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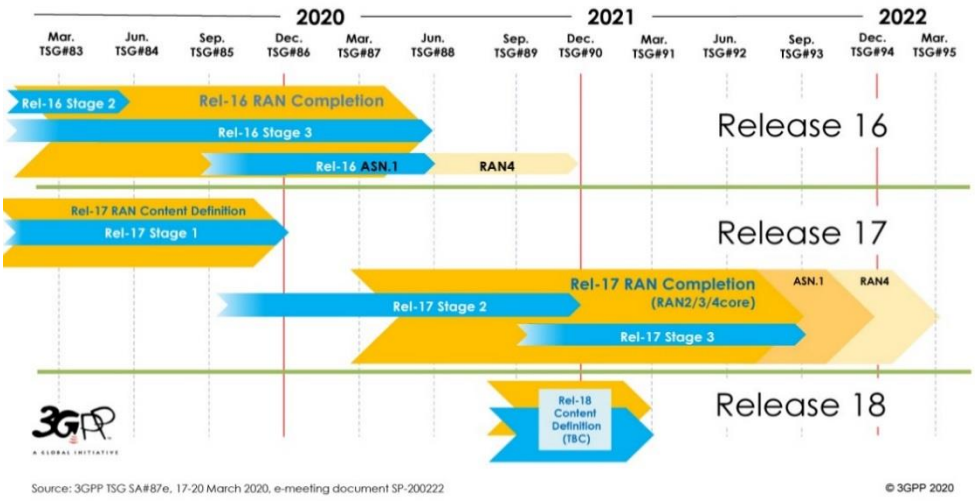
17 July 2020

5G standards – Release 16 (R16) frozen

Figure 1: the timeline of 5G standards



Source: 3GPP, AMTD Research

AMTD views: on July 3, 3GPP announced that Release 16 (R16) specification was frozen, marking the completion of the first evolution of "5G NR". R14 is known as the initial start of 5G standardization, and R15 is the first full set of 5G standards aiming to achieve "usable" specifications for 5G, in which Non-Stand-Alone (NSA) NR specifications and Stand-Alone (SA) NR specifications have been completed. Focusing on Stand-Alone (SA) 5G NR, R16 was targeted to achieve "easy to use" 5G networks. As we all know, ITU has defined three major application categories of 5G. R15 focused on delivering eMBB(enhanced Mobile Broadband); the recent R16 is expected to broaden the use cases to enhance URLLC(Ultra Reliable Low Latency Communications), and the upcoming R17 will support widely connected application scenarios, such as introducing "NR Light" to support industrial wireless sensor networks. In the light of the complexity and wide application of 5G, the standard-setting of 5G still has a long way to go, in our view.

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5G standards

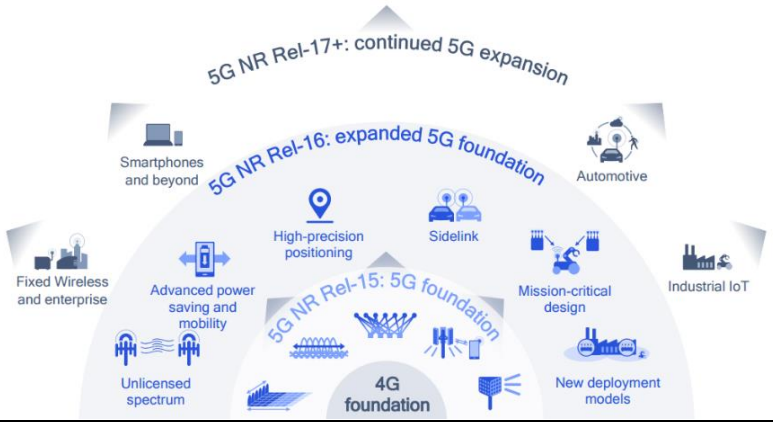
Release 16

Release 16 (R16) expected to broaden and enhance the use cases under URLLC

R16 enhances the 5G URLLC foundation and allows 5G to enter a new digital ecosystem, further supporting 5G commercial field progressively transfer from customer-facing(2C) to business-facing(2B). We believe R16 will benefit applications such as autonomous driving, industrial IoT, Internet of Vehicles, AR/VR. The main enhancements brought by R16 include:

- **Unlicensed spectrum (NR-U)**: specifications in R16 support for 5G NR operating in both license-assisted and standalone unlicensed spectrum, and allow devices to access up to 400 MHz and 100 MHz of unlicensed spectrum bandwidth in the downlink and uplink, respectively. The strengths of NR-U can make 5G private networks easy to deploy and can support demanding IIoT (industrial IoT).
- **Advanced power saving & mobility**: R16 introduces several power-saving features – wakeup signal (WUS), low power model groups, device-assisted power saving, for examples, to extend battery life. Besides, R16 reduces latency for setup and activation of carrier aggregation (CA)/dual connectivity (DC), therefore improving system mobility and capacity.
- **High-precision positioning**: R16 establishes the baseline for 5G-based positioning, and defines an array of both single- and multi-cell positioning techniques such as roundtrip (RTT), angle of arrival/departure (AoA/AoD), and time difference of arrival (TDOA). For now, these techniques help meet the initial 5G position requirements of 3-meter positioning indoors and 10-meter position outdoors up to 80% of the time.
- **Sidelink**: After R14 introduction of Celluar-Vehicle-to-Everything (C-V2X) sidelink (V2V, V2I, V2P) to support basic safety use case, R16 initiates a NR-based sidelink for new advanced safety use cases, which can enhance autonomous driving without using the cellular network. Sidelink is able to help increase safety and efficiency even in difficult situations like poor weather conditions or blind intersections.
- **Mission-critical design**: R16 launches coordinated multi-point (CoMP), which utilizes multi-TRP to introduce redundant communication paths with spatial diversity and avoid the interruption to achieve better link reliability (up to 99.9999% vs. 99.999% in R15). It's significantly important for mmWave bands, therefore allowing Mission Critical services to address a wider business sector, such as new industry 4.0.
- **New deployment model**: R16 supports private networks ("non-public networks" or NPN), which leverages dedicated resources (e.g. small cell base stations) that are independently managed, to allow sensitive data to stay on-premise, protect data security and deliver optimizations for local applications. That benefits a wide range of new 5G deployment such as Industrial IoT and enterprise.

Figure 2: 5G NR evolution



Source: Qualcomm, AMTD Research

News update

8 July 2020

AIoT

Alibaba

Alibaba to build AIoT innovation center

AliCloud IoT and Tmall Genie jointly announced plans to establish an AIoT innovation center, which will integrate Alibaba's technical abilities to fully enable the AIoT industry. The innovation center will have three innovation labs and one quality control center; meanwhile, it will launch city and industry experimental base planning. It is said that Hangzhou will become the first demonstration pilot city. (Source: ChinaTech)

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8 July 2020

Semiconductor

Qualcomm/Huawei

Qualcomm to obtain 41% share in high-end segment due to HiSilicon's loss

The smartphone application processor market has been dominated by Qualcomm, and the lead will increase due to the sanctions on Huawei (HiSilicon), which restrict the Chinese company from using TSMC's advanced 7nm and 5nm process technology for future chipset manufacturing. Therefore, Qualcomm is expected to obtain 41% share of the high-end market in 2020. However, MediaTek and Unisoc will be the gainers in the mid-segment smartphone market as Huawei looks for other sources to get chipset supplies. (Source: Counterpoint)

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7 July 2020

IoT

Synaptics/Broadcom

Synaptics acquired Broadcom's wireless IoT connectivity business

Synaptics announced the signing of definitive agreements under which Synaptics would acquire certain assets and manufacturing rights associated with the wireless IoT business of Broadcom for approximately US$250 million in an all-cash transaction. Under the terms of the agreements, Synaptics would acquire certain rights to Broadcom's existing Wi-Fi, Bluetooth and GPS/GNSS products and business in the IoT market. The transaction is expected to close in 1QFY21. (Source: Synaptics)

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7 July 2020

Cloud

Nvidia/Google

Nvidia teamed with Google on new cloud computing services

Nvidia and Google announced that the Google Cloud Platform (GCP) was launching a series of cloud computing instances -- known as the A2 VM family -- that's powered by Nvidia's new A100 GPU. Google said that the A100 will soon support its Kubernetes Engine service for deploying clusters of apps running within containers, and its Cloud AI Platform, which helps developers build, run and manage AI/machine learning models. (Source: TheStreet)

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7 July 2020

Smartphone

Apple

Apple to opt for OLED screens for entire 5G iPhone range

Apple plans to introduce four 5G iPhones with three different screen sizes -- 5.4-inch, 6.1-inch and 6.7-inch -- all of which will use the OLED technology. The technology not only is more power-efficient, but also produces sharper contrast and deeper blacks than liquid-crystal displays. That surely sparks new competition among suppliers of smartphone panels. (Source: Nikkei)

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7 July 2020

Display

LG Display

LG Display has delayed the start of its 10.5 Gen OLED plant in Paju

LG Display delayed the start of its 10.5 Gen (3370 x 2940mm) OLED plant indefinitely in Paju, South Korea. The original plan was to launch production in 2022-2023 with a production rate of 30,000 substrates per month. This would have been increased to 45,000 substrates per month in the first half of 2023. But it has now been delayed to the 2025-2026. It is also said to be delayed with an indefinite time. (Source: Displayspecification)

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7 July 2020

Cloud

Hyperscale Data Center count reached 541 in 2Q20, another 176 in the pipeline

According to Synergy Research, the total number of large data centers operated by hyperscale providers increased to 541 at the end of the second quarter, more than double the mid-2015 count. The EMEA and Asia-Pac regions continued to have the highest growth rates, though the US still accounts for almost 40% of the major cloud and internet data center sites. They have visibility of a further 176 data centers that are at various stages of planning or building. (Source: Syngrey Research)

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3 July 2020

Cloud

Alibaba

AliCloud to expand data center in Indonesia and enter Philippines market

AliCloud announced plans to enhance its layout in Southeast Asia and the company plans to expand its data center in Indonesia, establish an ecological alliance in Philippines and accelerate its entry into the Philippine market. Over the past year, AliCloud's market share in Asia Pacific increased from 26% to 28.2%, which was close to the combined market share of Amazon and Microsoft. So far, AliCloud has deployed over 100 cloud data centers in 21 regions around the world. (Source: ChinaTech)

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3 July 2020

Smartphone

CIS

Smartphone CIS sensors to top 5bn units in 2020

According to Counterpoint Research, each smartphone shipped in 1Q20 packed more than 3.5 image sensors on average. The growth is primarily driven by the rising penetration of quad-camera designs in the high-/mid-end smartphones, which jumped to nearly 20% during the period. The sales volume of CMOS image sensors (CIS) for smartphone applications increased eightfold over the past decade, reaching more than 4.5 billion units in 2019, and the shipment is expected to reach 5bn in 2020. (Source: Counterpoint)

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3 July 2020

Cloud

Tencent

Tencent unveiled mega data center capable of housing 1 million servers

Tencent announced the start of services at its largest data center cluster in Qingyuan, Guangdong province, which has the capacity to house more than one million servers. Tencent said that this is the largest new infrastructure project to date in the entire South China region and uses Tencent's fourth-generation T-block technology. In addition, the data center also uses Tencent's first self-developed Star Lake servers. (Source: Shenzhen Daily)

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3 July 2020

Smartphone

Apple

Apple is still working on under-display optical Touch ID reader

Apple is continuing development of optical under-display fingerprint reading technology, possibly for a future iPhone. The U.S. Patent and Trademark Office published two Apple patent applications related to the technology. The first, "Through-Display Optical Transmission, Reception, or Sensing Through Micro-Optic Elements," is to capture a two-dimensional (2D) or three-dimensional (3D) image of an object or user, such as fingerprints. The second patent, "Optical-Fingerprint Detection System," details a method of temperature compensation in an optical fingerprint detection system. (Source: Appleinsider)

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2 July 2020

Semiconductor

Samsung/TSMC

Samsung reportedly to skip 4nm foundry process and jump directly to 3nm

Samsung Electronics has revised its foundry process roadmap, skipping 4nm and jumping directly to 3nm GAAFET from 5nm. TSMC, however, has already started its research and development of 3nm, earlier than the expectation. (Source: Digitimes)

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2 July 2020

Devices

Xiaomi

Xiaomi announced the top-notch MI TV LUX 65'' OLED, priced at RMB12,999

Xiaomi officially debuted its first-ever premium TV model - Mi TV Lux 65-inch OLED - in Mainland China. It boasts a 65-inch OLED display, accurate colors, AI Master Smart Engine, and Dolby Vision support. Priced at RMB 12,999, Mi TV Lux 65-inch OLED was available starting from July 3rd. (Source: Xiaomi)

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1 July 2020

Smartphone

Xiaomi

Redmi's Dimensity 1000+ SoC-powered phone to feature a 120Hz OLED display

Redmi was reported to launch its first smartphone powered by the Dimensity 1000+ chipset soon. Redmi's handset packing the Dimensity 1000+ chipset is expected to come with a 120Hz refresh rate. For reference, the upcoming phone will feature a pop-up selfie camera. The upcoming device could be launched in July as Redmi K40. (Source: Ofweek)

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30 June 2020

AR

Google

Google acquired AR glasses company North

Google confirmed that it has acquired Canadian smart glasses company North, which began as human interface hardware startup Thalmic Labs in 2012. According to the Globe and Mail, which first reported Google's interest, the transaction value is at around US$180 million. (Source: Google)

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30 June 2020

Wearables

Qualcomm

Qualcomm announced Snapdragon Wear 4100 platform

Qualcomm unveiled the new Snapdragon Wear 4100 platforms, Snapdragon Wear 4100+ and Snapdragon Wear 4100, designed for next-generation connected smartwatches and based on their ultra-low power hybrid architecture. The Snapdragon Wear 4100+ platform included a super-fast System-on-Chip (SoC), a smarter Always On (AON) co-processor, and substantial improvements in platform power based on 12nm process technology compared to their previous platform. (Source: Qualcomm)

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30 June 2020

5G

Nokia/Taiwan Mobile

Nokia won exclusive Taiwan Mobile 5G contract worth US$450 mn

Nokia won a major 5G contract with Taiwan Mobile (TWM) worth approximately US$450mn. Nokia will be supplying the Taiwanese operator with 5G RAN, 5G Core, and 5G IMS solutions in the next three years. This three-year framework contract involves deployment of 5G non-standalone, with the aim to migrate to 5G standalone infrastructure by the end of the contract. It will also provide digital design and deployment services to the operator. (Source: Nokia)

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30 June 2020

Cloud

Amazon

AWS established new aerospace cloud unit - Aerospace and Satellite Solutions

Amazon's AWS announced it was establishing a new space unit called Aerospace and Satellite Solutions, led by former U.S. Air Force Maj. Gen. Clint Crosier — who most recently directed the establishment of the U.S. Space Force. Amazon has steadily grown its influence in the space industry in recent years, with a satellite connection service called AWS Ground Station and a satellite internet venture called Project Kuiper. (Source: Amazon)

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29 June 2020

Semiconductor

TSMC/MediaTek

MediaTek to replace Huawei's orders of 5nm chips from TSMC

MediaTek has approached TSMC in three waves, since the demand for 5G wafer is high at the moment. Currently, more than 20,000 wafers per month have been added. By the first two waves of orders, MediaTek focused on the 7nm and 12nm processes. The third wave brings a 5nm process to its next mid to high end 5G mobile chipsets. (Source: GizmoChina)

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29 June 2020

VR

Facebook

Facebook developed holographic optics for thin and lightweight virtual reality

Facebook Reality Labs (FRL) has published "Holographic Optics for Thin and Lightweight Virtual Reality", its latest research into making VR headsets less cumbersome and more suitable for everyday use. Using only thin, flat films as optical components, it demonstrated VR displays with thicknesses of less than 9 mm, fields of view of over 90° horizontally, and form factors approaching sunglasses. (Source: Facebook)

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26 June 2020

Autonomous driving

Amazon

Amazon to acquire autonomous driving startup Zoox in US$1.2bn

Amazon announced that it will acquire Zoox, a self-driving startup founded in 2014 that has raised nearly US$1 billion in funding and which aims to develop autonomous driving technology, including vehicles, for the purposes of providing a full-stack solution for ride-hailing. The deal is roughly worth US$1.2 billion, and Zoox will continue to exist as a standalone business. (Source: Techcrunch)

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26 June 2020

Cloud

Microsoft

Microsoft to permanently close all of its retail stores

Microsoft announced plans to concentrate on digital retail moving forward and permanently close all Microsoft Store locations in the United States and around the world, except for four locations that will be "reimagined" as experience centers that no longer sell products. Those four locations are New York City (Fifth Ave), London (Oxford Circus), Sydney (Westfield Sydney), and the Redmond campus location. (Source: Cnbc)

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25 June 2020

Semiconductor

Qualcomm/Huawei

Global cellular baseband processor market to reach US$5.2 bn in 1Q20

The global cellular baseband processor market grew 9% YoY to reach US$5.2 billion in 1Q20, according to Strategy Analytics. In 1Q20, Qualcomm maintained its baseband market share leadership with 42 percent revenue share, with its second-generation 5G products including the X55 slim modem and Snapdragon 765/G 5G SoCs, followed by HiSilicon with 20 percent and MediaTek with 14 percent. Intel and Samsung ranked No.4 and No.5 in 1Q20, respectively. (Source: Strategy Analytics)

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24 June 2020

Semiconductor

TSMC/Apple

TSMC invested 300 R&D teams to assist Apple in developing Mac chips

TSMC has invested in 300 R&D teams to help Apple develop the new Mac chips. At the WWDC 2020, Apple announced plans to switch from Intel chips to ARM chips for the Macs. In addition, Apple's self-developed Mac chips will be exclusively manufactured by TSMC. (Source: GizChina)

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