



MWC19

Key Takeaways

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MWC19: 5G and Cellular IoT Go Mainstream (1 of 2)

5G expected to become commercial reality in '19 while NB-IoT gains significant traction

- The smartphone market roars back to life with numerous 5G handsets and foldable flagships

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Commercial Reality in 2019

- Commercial 5G networks being rolled out across 5 continents in 2019, led by eMBB (Enhanced Mobile Broadband) services
 - *China focusing on Sub-6 GHz (2.6 and 4.9 GHz) while other regions incorporating mmWave as well*
 - *20+ operators in 16 major markets rolling out 5G networks and 20+ OEMs have announced devices*
 - *In year 1 of 4G LTE rollout, only 4 operators launched networks with devices from 3 OEMs*
- Industry continues to make progress in defining 5G business models, but no longer in search of a killer-app
 - *Early focus is on eMBB, but also evolving to a wide variety of capabilities that 5G supports*
- In the 5G technology wars, both Qualcomm and Huawei touted success
 - *Qualcomm: Snapdragon X50 5G modem family & 855 mobile platform have 30 design wins to-date; Industry's first mobile platform with integrated 5G (SoC) announced, commercial availability in 1H'20*
 - *Huawei: Balong 5000 chipset claims 6.5 Gbps peak speed; 40K 5G base stations shipped and 30 contracts globally (18 Europe, 9 Middle-East and 3 Asia-Pac)*
- Multiple OEMs launched 5G phones, indoor CPEs, smart hubs etc.
 - *Samsung Galaxy S10, Huawei Mate X, LG V50 ThinQ, Xiaomi Mi Mix 3, and ZTE Axon 10 were among the flagship 5G devices showcased*

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IoT Goes Global

- Continued efforts to evangelize for and acceleration of 3GPP standards based IoT network rollout
 - *94 commercial launches across 50 markets by YE 2018 (25 LTE-M and 69 NB-IoT networks)*
 - *Automotive currently #1 use case globally, smart devices and smart homes are other volume drivers*
- Unlicensed LPWA networks (e.g. LoRa, Sigfox) continue to address targeted use cases on a regional basis but start to cede share to licensed cellular based networks with global use cases
- LTE-M (>1 Mbps) and NB-IoT (<1 Mbps) positioned as complementary with over-the-air (OTA) upgrades for firmware and software enabling broad use cases on a global basis
- Huawei among leading end-to-end NB-IoT vendors globally aided by smart city push in China
 - *500+ smart city projects and 100M chipset shipments expected in 2019*
 - *Multiple commercial rollouts across sectors and use cases (e.g. 2M smart water metering, 1.5M smart gas metering, 3M electric bikes, 1M connected white goods, 2M connected smoke detectors etc.)*
- Key issues for broader adoption remain security, availability of required expertise and interoperability
 - *Multi-mode devices with NB-IoT and LTE-M expected to address global roaming and interoperability*

MWC19: 5G and Cellular IoT Go Mainstream (2 of 2)

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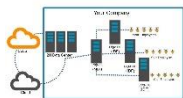
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Foldable Phones Breathe Life Into Category – Maybe!

- Huawei's Mate X was the highest price smartphone launched at the show at €2,299!
 - *It's the return of the phablet with a 6.6 inch screen when folded and 8 inches when open*
 - *With 5G functionality and potential battery drain issues, Mate X has a huge 4,500 mAh battery*
 - *Includes Huawei's own Balong 5000 5G chipset*
- Samsung beat Huawei to the punch by unveiling the Galaxy Fold at the Galaxy Unpacked event on Feb 20
 - *It has a slightly smaller form factor with a 7.3 inch screen when unfolded*
 - *Focused on multi-tasking with capability to have 3 active apps on screen at one time*
 - *However, it also has a huge battery, actually 2 combined at 4,380 mAh and sports an equally extortionary price of \$1,980*
- Beyond foldable phones, OEMs competed on packing as many cameras as they could on both the front and back of their phones
 - *Galaxy S10 has 5 cameras (3 on back, 2 upfront), Nokia 9 PureView has 6 (5 on back and 1 upfront)!*
- Given the pricing trends, foldable phones are unlikely to become mainstream until ~2021 and we also expect the cottage industry around refurbishing phones to become more industrialized and professionalized

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Edge Goes Viral

- In a bid to better compete with cloud players, telcos and others in the value chain are hyping up the need for an opportunity with edge data centers
- As with any effort to create a de-centralized and distributed architecture, multiple participants in the value chain across industries need to coordinate actions to drive traction, slowing down adoption
- Barring yet to be envisioned use cases that may require <1 millisecond latency, data centers in the vicinity of most metro areas ought to be able to satisfy latency requirements of many 5G enabled use cases
 - *Single mode fiber drives 0.5 millisecond latency for a 100 km fiber link*
- While there are many benefits to having compute and storage close to point of generation/ consumption, latency alone is not likely to drive the widespread rollout of edge data centers in the near-term

MWC19: Other News of Note & Cool Concepts

While foldable phones grabbed most of the attention, there were several other game changing concepts and devices launched in Barcelona

Microsoft HoloLens 2

Augmented Reality Headset:
\$3,500 – available 2H19



Nubia Alpha Smartcuff

Wearable 4" phone



Nokia PureView 9

5 rear cameras with
Carl Zeiss optics: \$699



HTC 5G Hub

Connects up to 20 devices



1 TB SanDisk Extreme MicroSD

World's fastest flash memory:
\$450 – available Apr 19



In-screen Fingerprint Sensor

Samsung, Vivo and other
OEMs



GenCell A5

Off-grid power solution:
Hydrogen Fuel Cell



Aira Horizon Smart Glasses

On-demand agent for
visually impaired



Photo Credit: MWC19, OEM Websites