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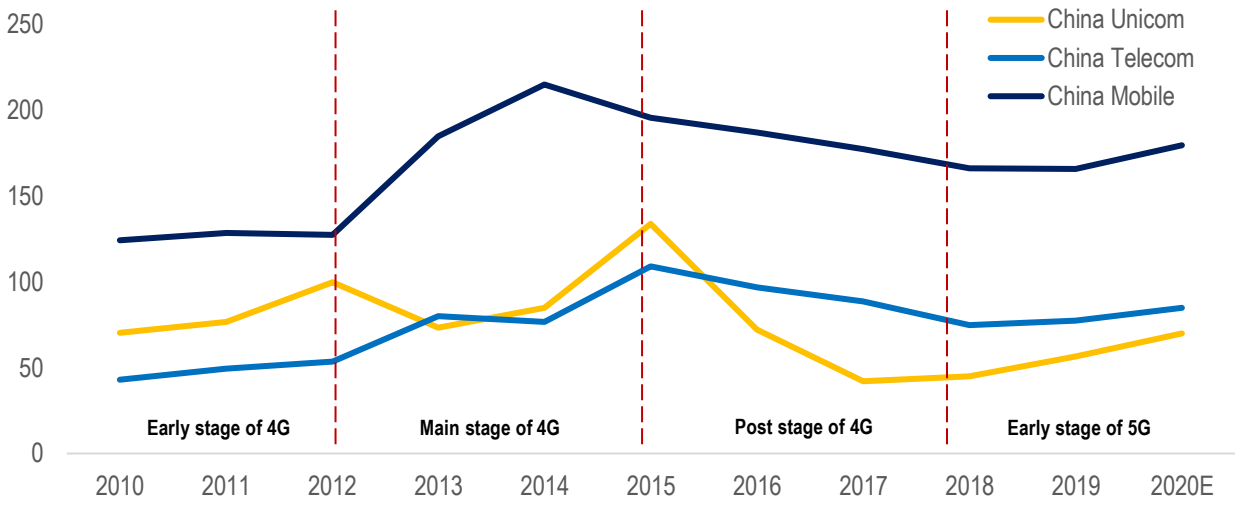
China telecom capex cycle – 5G-related investment is picking up

Figure 1:Total capex cycle of China Big3 telecom operators (RMB bn)



Source: Company data, AMTD Research

AMTD views: China Big3 telecom operators announced their FY19 results recently. The latest announcements indicated that Big3 has begun to accelerate a new round of investment to promote the 5G commercial deployment since their capex bottomed out from the post stage of 4G in 2016-2018. The total 5G-related investment of Big3 telecom operators in 2019 was RMB42bn, and it was expected to increase threefold to RMB180bn in 2020. On the other hand, ITU has defined three major application categories of 5G, namely Enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (mMTC), and Ultra-reliable and Low Latency Communications (URLLC). We believe among these three major applications, Enhanced Mobile Broadband, Massive Machine Type Communications will be firstly deployed by the telecom operators.

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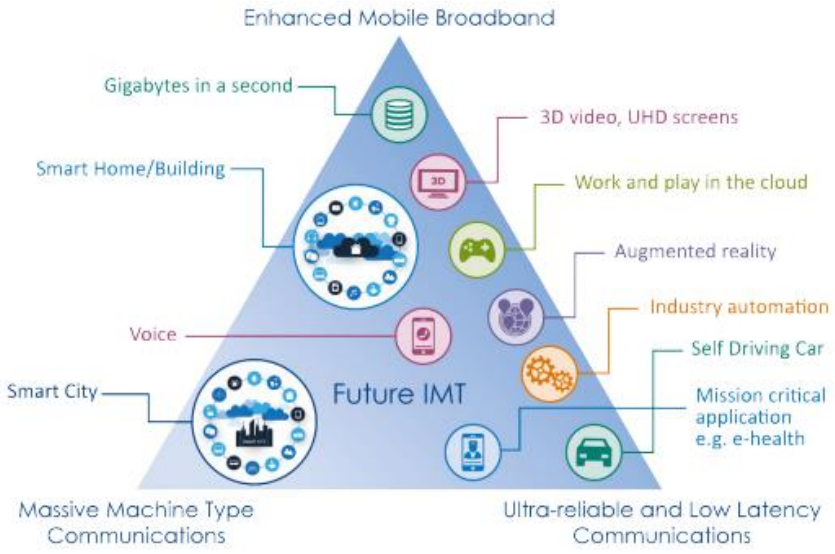
Three major application categories of 5G

Enhanced Mobile Broadband (eMBB) can be seen as the first phase of 5G rollout and is a natural evolution to existing 4G networks. eMBB promises 5G deliver in three key areas: 1) higher capacity: access to broadband (up to 1Gbps, 20x faster than 50Mbps of 4G LTE) will need to be available in both indoor and outdoor locations in densely populated areas; 2) enhanced connectivity: users must have consistent broadband connectivity everywhere; 3) higher user mobility: will enable mobile broadband services in moving vehicles including cars, buses, trains and planes. Major applications include 360-degree streaming video, AR/VR, etc.

Massive Machine Type Communications (mMTC) provides connections to large numbers of devices that intermittently transmit small amounts of traffic via internet. Under mMTC, 5G supports: 1) high density of devices (1mn devices in 1 sq. km); 2) deep coverage to reach challenging locations (coverage penetration of 164 dB with throughput of >160bps); 3) round-trip latencies of < 10s at the 164 dB MCL; 4) low power consumption with battery life of 10 years. Major applications include devices used in smart cities, smart logistics and smart utility meters.

Ultra-reliable and Low Latency Communications (URLLC) is a set of features that provide low latency and ultra-high reliability for mission critical applications such as industrial internet, smart grids, remote surgery and intelligent transportation systems. One of often mentioned application is autonomous driving. For comparative purpose, latency with 4G LTE is in the 4-millisecond range while URLLC target is 4-millisecond in Release 15.

Figure 2: 5G usage scenarios



Source: "Setting the Scene for 5G: Opportunities & Challenges" by ITU

The initial phase of 5G Non-Standalone (NSA) deployments focuses on eMBB, while mMTC has been already developed as part 3GPP Release 13/14 based on LTE-M and NB-IoT networks, which will be forwards-compatible with incoming 5G technologies. We believe new 5G NR will bring new capabilities to existing NB-IoT and LTE-M services as they fold into 5G networks. Release 16, often referred as "Phase 2" of 5G, sets out the template for NB-IoT and LTE-M to co-exist in 5G NR networks; on the other hand, it focuses more on URLLC to enhance the 5G NR support for URLLC services.

5G

Capex plan

China Big3 telecom operator 5G plan

With the 5G license officially launched, 2019 marked the first year of 5G era in China. Entering 2020, 5G investment accelerates. The total investment of Big3 telecom operators will reach RMB180bn and 5G services are expected to cover all the cities above prefecture-level across China by the end of this year. The whole 5G value chain, including upstream telecom equipment suppliers and downstream 5G devices manufacturers will benefit, in our view.

China Telecom – target to realize SA commercialization in Q4 2020

On 31 October 2019, China Telecom officially launched its 5G commercial services in 50 cities across China, and created a membership-based innovative service model of "5G + Privileges + Applications" for individuals and 5G service combining "5G + Gigabit Broadband + Smart Family Applications" for households. Meanwhile, China Telecom has now rolled out 5G services for smart cities based on SA architecture in Shenzhen, while also setting benchmarks in a number of demonstrative industries, including industrial Internet, smart energy, smart ports, telemedicine, and distance education. In addition, China Telecom was designated by GSMA to lead the global 5G SA industry chain to formulate and publish "5G SA Deployment Guidelines".

China Unicom – upgrade to SA with commercialization during 2020

On 9 September 2019, China Unicom entered into a cooperation agreement with China Telecom to jointly build one 5G access network across the country, creating a new model of centralised and rapid development of 5G by leveraging the advantages of "co-build and co-share". On the other hand, China Unicom collaborated with leading players in certain key industries to actively create typical 5G applications, accelerate the incubation of innovative 5G industry applications, promoting the prosperity of 5G ecosystem and generating energy for future growth.

China Mobile – forge ahead with "5G+" plan

China Mobile has been fully implementing our "5G+" plan since June 2019, when they were granted the 5G license. China Mobile launched 5G commercial services in 50 cities and assimilated emerging technologies such as AI, IoT (Internet of Things), cloud computing, big data and edge computing into 5G (5G+AICDE) and developed more than 200 critical capabilities. China Mobile aimed to develop "5G+Eco" with other industry players. In addition, China Mobile led 61 5G key projects on 5G international standards formulation, owns >2,000 5G patents, and promoted continuous advancement of SA international standards.

Figure 3: China Big3 telecom operator's total capex and 5G capex in 2019 and 2020 forecast

	Total		5G		5G %	
(RMB bn)	2019	2020E	2019	2020E	2019	2020E
China Unicom	56.4	70.0	7.9	35.0	*14.0%*	*50.0%*
China Telecom	77.6	85.0	9.3	45.3	*11.9%*	*53.3%*
China Mobile	165.9	179.8	24.0	100.0	*14.5%*	*55.6%*
Total	**299.9**	**334.8**	**41.2**	**180.3**	***13.7%***	***53.9%***

Source: Company data, AMTD Research

Figure 4: 5G operating data of China Big3 telecom operator

		No. of base stations ('000)	
	5G users (mn) as of 2019	under operation as of 2019	new additions 2020E
China Unicom	Not disclosed	43 + 23 (China Telecom)	*250
China Telecom	10.73	40 + 20 (China Unicom)	*250
China Mobile	15.39	> 50	250

Source: Company data, AMTD Research
*Note: China Unicom and China Telecom co-build and co-share 5G base stations

News update

29 Mar 2020

Cloud

Microsoft

Microsoft cloud demand surged by 775%, and Teams users exceeded 44M

Microsoft's cloud services have seen a 775% increase in demand in the past week in regions with shelter in place or social distancing orders. Microsoft Teams reported 44 million users as of 18 March, up from 32 million on 11 March as well, following a surge of remote working to combat the spread of the COVID-19 virus. (Source: Techweb)

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25 Mar 2020

5G

Nokia/Sprint

Nokia & Sprint augmented 5G network with software upgrade

Nokia collaborated with Sprint for the deployment of 5G network through a software upgrade on Nokia's much-acclaimed AirScale solution. The partnership is likely to aid businesses and customers with reliable network connectivity, especially at a time when majority of communication service providers (CSPs) migrate toward experience-driven and automated 5G network operations. Till date, the Overland Park, KS-based wireless communications company tapped Nokia for 5G launches in Los Angeles, Washington DC, Phoenix and New York. (Source: Yahoofinance)

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24 Mar 2020

Smartphone

Apple

Apple rolls out option to buy Mac and iOS apps as a package

Apple planned to allow developers to sell Mac and iOS apps as a single "Universal Purchase". Developers only need to change the bundle identifier on their Mac app to the same one as their iOS app, and the App Store will take care of the rest. However, there aren't yet any applications that support Universal Purchase between Mac and iOS. This is because Apple has not yet made the Xcode 11.4 GM available to developers. (Source: Yahoofinance)

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24 Mar 2020

TV

Xiaomi

Redmi Smart TV Max 98-inch announced, priced at RMB 19,999 ($2,825)

Xiaomi introduced the Redmi Smart TV Max 98-inch. The Redmi Smart TV Max 98-inch features a 4K display with 85 percent NTSC, wide colour gamut and 192 dynamic backlight zones. The Redmi Smart TV Max 98-inch is powered by a customised 12nm chip, and it features MEMC motion compensation for smoother animation. The television packs 4GB of RAM, and offers 64GB of storage. The Redmi Smart TV Max 98-inch is priced in China at RMB 19,999 ($2,825). The TV will launch on 9th April 2020. (Source: Cnbeta)

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24 Mar 2020

Semiconductor

Qualcomm

Samsung and Google Smartphones were the first to get GPU drivers update

Qualcomm has announced that several Snapdragon 855 phones will be first to get GPU driver updates. These phones are the Samsung Galaxy S10, Samsung Galaxy Note 10, and Google Pixel 4 series, with Qualcomm saying more devices will get the feature. The new optimizations can decrease GPU strain by as much as 40% while providing faster frame rates and improved battery life on supported devices. (Source: Andriodauthority)

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24 Mar 2020

Semiconductor

Intel

Intel suspended share buybacks on Coronavirus concerns

Intel said it would suspend its share buybacks and warned that the coronavirus pandemic could have a material impact on its business, even as its factories remain operational. The suspension of buybacks would not impact dividend payments, Intel said in a filing. Intel in October 2019 said it would repurchase $20 billion worth of shares over the next 15 to 18 months. The company bought back about $7.6 billion in shares in the fourth and the first quarter. (Source: Yahoofinance)

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23 Mar 2020

Smartphone

India

Major electronics companies in India announced suspension of operations

Due to the spread of COVID-19, Samsung suspended operation of its smartphone factory in Noida on March 23 and LG electronics will also suspend production of its factories in Noida and Pune until the end of the month. OPPO and vivo suspended operations at the Greater Noida until March 25.

From 2015 to 2019, mobile phone manufacturers such as Lenovo, Xiaomi, Huawei, Samsung, OPPO and vivo have set up production lines in India. Well-known mobile phone supply chain enterprises such as TCL, Holitech, OFILM and Sunny Optical also started production in India at a faster pace. At the same time, Foxconn, Wingtech, Flextronics, MCM and other ODM/OEM enterprises also set up factories in India. (Source: Economictimes)

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23 Mar 2020

Semiconductor

Nvidia

Nvidia launched DLSS 2.0 to sharpen and supercharge games

Nvidia officially launched DLSS 2.0. Powered by dedicated AI processors on GeForce RTX GPUs called Tensor Cores, DLSS 2.0 is a new and improved deep learning neural network that boosts frame rates while generating beautiful, crisp game images. It gives gamers the performance headroom to maximize ray tracing settings and increase output resolutions. (Source: Nvidia)

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19 Mar 2020

Smartphone

Xiaomi

Xiaomi's production line has been fully resumed recently

Xiaomi said that their production line has been fully resumed and production capacity is in full operation. More than 1,800 Xiaomi stores across China have resumed business, and stores will adopt high standards of in-store disinfection and temperature measurement measures. (Source: Sinafinance)

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18 Mar 2020

Internet

Tencent

Tencent announced FY19 results: cloud business maintained rapid growth

Tencent released its fourth-quarter and full-year results for 2019. In 2019, total revenue of Tencent was RMB 377.29 bn, up 21% yoy, and net profit (Non-IFRS) was RMB 94.35 bn, up 22% yoy. Cloud business continued to maintain rapid growth with annual revenue exceeding RMB 17 bn. In 2019, the cloud business of Tencent showed rapid growth: revenue from cloud business exceeded RMB 10 billion, the number of paying users exceeded 1 million, the total network server exceeded 1 million, and the peak bandwidth exceeded 100T. (Source: Tencent)

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18 Mar 2020

Display

BOE/GIS

BOE, GIS reportedly jointly developing touch modules for iPhone

BOE Technology reportedly has teamed up with touch panel maker General Interface Solution (GIS) to develop an out-cell touch module looking to grab orders from Apple for one of its 5G iPhone devices slated for launch in the second half of 2020. It is heard that BOE decided to invest in OLED module lines exclusively for Apple, and is planning to construct 10 new module lines at its B11 OLED plant located in Sichuan. (Source: Digitimes)

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17 Mar 2020

Module

Samsung

Samsung developing new 150MP Nonacell sensor for Q4 2020

Samsung might be developing a new 150-megapixel sensor for flagship phones. It claimed that the sensor had a footprint of around 1 inch and that it used the same Nonacell technology that was employed by the Galaxy S20 Ultra's ISOCELL Bright HM1 sensor. The rumor further suggested that Xiaomi would be the first third-party company to utilize the 150MP shooter in one of its flagship phones scheduled to be unveiled in Q4 2020. Other companies including Oppo and Vivo would supposedly employ the module in the first quarter of 2021. They would pair the sensor with the unannounced Qualcomm Snapdragon 875 chipset which would presumably beat at the heart of their premium models. (Source: Sammobile)

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16 Mar 2020

Device

Microsoft

Microsoft revealed details on the New Xbox

Microsoft recently revealed the hardware specifications and features for its upcoming Xbox Series X console, and perhaps the most notable item in the announcement was that the device would include an AMD graphics processing unit that used its latest Zen 2 and RDNA 2 architectures. Microsoft also announced that the Xbox Series X would make use of variable rate shading (allowing developers to more efficiently use AMD's GPU when rendering images) and hardware-accelerated DirectX Raytracing (which will enable better lighting and other effects). (Source: Xbox)

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