Work Together for 5G

WANG Zhiqin
June.2017
Mobile Broadband Market in China is Booming

- By the end of April 2017, 4G users in China had reached 849 million.

- The market share of Chinese users in the global 4G market rose to 41%.

Source: GSMA, MIIT
The Growth of Mobile Data Traffic Reaches a New Level

- Mobile data traffic CAGR reached 92% in China from 2013 to 2016.
- The year-on-year growth rate was up to 124% in 2016. The growth rate will keep the speed in 2017.

- By the end of April 2017, DOU reached 1.34GB, over two times than the same period of last year in China.

Source: Cisco, MIIT
2017，The First Year of NB-IoT to Launch

Government
• June 2017, MIIT issued a notice to promote mobile Internet (NB-IoT) construction, The goal of the NB-IoT in 2020 is to achieve national coverage.
• Chinese local governments actively promote the construction of the IoT

<table>
<thead>
<tr>
<th>Year</th>
<th>NB-IoT Base Station (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>400</td>
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<tr>
<td>2020</td>
<td>1500</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>M2M connections (million)</th>
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<tbody>
<tr>
<td>2017</td>
<td>20</td>
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<td>2020</td>
<td>600</td>
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</table>

Operators
• On May 17, China Telecom announced will Complete the upgrade of 310,000 base stations in June.
• China Mobile has launched NB-IoT field test in four cities in Shanghai, Guangzhou, Hangzhou and Fuzhou.
• China Unicom has been opened the NB-IoT pilot in Shanghai, Beijing, Guangzhou, Shenzhen and other 10 cities. Shanghai Unicom has the largest provincial NB-IoT commercial network in China.
5G Economic and Social Impact in China

**Y2030**

- **Direct Economic Output**: 6.3 trillion
- **Indirect Economic Output**: 10.6 trillion
- **Employment opportunities**: 8 million

**5G Economic Output in China**

*Source: White paper on 5G Economic and Social Impact, CAICT, 2017.6*
IMT-2020 (5G) PG Structure Update

Expert Committee

Secretariat

Require. WG  Spectru m WG  Wireless Tech. WG  Network Tech. WG  ITU WG  3GPP WG  IEEE WG  IPR WG  Inter. Coop. WG

New WG

5G Trial WG  C-V2X WG

http://www.caict.ac.cn/
Responsibilities of the New WGs

**C-V2X WG**

- Study cellular V2X solutions
- Accelerate C-V2X R&D via trials
- Promote C-V2X industrialization and application

**5G Trial WG**

- Organize 5G Technology R&D Trials, including define test specifications, carry out test tasks, analyzing and summarizing test results

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2015

![Step 1: Key tech trial](image1)

2016

![Step 2: Tech scheme trial](image2)

2017

![Step 3: System trial](image3)

2018

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2017

- LTE-V product trial
- V2X Application verification
- Demonstration verification

2018

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C-V2X WG : Main Tasks

- Test the function, performance, interconnection and interoperation of LTE-V2X under lab, in-loop simulation and testing field.

- Research on the traffic modeling between C-V2X terminal and network, and the networking and implementation according to PC5, LTE-Uu interfaces.

- Research on the strategy for LTE-V2X evolution and 5G-V2X, expedite the technical scheme design and standalization of IMT-2020.

- Research on the new business model for C-V2X development.

Network → Data → Ecosystem
5G plans to commercialize in 2020

- **eMBB**: Higher Speed
  - 2017: 3D MIMO...
  - 2020: Evolution

- **IoT**: More connection
  - 2017: NB-IoT / eMTC
  - 2021: 5G NR

- **V2X**: Low latency and High reliability
  - 2017: LTE V2X
  - 2022: NR V2X

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IMT-2020 PG → National Major Project → 5G trial → 5G commercialization
**5G Spectrum vs. Scenarios**

<table>
<thead>
<tr>
<th>Test environment and suitable band</th>
<th>eMBB</th>
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</thead>
<tbody>
<tr>
<td>Indoor hotspot</td>
<td>LF and/or HF</td>
<td>LF and/or HF</td>
<td>LF</td>
<td>LF</td>
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<tr>
<td>Dense urban</td>
<td>LF and/or HF</td>
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<td>Rural coverage</td>
<td>LF</td>
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<td>LF</td>
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<td>High speed</td>
<td>LF</td>
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- **M-MTC**: Urban coverage
- **URLLC**: Urban coverage

- LF (below 6GHz) could cover all the test environments.
- HF (above 6GHz) only covers indoor hotspot and dense urban test environments.
Global C-Band Status

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<tr>
<th>(GHz)</th>
<th>3.3</th>
<th>3.4</th>
<th>3.5</th>
<th>3.6</th>
<th>3.7</th>
<th>3.8</th>
<th>3.9</th>
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<td>3.3-3.4GHz:</td>
<td>3.4-3.6GHz:</td>
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<td></td>
<td></td>
<td>4.4-4.5GHz &amp; 4.8-5GHz:</td>
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<td>Global spectrum</td>
<td>Global aligned spectrum</td>
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<td>Regional spectrum</td>
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Available to MBB

Being considered by regulators

Potential for MBB
High frequency bands are complementary 5G spectrum, focus on capacity boosting & self-backhaul.

High priority for 20~40GHz for outdoor deployment.

26GHz and 40GHz are the key compatibility studying bands in IMT-2020(5G) Promotion Group.
Compatibility Studies@26GHz & 40GHz

- Several compatibility studies are carrying out in IMT-2020 (5G) Promotion Group based on the inputs from contributing WPs of WRC-19 Agenda Item 1.13.
  - IMT vs. Inter-Satellite Service (ISS), Earth Exploration-Satellite Service (EESS) and Fix Satellite Service (FSS) @26GHz band
  - IMT vs. FSS @40GHz band
About CAICT and Cooperation with GSMA

- CAICT is a professional think-tank for the government and an innovation & development platform for the industry.

Cooperation between CAICT and GSMA

✓ Joint report last year:
  - Mobile operators: the digital transformation opportunity

✓ Joint report this year:
  - 5G in China: outlook and regional comparisons

GSMA Intelligence

ANALYSIS
Mobile operators: the digital transformation opportunity
June 2016

5G in China:
Outlook and regional comparisons
CAICT and GSMA Joint Report—5G in China

- the outlook for 5G in China,
- potential use cases in the consumer and enterprise segments,
- making comparisons with other leading markets,
- presenting forecasts and key future challenges

Highlight

Use case

- Consumer: early deployments on eMBB
- Enterprise: the largest incremental opportunity

Deployment

- Different approaches (Standalone vs Non-standalone) to be adopted by different operators

Outlook

- New business models and near-term revenue outlook

Figure:

Forecast

- From launch in 2020, we forecast that Chinese 5G connections will scale rapidly over time, to reach 428 million by 2025.
- The further growth will be determined by incremental network rollout and the price of 5G devices

Figure: China – forecast for 5G connections

http://www.caict.ac.cn/