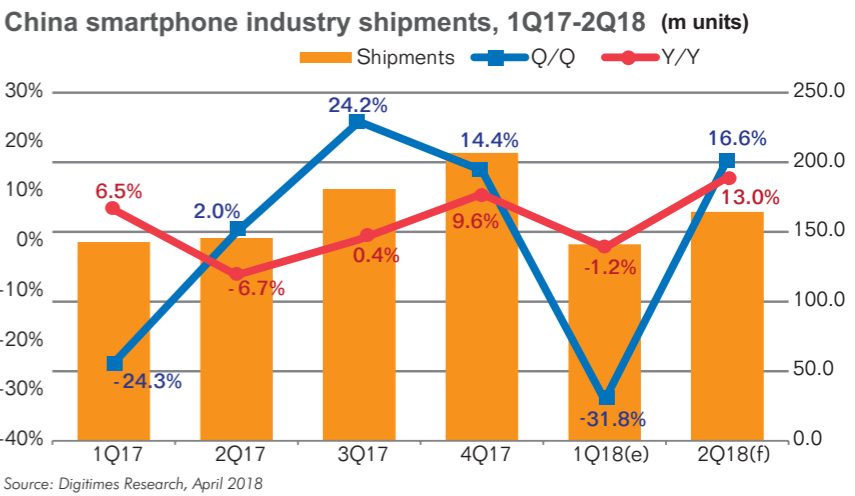
In terms of shipment volume, Huawei, Xiaomi, Oppo and BBK are clearly the leading brands among China-based smartphone makers. The four together accounted for more than 60% of first-quarter 2018 shipments, up 4.8pp from the share held by the top four makers (Huawei, Oppo, BBK and Lenovo) in the corresponding period of 2017. Lenovo, ranked No. 5 among China-based vendors in first-quarter 2018, lagged behind BBK by a wide distance.

Looking forward into second-quarter 2018, total shipments by China-based makers will likely show a sequential growth of 16.6% and an annual growth of 13% as the top four makers aggressively introduce new phones to the market. With the domestic market becoming saturated, China-based makers will step up efforts on overseas expansions, hike export ratio and adjust delivery pace so that shipments remain at high levels even during low seasons.

Supply side

With respect to component costs, NAND flash and display panel prices both trended downward; DRAM prices showed flat or small increases; PCB prices stabilized; and resistor and capacitor prices continued to go up, which had a more significant influence on small and medium-sized brands.

Huawei set the launch schedule of



Shipments by maker

The top five China-based smartphone makers in terms of first-quarter 2018 shipments are respectively Huawei, Xiaomi, Oppo, BBK and Lenovo.

It is clear now who are among the leading China-based smartphone brands, namely Huawei, Xiaomi, Oppo and BBK. Although Lenovo is in 5th place, it only shipped 8.3 million phones in the first quarter of 2018, falling short of the 10 million mark and lagging far behind fourth-place BBK.

First-quarter shipments by China-based makers showed declines across the board as sales channels were digesting the inventory resulting from excess shipments in fourth-quarter 2017.

Huawei’s first-quarter shipments, mostly of existing models, totaled 30.2 million units, slightly lower than the level seen in the corresponding period of 2017.

Xiaomi debuted Hongmi 5 Plus – an all-screen model priced around CNY1,000 – buoying its total shipments to 24.8 million units.

Oppo launched an upgrade version of A71 with a price tag of CNY1,000 in India in the first quarter but A1 (selling for CNY1,499) was only available starting from March. As a result, Oppo’s first-quarter 2018 shipments totaled 19 million units, down significantly compared to the

multiple new phones for March so its first-quarter 2018 shipments dropped more than 30% on quarter. Huawei is expected to bring new low-cost phones to the Indian market in the second quarter to expand its presence in the country.

Unlike Huawei, Oppo and BBK – all of whom showed a more than 30% sequential decline – Xiaomi’s shipments only fell about 20% thanks to the debut of Hongmi 5 Plus (known as Hongmi Note 5 in overseas markets) with a price tag of CNY999 for the 5.99-inch model in late fourth-quarter 2017.

Demand side

As the China government steps up efforts to push 5G networks into commercial operation by 2020 with IoT also included in pre-5G and 5G planning, China Mobile has set a goal to reach 100 million 5G connections by 2020 and thus offers no significant 4G subsidy plan.

Indian telecom operator Reliance attempts to boost 4G subscriptions by offering subsidies. With a deposit of INR1,500 (US\$22.50) – refundable when subscription expires – the user gets a free Reliance-branded China-made 4G JioPhone and unlimited voice, text and data access for a low rate of INR153 per 28 days.

Shipment breakdown

China-based smartphone makers shipped a total of 141.1 million phones in the first quarter of 2018, down 1.2% on year and 31.8% on quarter. Excluding IDH shipments of JioPhone to Indian telecom operator Reliance, the yearly decline would exceed 12%.

According to supply chain sources, there was no sign of order ramp up in late first-quarter 2017 but in first-quarter 2018, most supply chain vendors started to hike component shipments in March in preparation for new phones from Huawei, Xiaomi, Oppo and BBK set to enter the market in the second quarter.

Digitimes Research estimates smartphone shipments by China-based makers will grow to 164.5 million units in second-quarter 2018, up 16.6% on quarter and 13% on year. Their share among the global total will also expand to 48.6%.

level in the corresponding period of 2017.

BBK’s new phones entered the market in March so its first-quarter shipments focused on older models. Its shipments showed a considerable on-year decline to come to 14.9 million units.

In the second quarter of 2018, all the five leaders will aggressively put new phones on the market. As such, Digitimes Research expects all of them to deliver significant shipment growth compared to the previous quarter.

Huawei will beef up efforts toward expansion into India and compete against Xiaomi with low-cost phones.

Amid a high fourth-quarter 2017 base period and a traditional first-quarter low season, China-based smartphone brands showed two-digit sequential declines across the board. Shipments by Huawei, Oppo and BBK all dropped around 30% on quarter. Xiaomi showed a smaller sequential decrease of 20.8%. Due to financial difficulty and cash payment terms, Gionee exhibited a whopping 60% drop in shipments.

The top five brands’ plans to put new phones on the market in late first-quarter and in the second quarter will likely bring two-digit sequential growth in the second quarter.

Continued on page 5...



# AMI partners with KingTiger to push computer reliability and performance

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As developments in artificial intelligence (AI) and cloud services drive rapid industry growth and bring about a wave of products and services that highlight convenience and user needs, demand for computation power and system stability is also increasingly challenging. In response, developers are making more powerful operating systems and diverse software functions as well as new generation processors. Among these advancements, memory supporting high-speed data transfer plays a critical role. The use of dynamic random access memory (DRAM) with large capacity and high-speed data transfer interface designs is making data throughput growing at unprecedented rates. A common PC nowadays comes with 8GB DRAM.

System performance and stability builds on top of memory reliability. However, with memory process technologies continuing on the miniaturization trend and new software applications keeping on evolving, all types of memory errors are prone to happen, resulting in system malfunction or failure which could have a negative influence on user experiences and brand reputation.

BIOS vendors have a far-reaching influence on PC system stability and performance. In an exclusive interview, PaiLin Huang, general manager, AMI Taiwan, and Bosco Lai, CEO and executive

president, KingTiger, talked about their collaborations to bring users a total solution to DRAM error detection and correction.

DRAM test equipment is a core business of KingTiger, serving major DRAM providers and users around the globe so the company has extensive knowledge about memory testing procedures. With growing popularity of mobile devices, memory products have transitioned from a modular form factor to being soldered directly onto mini motherboards and therefore application specific testing has become part of KingTiger's main services.

According to Lai, as DRAM process technologies trend toward miniaturization and capacities grow higher and higher, DRAM manufacturers have difficulty implementing comprehensive tests on their products. For example, DRAM design today has a less-than-one signal-to-noise ratio and manufacturers can hardly cope with problems like early wear-out, variable retention time (VRT) or frequent occurrences of errors with in-plant testing.

Some DRAM errors only occur when the memory is put to use under a combination of certain platforms and application scenarios. KingTiger's core expertise is its patented logic/system dual mode testing technologies. It is well aware that in-plant testing is unable to cope with the requirements by the slew of systems on the market so

KingTiger leverages its thirty years of experiences in developing unique memory checking and correcting technologies to introduce a patented intelligent memory surveillance (iMS) software solution that works like the human immune system. It ingeniously conducts memory testing, scanning and checking when the processor is idling.

When a section of memory is found to be defective, it is marked as unusable to ensure the memory system can continue to function normally. The complete approach to memory error detection, correction, diagnosis and handling includes comprehensive memory management functions such as inspection and failure isolation and warning. Memory reliability and performance is enhanced without occupying system resources, so it is called the memory system's silent guardian.

As a matter of fact, KingTiger iMS has had some impressive success stories mainly for its use in server systems in recent years. This is because server systems impose much more stringent requirements on performance and stability than PC. For example, Inspur adopted KingTiger's iMS solution in its Tiansuo M13 in 2017 and was able to reduce system instability resulting from memory errors by 95%. Such significant improvement gave rise to positive market reviews on Inspur servers and also provided a stage for KingTiger iMS to excel on.



Bosco Lai (left), CEO and executive president, KingTiger, and PaiLin Huang (right), general manager, AMI Taiwan

## AMI BIOS combines iMS Lite for added strength

PC manufacturers and leading brands cannot afford to overlook memory risks. Outstanding achievements of the iMS solution enabled KingTiger to enter into collaborations with AMI and further expand into motherboard, computer assembly, computer brands and white-box markets with AMI BIOS. Commenting on the partnership, Huang indicates the two companies share the common objective to boost computer stability and make benchmark progress. AMI chose to engage in collaborations with KingTiger in the early development of its major BIOS products in an attempt to shorten customers' R&D cycles. This will allow users of AMI BIOS to experience iMS Lite's capabilities in memory error detection and correction and also give added values to AMI's line of BIOS products.

If users wish to upgrade to the full version iMS, they can choose iMS-enabled DIMMs or purchase KingTiger solutions online in the future. The full version iMS

solution provides around-the-clock uninterrupted operation and further features memory failure warning. Based on KingTiger's smart algorithm, the solution can calculate parameters that can accurately indicate imminent memory failure and initiate preventive actions, so system stability can be enhanced significantly to provide a high-quality computer system with self-correcting memory, thereby delivering premium user experiences.

At Computex 2018, AMI plans to showcase a full spectrum of BIOS products and KingTiger iMS Lite at booth L1332 on the fourth floor at Nangang Exhibition Center. AMI customers, partners and Computex visitors are all welcome to the AMI booth for a firsthand experience on amazing AMI innovations.

KingTiger and AMI have successfully integrated Memtest86, one of the most common memory testing standards in the industry, in AMI BIOS. Memory errors detected by MemTest86 in iMS-enabled systems can be directly corrected by iMS.

# Colorful Technology and Chaintech showcase the latest technologies and applications of computer boards and cards

Press release

China's No. 1 gaming hardware brand Colorful Technology joins forces with Chaintech to exhibit its high-end brand iGame series at booth M1112 at Computex 2018.

iGame is Colorful's only graphics card brand with a high-end positioning. Undergoing a decade of development since its debut in 2008, the iGame series has expanded to include motherboards, storage and memory devices entering the market this year and has secured the largest share of the brand graphics card market. Gearing iGame toward the gaming segment, Colorful forayed into international markets in 2017 and is enjoying rapid growth in shipments to Southeast Asia and Korea. In

particular, iGame SSD is gaining widespread popularity in Japan.

With 22 years of continuing efforts and extensive experiences in the DIY computer market, Colorful has been able to stay as the top vendor in the China brand graphics card market for 15 years in a row.

Colorful participates in a variety of gaming events to engage gamers. Hot League of Legends (LOL) e-sport teams including Snake and RNG have chosen to use iGame in training and competition. Colorful has designed iGame with gamers in mind and crafted motherboards and graphics cards specifically for e-sport teams. Furthermore, Colorful has been participating in or sponsoring e-sports tournaments including LOL, Overwatch, PlayerUnknown's Battlegrounds

and Dota 2 at home and abroad and also organizing its own Colorful Games Union (CGU) competitions. By partaking in global e-sports games, Colorful looks to enhance the iGame brand awareness.

Celebrating iGame's 10th anniversary, Colorful will unveil a whole-new logo in addition to the latest generation graphics cards, motherboards and memory devices with the iGame theme design at Computex 2018. It will also jointly present two new gaming computers with Chaintech and Intel on the afternoon of June 6.

At Comnputex 2018, Colorful will showcase iGame GTX1080Ti Vulcan X OC – the world's first graphics card with an LCD display, in addition to iGame GTX1080 Vulcan X OC, iGame GTX1070Ti

Vulcan X Top, iGame GTX1070 Vulcan X OC and iGame GTX1060 Vulcan X OC 6G of the Vulcan series. Furthermore, the high-end iGame GTX1080Ti Kudan will also be on exhibit along with the Neptune and Customization series. The 10th anniversary retro edition and new products featuring the iGame design concept will also be the highlights of this year's exhibition.

Colorful's iGame GTX1080Ti Vulcan X OC is powered by the advanced Pascal GP102 GPU, featuring a one-key overclock of 1620MHz and a boost clock of 1733MHz as well as 11G GDDR5X 352-bit memory. It is equipped with a high-performance power supply for the GPU core and memory, the SWORIZER cooler, 1.68 million



Colorful's flagship iGame series

color-capable RGB lighting, and PCB protected with high-strength alloy. As a most prominent feature, the cooler is built in with the iGame Status Monitor which shows the core frequency, core temperature, fan speed and memory usage during operation. The core usage and load level is displayed in the form of a load bar so the user can stay aware of the current operating condition of the graphics card.

# VATek GEN-3 Modulator Chips Brings Advance Features to a New Tier of DTV Headends

Sponsored content

Vision Advance Technology introduces the GEN-3 Platform to the market. VATek took years of dedication to bring the new series to reality. The GEN-3 portfolio includes 2 Super ENMODER chips (B3+ & B3) and a brand new Super Modulator (A3). New platform is designed to exceed the expectation of modulator makers by offering technologies and features previously only can be implemented with FPGAs. This will be the first non-FPGA chip to support DVB-T2(base 1.3.1) modulation.

GEN-3 Super ENMODER can support up to 7 different digital TV standards, and featuring AVC + MPEG-2 dual format encoder. By incorporating key modulation capabilities and media processing performance advancements, the GEN-3 Super ENMODERs are designed to transform headend products into ultimate broadcast devices, which can work and deliver high quality TV program to every digital TV in different standards. That helps head-end manufactures to expend the market worldwide.

GEN-3 Super Modulator (A3) has new architectures, engineered to result in significant improvements over the GEN I modulator. A newly added stream engine that can work as transport stream regulator. Capable to implement PID filtering, regulating busy transport stream and inserts customize PSI/SI info into media stream.

Making A3 able to adopt with any video encoder without MUX units. A3 modulator also equipped with VATek latest modulator engine, brings more DTV standards including ISDB-T & DVB-T2 to the chip. It allows manufactures to design UHD (4K) DVB-T2 headend product with ease.

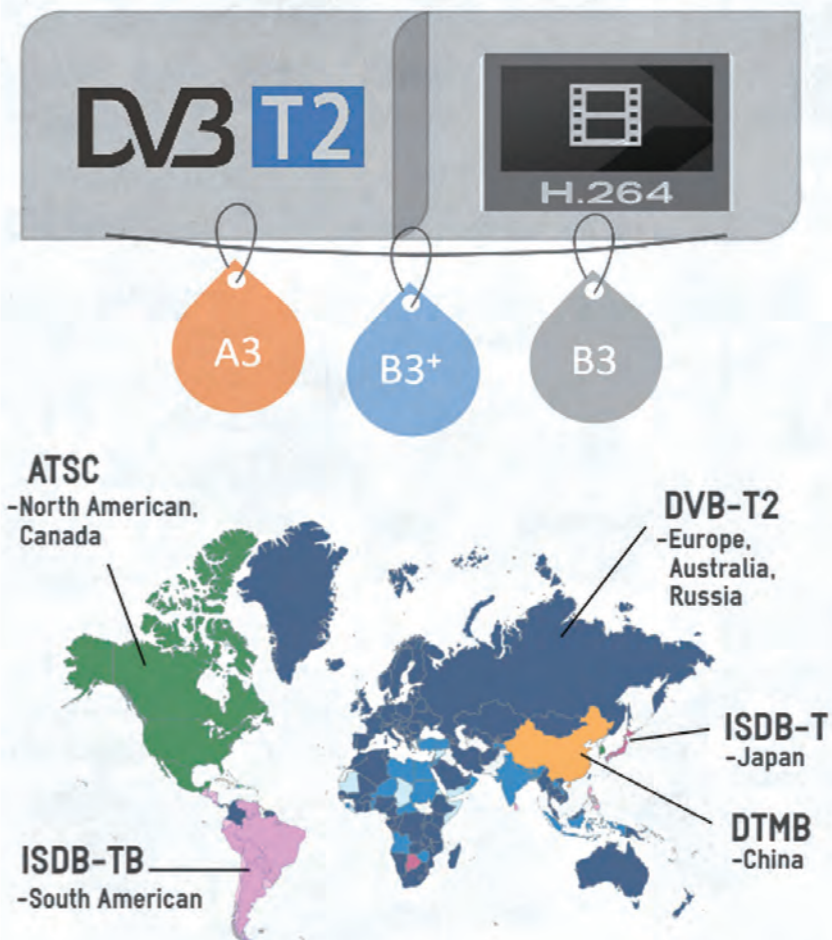
VATek's will also release new firmware platform to all series of products. The new platform is engineered to deliver efficiency and design flexibility. The update allows each VATek product to share the same developing tools & control logic. Several features and function upgrade will be found in new firmware as well. The most significant improvement will be the control method. A register-like control mechanism will be introduced to replace current GATEWAY control system. R2 control logic will be also available in new firmware platform, which

makes every VATek modulator & ENMODER chip capable to control R2 RF chip automatically. Developers no longer need to build R2 driver, and are still able to access the RF chip, more than that, users can even conduct IQ balance calibration with few mouse clicks. Additionally, VATek also made a major upgrade to extend TS API, with new auto data repeat feature, chip now can automatically mux the repeated PSI/SI data into stream reduce system loading dramatically. VATek will provide paid PSI/SI design service, for customers who use new platform can purchase authorization key to enable on chip PSI/SI function.

The VATek GEN-3 Series is available this June and is expected to be found in consumer devices in the 4th quarter of 2018. Visit VATek website at [www.vatek.com.tw](http://www.vatek.com.tw) for detail

	SUPER MODULATOR A3	SUPER ENMODER B3+	SUPER ENMODER B3
MEDIA INTERFACES	TS Serial/Parallel, USB	BT656 / 1120, I²S	BT656 / 1120, I²S
FHD H.264 / MPEG-2 ENCODER	---	Yes	Yes
DVB-T2	Yes	Yes	---
DVB-T, ATSC, J83A/B, DTMB, ISDB-T	Yes	Yes	Yes

▲ VATek GEN-3 Product Comparison Table



▲ The VATek GEN-3 Series, Designed to support Next-Generation broadcast technology. New DVB-T2 & AVC video engine brings exceptional performance and quality to the industry.

# Smart speakers enrich user experiences with AI and hardware optimizations

DIGITIMES staff

Sales of smart speakers integrating artificial intelligence (AI) analyses and targeting wide-ranging smart home application scenarios have performed outstandingly in 2017-2018.

After Amazon launched its Echo smart speakers with smart voice services, enabling users to access its value-added e-commerce services using its voice assistant, Apple followed suit and unveiled its own smart speakers with a home assistant powered by Siri, Apple's voice-controlled personal assistant originally available on iPhones. Leveraging its smart speakers, Apple's smart service ecosystem spreads into the smart home arena.



The interior of Apple HomePod  
Source: Company

## Rapid developments of smart speakers

With world-class e-commerce giants and smart product developers entering the market space, vendors – large and small – were scrambling to unveil their own AI-enabled smart speakers in 2017. As a result, the market is seeing a wide variety of smart speaker implementations and designs each with different AI value-added services corresponding to different applications and assistance services. CES 2018 even had a slew of smart speakers competing

for the spotlight, following the smartphone frenzy. There will be large differences in terms of core technologies, application scenarios, ecosystem integration and product usability as a great number of IT companies and network service operators join the game.

Global smart speaker shipments reached 30 million units in 2017. As big players pour in more marketing resources and additional mid- and large-size vendors bring new products to the competition, 2018 will be a defining year for smart speakers. The outcome will hinge on who has more “smart” integration advantages, how well the smart speaker is suited to diverse application scenarios, how many resources are available for the vendor to provide immense value-added services, and how the vendor can stand out from the competition, leveraging hardware, smart system and ecosystem technologies and resources. This is why the smart speaker contention is attracting market attention.

## Maturing smart speaker industry chain

A review of the smart speaker market with respect to industry chain development showed the products on the market still had many problems in 2017, when the storm was still brewing. For example, their AI smart service modules still needed to be validated and enhanced. Their fundamental SoC solutions had room for improvement. Their market remained to be further developed. However, after 2017, smart speaker SoCs, voice/face recognition and other AI modules gradually reached marketable functionality with every element in the industry

chain including mechanical designs, user experiences, major chips and overall technologies also becoming mature. As such, the key to product success will be determined by what application scenario the smart speaker is targeted for and how well it addresses users’ pain points.

In fact, a vendor attempting to expand into the smart speaker market in 2017 would encounter some major non-technical challenges. First of all, smart speaker system integration had not yet reached completion. It still needed some time for chip yield rates and service consolidation to keep improving. Furthermore, as there were a large number of human machine interface (HMI) designs for voice assistant, biometrics authentication and decision making, it would take users a while to get used to these new generation products. As a result, market awareness of smart speakers was still limited and market development costs were running high. However, big players including large-scale network/cloud service operators and smart hardware developers have been beefing up efforts toward the smart speaker market in 2017-2018, having launched more than 10 AI-enabled smart speakers.

## Independently-developed products with limited functionality have difficulty surviving

In 2017, independently-developed smart speakers were the mainstream on the market. They were mostly developed in-house, combining diverse network services such as streaming music, video and data services. With large-scale network operators and

Baidu Duer smart speaker integrates an array of six microphones arranged in a circle to enable an HMI interface with 360-degree sound pickup and voice command recognition within a 10m range.  
Source: Company



hardware developers joining the game, the smart speaker market puts up a high entry barrier with smart applications including noise reduction with microphone array, AI-based voice recognition, AI-based application scenario analysis and automation applications. World-class hardware developers and network service operators like Apple, Google and Amazon have leveraged their corporate resources and advantages to expand into the smart speaker market, wherein the competition will become increasingly intense and the growth will be fueled by these large vendors offering subsidies, promotions or even more advanced smart applications in 2018.

Thanks to large vendors joining the game, smart speakers entering the market in 2017-2018 come with mature functionality and applications. For example, major network service operators Baidu, JD.com and Alibaba as well as home appliance or consumer electronics providers Haier, Lenovo and Xiaomi are entering the market. International players including Sony and sound equipment vendor Sonos have also launched their own smart speakers, and so have Rokid and Mobvoi endeavoring on smart

hardware. Even online content provider Ximalaya has also brought a smart speaker under its brand name on the market.

## Smart designs in smart speakers are growingly challenging

As speakers become smart, they can be used in wide-ranging scenarios. Smart speakers in their early days worked in conjunction with smartphones through Bluetooth or other communication protocols. Users controlled smart speakers using smartphone apps for media playback or more advanced smart applications. These early-stage products were much similar to Bluetooth speakers in terms of user experiences. Budget restraints also limited how smart they could be so the overall speaker systems provided little usability. New generation smart speakers have transitioned toward independent smart operation with built-in network connectivity and expanded smart functions such as AI-based voice recognition, smart home appliance control, online streaming video/music and human-like conversation. They are a significant upgrade from the early-day products at system, intelligence and hardware levels.



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# Gigabyte to demonstrate integrated AI/Data Science Cloud at Computex

Press release

Gigabyte, an industry leader in server systems and motherboards, has collaborated with local cloud and storage platform providers to showcase an integrated "AI/Data Science Cloud" at Computex 2018, demonstrating how customers can build a private cloud to own and protect their data while connecting with public cloud services, and incorporate inbuilt AI (artificial intelligence) capabilities to use big data for real-time deep learning and inference processing (AIoT).

Gigabyte Featured Hardware

Gigabyte's Network & Communication Business Unit exhibit area at Computex will showcase its six main product lines and their target applications: H-Series Density Optimized Servers for cloud computing; G-Series High

Performance Computing Servers for AI; S-Series Storage Servers for big data; W-Series Workstations for content creation and software development; R-Series General Purpose Rack Servers for enterprise IT; and Racklution-OP Open Rack Standard products for hyper scaled data centers.

AI/Data Science Cloud Demonstration

Gigabyte will not only showcase its hardware during Computex but also demonstrate to its customers the practical applications of its products by building a private cloud in collaboration with its partners InfinitiesSoft and Bigtera. It calls the demonstration an "AI/Data Science Cloud." It is an AI and big data analysis enabled hybrid cloud, enabled with Infinities CloudFusion cloud management platform and Bigtera

VirtualStor scale-out storage, running onsite at Gigabyte's Computex booth on its H-Series, G-Series and S-Series server products. It provides remote cloud services in categories such as compute, storage, big data analytics, deep learning and AI training, and management functions. The platform has a high availability architecture that can avoid a single point of failure and can be quickly scaled out at remote locations.

Infinities CloudFusion

Gigabyte's "AI/Data Science Cloud" has been built with InfinitiesSoft CloudFusion, a comprehensive cloud management solution that can support and integrate over 30 different private and public clouds with a single platform. For this demonstration, a hybrid cloud has been built with OpenStack and Bigtera VirtualStor storage working seamlessly

under the hood of CloudFusion, running on Gigabyte's H281-PE0 and H261-N80 hyper-converged servers, and connected with public cloud services. HPC application containers have also been set up and integrated into this cloud with Kubernetes and running on Gigabyte's G481-S80 GPU servers to provide remote AI training and deep learning capabilities. Since CloudFusion supports a highly elastic open API interface for developers, many other additional public or private clouds can also be connected and integrated into this platform to ensure it is future-proof.

Bigtera VirtualStor Scaler

Gigabyte's "AI/Data Science Cloud" includes a scale-out storage cluster created with Bigtera's VirtualStor Scaler storage platform and running on Gigabyte's S-Series storage servers. VirtualStor Scaler provides



Gigabyte to demonstrate integrated "AI/Data Science Cloud"

customers with a cost effective x86 scale-out storage solution that allows them to pay as they grow. VirtualStor Scaler's scale-out architecture provides the flexibility to specify the storage type (NAS, SAN, object storage), performance (IOPS and throughput), and efficiency all while delivering resilient and secure capacity. VirtualStor Scaler's unique advantages

include offering multi-tenant storage capabilities to provide different "virtual storage" for different tenants, making storage management flexible, as well as providing functionality to consolidate legacy devices and help seamlessly migrate old data to a new storage system without downtime.

Gigabyte's Computex booth is at TWTC Hall 1, D0002

# V-Color unveils upgraded Prism RGB memory and PCIe M.2 RGB SSD VPM800

Press release

V-Color unveils its latest DDR4 Prism RGB memory and PCIe SSD VPM800 at Computex 2018. Carrying on the V-Color style, the new products feature not only a total upgrade to performance but also dazzling designs and colors, bringing gamers never-before-seen visual enjoyments and top-notch performance.

Combining the latest heat sink design and improved light bars to present fascinating lighting effects mimicking water flow, DDR4 Prism RGB is a must-have for PC modders and gamers. It comes with several models including the entry-level DDR4-2666 8GB CL 16 1.2V memory available in red and gray and two high-end models DDR4-3000/3200 8GB for heavy gamers and overclockers. DDR4-3000 8GB CL 15 1.35V features silver heat sinks while DDR4-3200 8GB CL16 1.35V, the highest



V-Color's Computex 2018 booth at Taipei Nangang Exhibition Center, Hall 1, J0818

spec among the Prism RGB series, is equipped with heat sinks made of special metallic materials with optimal heat transfer property to enhance heat dissipation. Built with Samsung B-die chips, DDR4-3200 8GB unleashes full overclocking potential for gamers to keep pushing the limit.

DDR4 Prism RGB products are built with 10 layers of PCB. They support Intel XMP 2.0 one-key

overclock, enabling an instant boost to blazing performance. RGB lighting is controlled by Gigabyte and ASRock motherboard software and works in sync with other RGB devices to create dazzling, ever-changing colorful effects controllable by users in a snap of fingers.

The new RGB PCIe SSD VPM800 series is another highlight of V-Color's offerings. VPM800 SSDs use Silicon

Motion's SM2263XT controllers and support PCIe 3.0 x4 interface and NVme 1.3 protocol. Take VPM800 480GB for example. It enables sequential read performance of up to 2,000MB/s and sequential write performance of up to 1,600MB/s. Maximum random reads and writes are rated at 250K IOPS and 200K IOPS respectively. VPM800 uses Toshiba's new 3D NAND flash chips to significantly boost storage density. On the outside, V-Color still incorporates color IC patent in its PCIe SSD, coupled with RGB lighting, to instantly transform the cold, hard feel of an SSD to an eye-catching RGB work of art in concert with the lighting effect of Prism RGB. The two make a new gaming package with compelling cost advantages that gamers simply cannot miss this year.

V-Color chairman Tomson Ho thinks RGB is iconic and trendy in the gaming market. This is why V-Color

is launching at full blast the Prism RGB series combining cool looks and powerful performance. "Prism RGB series uses metal heat sinks with optimal heat dissipation effects. Its weight also exceeds other products in the same category by more than 10g. V-Color aims to bring unrivaled experiences to gamers, no expense spared," said Ho with confidence.

With respect to the RGB synchronization issue gamers are concerned with, Ho indicated V-Color is working on a patented solution that combines software and hardware and synchronizes peripheral devices. The solution is scheduled for release by year-end 2018. Users can control RGB synchronization simply using a smartphone app without complicated BIOS settings.

Amid a market keen to get into overclocking, Ho holds a different view. "V-Color focuses on products that have a larger user base and strives

to build up market presence in this segment. V-Color enables gamers to overclock their systems by themselves for better cost-performance ratios, rather than telling them where the limits are right in the beginning," said Ho.

Ho commented, "iMS is now available with a simple push of the F4 key and the motherboard will automatically engage in memory error checking and correcting without the need for complicated BIOS operations. As such, motherboard makers no longer have to teach users how to do this. V-Color is working with Gigabyte and ASRock on iMS, which allows software and hardware to combine forces, demonstrating V-Color's outstanding R&D strength." To put it another way, V-Color looks to collaborate with system vendors and enhance service quality and efficiency to further boost system vendors' brand image.

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