



Mobile360
Digital Societies

APAC IoT INNOVATION SUMMIT

Kuala Lumpur 24-26 Sept 2019



#MOBILE360

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Kuala Lumpur 24-26 Sept 2019

Session 6: IoT in the 5G Era

Kuala Lumpur 24-26 Sept 2019



Alvin Poo
Regional Sales Director
South-East Asia
Quectel

Session 6:
**Cellular V2X, Connected Skies,
Medical Surgery & Fixed Wireless
Access**

Quectel 5G Innovations Reshape a Smarter Future

Quectel Wireless Solution Co. Ltd

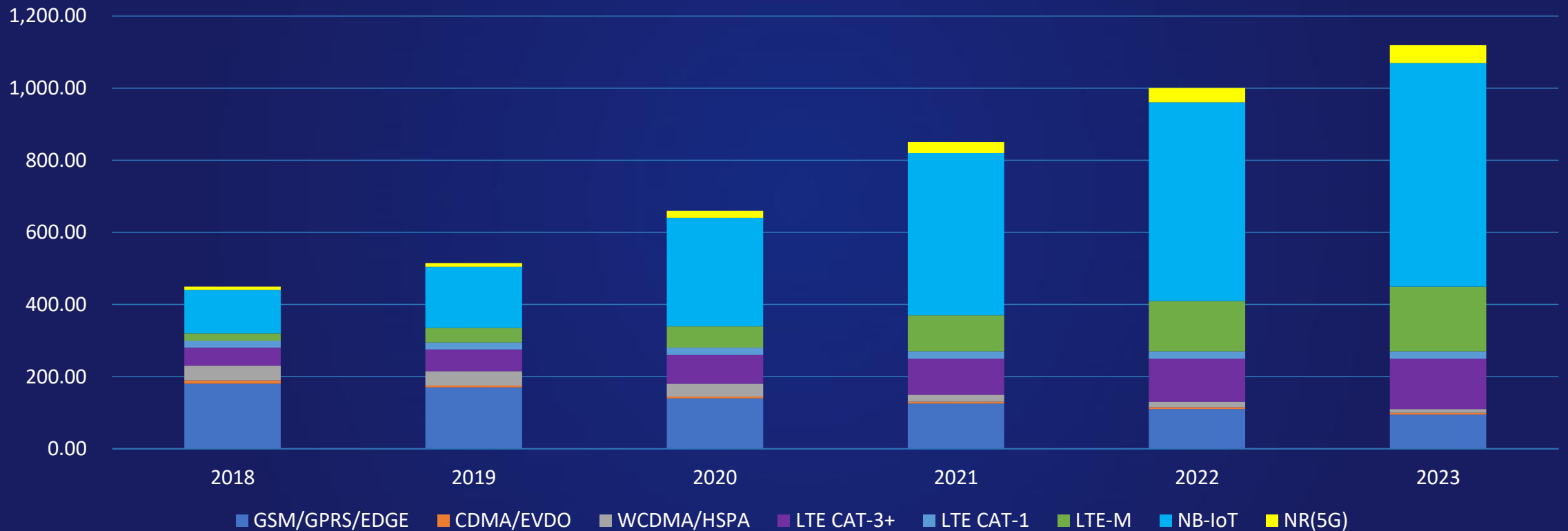
Alvin Poo Regional Sales Director



Global Cellular IoT Connections Keep Growing



By 2020, global shipment of cellular IoT devices will **exceed 600 million units.**

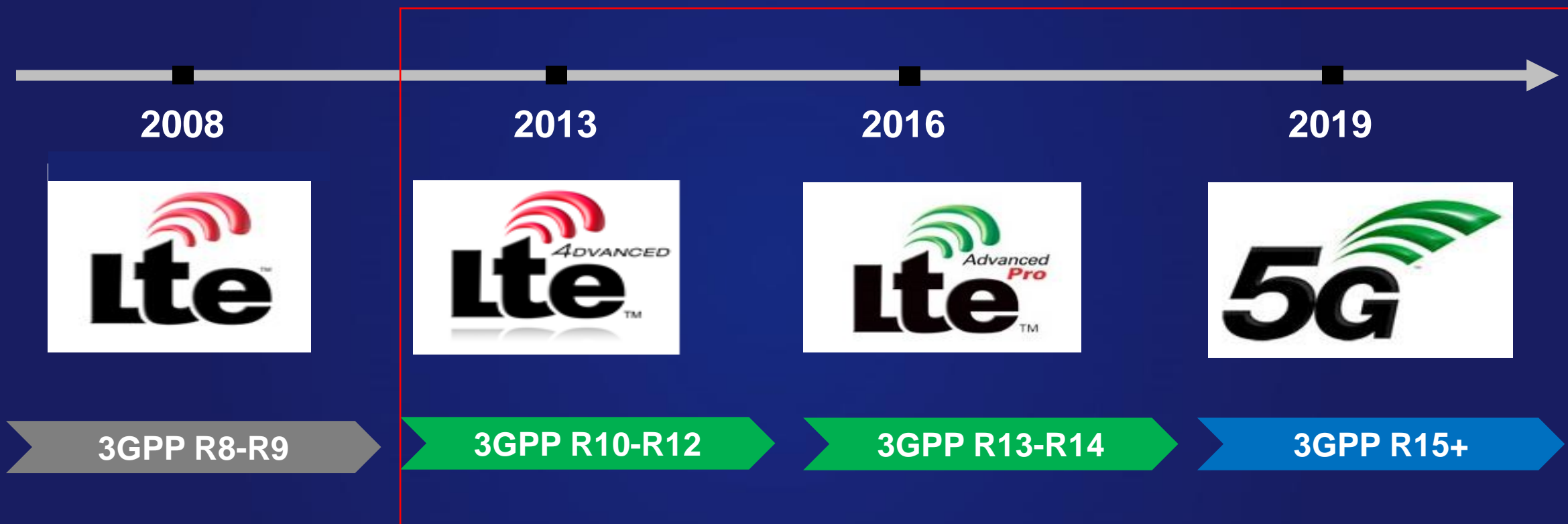


TSR: Global cellular IoT device shipment forecast, by technology (2018-2023)

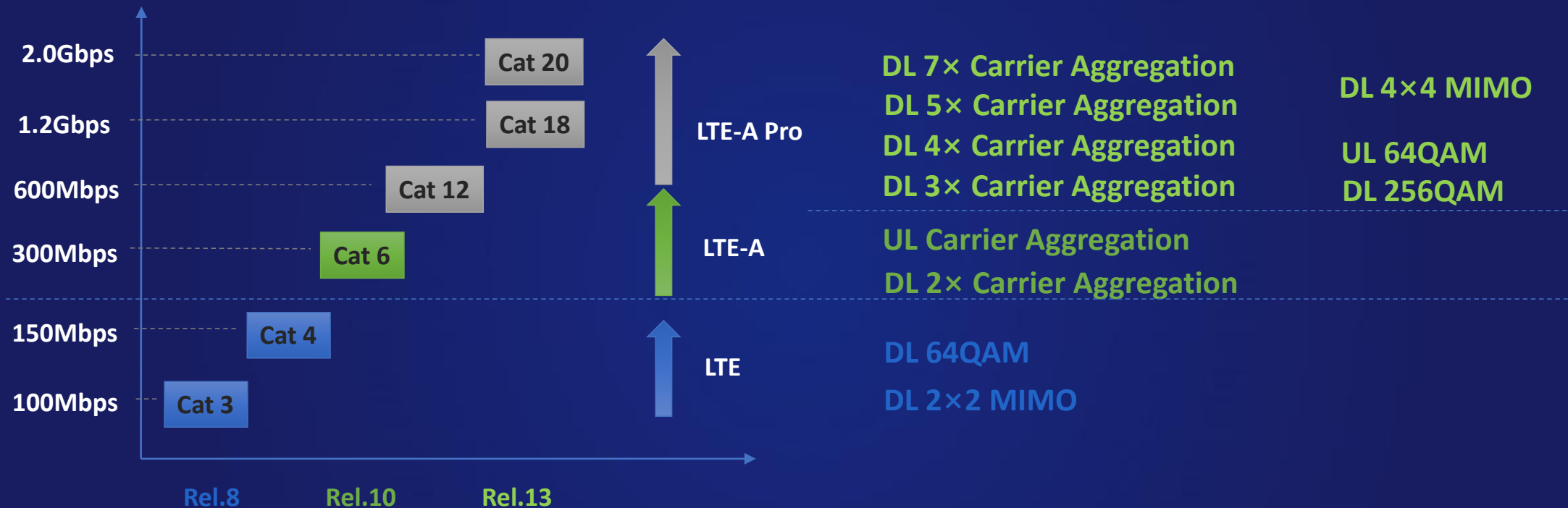
Contents

- 1. 5G Network Introduction**
- 2. 5G Product Line**
- 3. 5G Use Cases**

Cellular Networks Keep Evolving



Key Technologies



Aggregate More Spectrums

Multi-antenna Technology

Higher Order Modulation

5G – Taking Mobile Experience to the Next Level **QUECTEL**[®]

Mobile media and entertainment



Connected to cloud computing

Rich user-generated content



Fiber-like data rate

Immersive experience

5G

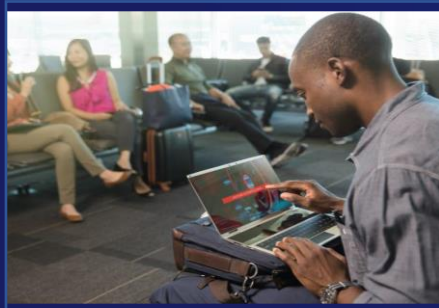
Crowded environment



Internet of Vehicles

More consistent performance
AR

High-speed mobile scenario



Low latency, real-time interactive



Mass data



5G - Key Benefits



Latency: 10-100ms

Data traffic: 7.2Eb/month

Peak data rate: 1Gb/s

Available spectrums: 3G

100,000 connections/Km²



4G → 5G

Latency: 1-10ms

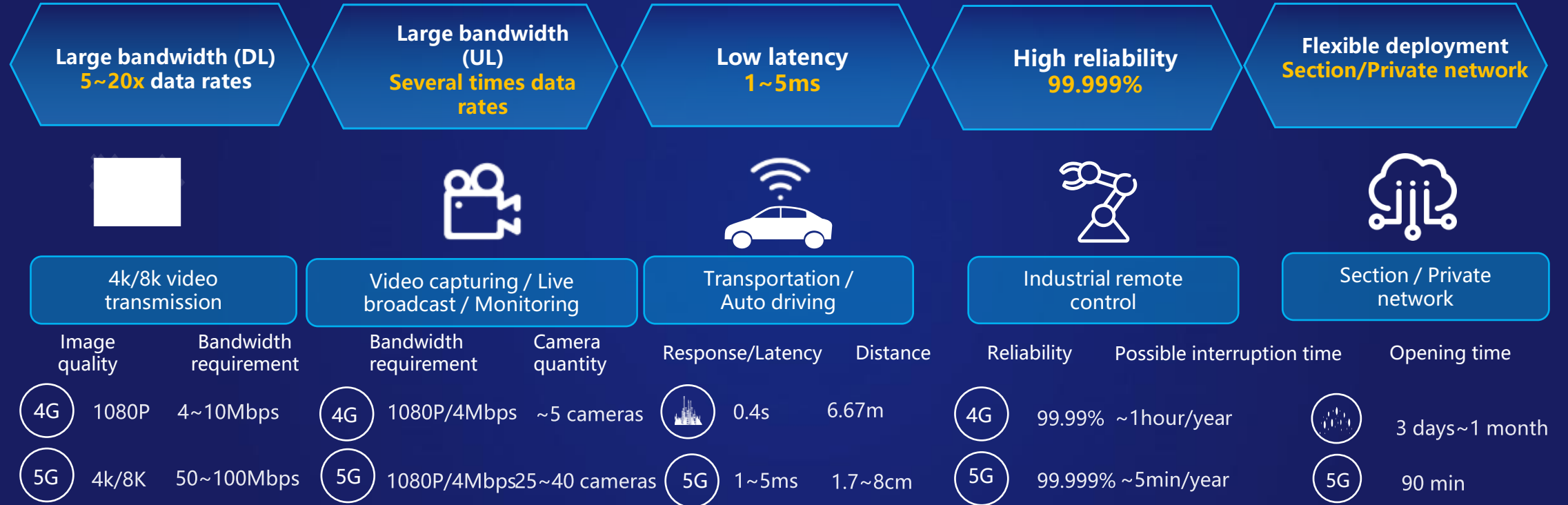
Data traffic: 50Eb/month (2021)

Peak data rate: 20Gb/s

Available spectrums: 30GHz

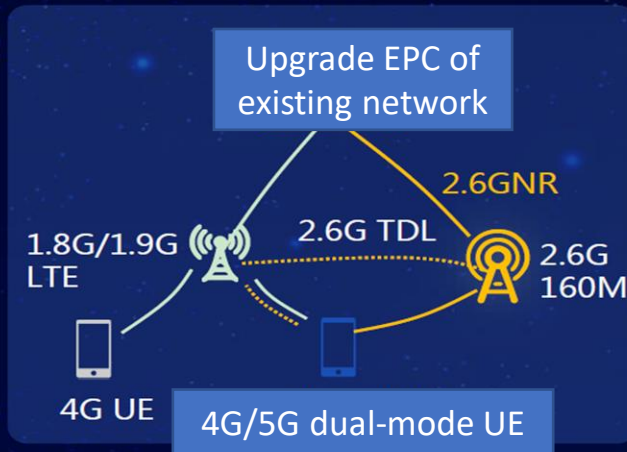
1 million connections/Km²

5G – Improved Communication Capability Enables Various Industries



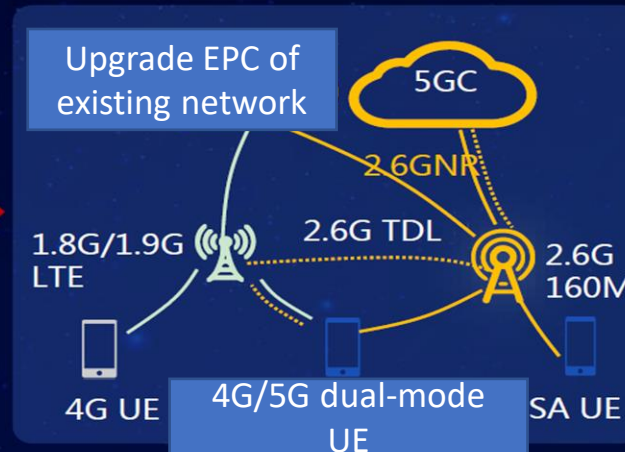
5G - Network evolution

5G NSA network was built up quickly before May 17



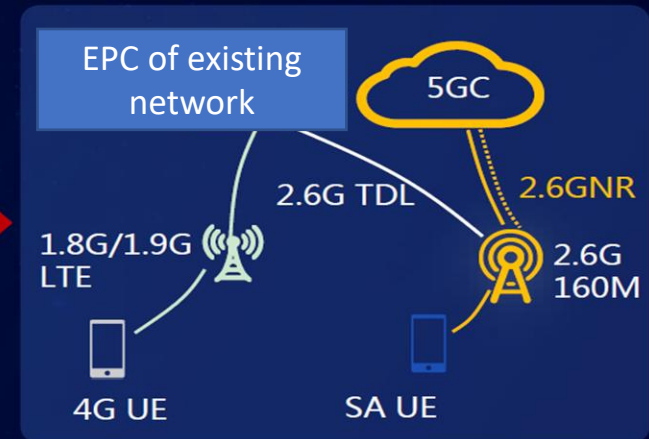
BTS were built to meet marketing requirements
Basically to meet 5G demonstration requirement

NSA/SA dual-mode base station satisfy commercial needs



Vertical market requirement accelerates the establishment of SA network;
Ensure 5G experiences of 5G NSA-only devices in a certain period of time

SA mode enables new businesses



With the full deployments of 5G networks, the SA mode will also be supported on all networks to enable new businesses.

Global Commercial 5G Network Plan

NA

n260, 19H2
n261, 19H2
n41, 2020
n78, 2020
n71, 2020+
n5, 2020+
n66, 2020+

EU

n78, 19H2
n28, 2020+
n7, 2020+
n257, 2020
N258, 2020+

China

n41, 19H2
n78, 19H2
n79, 2020+
n258, 2021+

Korea

n78, 19H1
n257, 2020

Japan

n77, 19H2
n79, 19H2
n257, 2020

Sub 6

n41, 2.50-2.69GHz
n77, 3.3-4.2GHz
n78, 3.3-3.8GHz
n79, 4.4-5.0GHz

mmWave

n257, 26.5-29.5 GHz
n258, 24.5-27.5 GHz
n260, 37-40 GHz
n261, 27.5-28.35 GHz

AU

n78, 19H2
n257, 2020
n258, 2020

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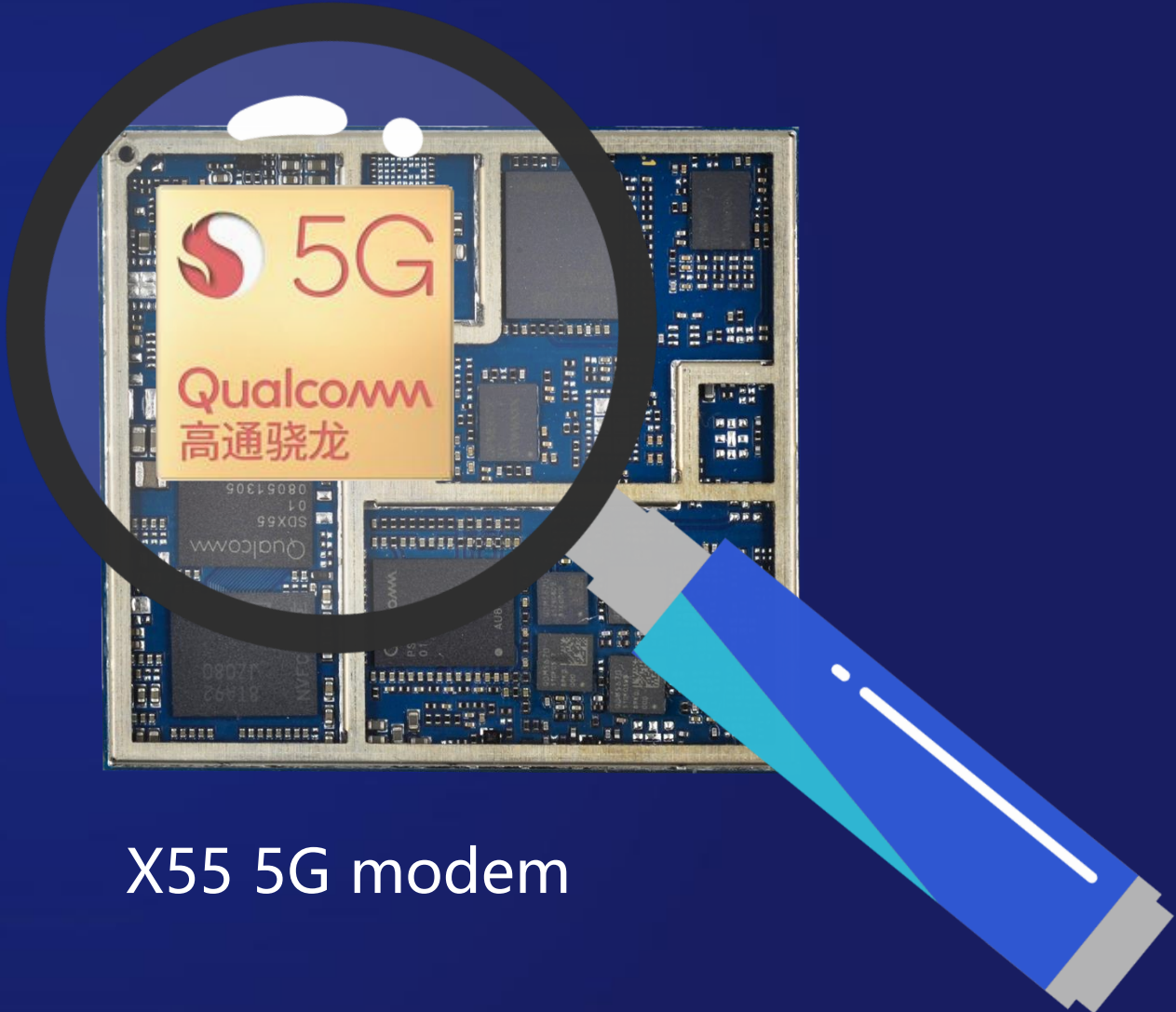
Quectel 5G Module



QUECTEL

RG500Q Q1-Axxxx
XX RG500QXX-XXX-XXX

SN:XXXXXXXXXXXXXXXXX
IMEI:XXXXXXXXXXXXXXXXX



X55 5G modem

Quectel LTE-A/LTE-A Pro/5G Roadmap




5G mmWave



RG510Q

- LGA Form Factor
- 5G NR mmWave
- LTE/ 5G Dual-Mode



RM510Q


- M.2 Form Factor
- 5G NR mmWave
- LTE/ 5G Dual-Mode

5G Sub-6GHz



RG500Q


- LGA Form Factor
- 5G NR Sub-6GHz
- LTE/ 5G Dual-Mode



RM500Q

- M.2 Form Factor
- 5G NR Sub-6GHz
- LTE/ 5G Dual-Mode

Cat 18/ Cat 20



EG18


- LGA Form Factor
- 5CA, 4 × 4 MIMO
- Cat 18



EM20


- M.2 Form Factor
- 7CA
- Cat 20

Cat 12



EG12

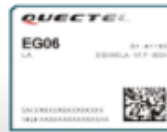
- LGA Form Factor
- 3CA
- Cat 12



EM12


- M.2 Form Factor
- 3CA
- Cat 12

Cat 6




EG06

- LGA Form Factor
- LTE with CA
- Cat 6



EP06

- Mini PCIe Form Factor
- LTE with CA
- Cat 6



EM06

- M.2 Form Factor
- LTE with CA
- Cat 6

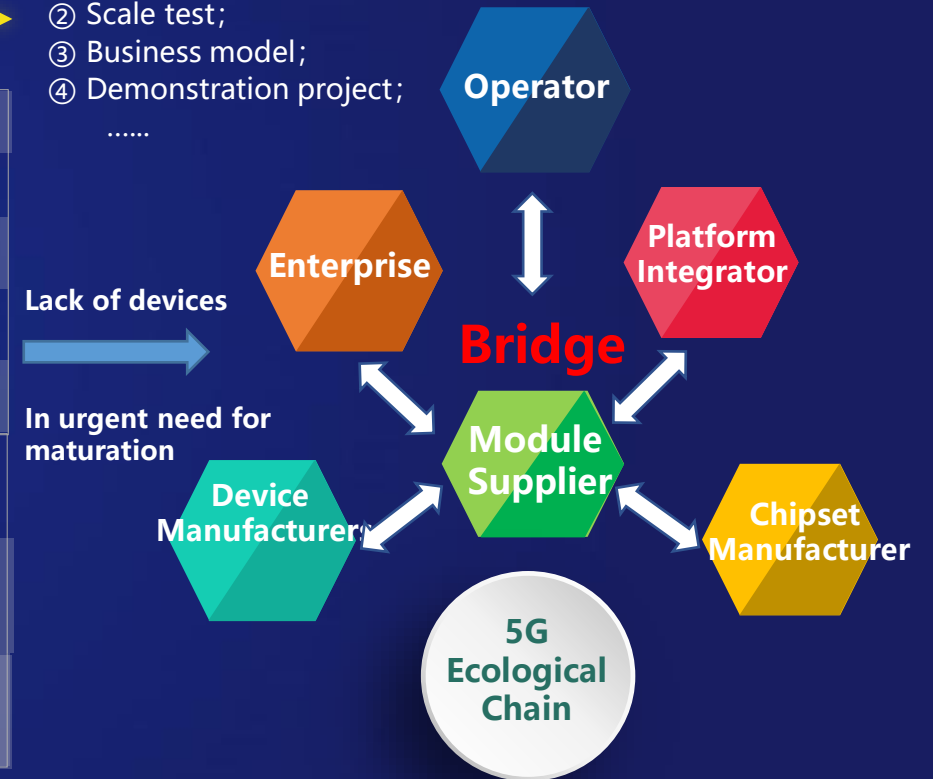
Qx/YY Estimated ES time

5G Industrial Chain – Create a Win-win Ecosystem



Operators critical in pushing 5G commercialization

- ① Network construction;
- ② Scale test;
- ③ Business model;
- ④ Demonstration project;
-



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5G – Transforming the Society

Manufacturing industry
More automatic



Energy
More efficient



Autonomous driving
Safer, more mature



Utility
More secure



Remote medical device
More reliable



Cities and infrastructure
More sustainable



Agriculture
Smarter



Logistics & Retailing
More digital

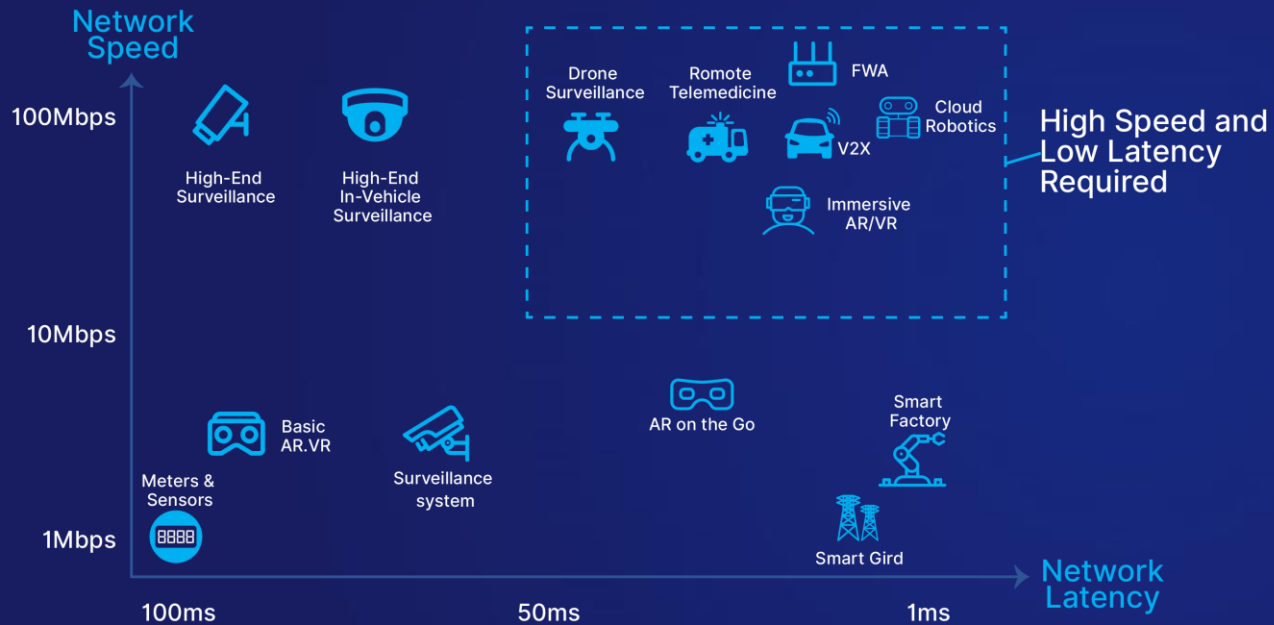


5G

2035

\$12 Trillion

5G Use Cases



There is little doubt that **5G** will have profound impact on the course of human civilization. Mobile subscribers would benefit from 5G in different ways which can be summarized as better User Experiences.

However, **the greater impact is on Machines, to make the world highly connected and ultra-smart.** The foundation for such transformation will be the 5G. The figure depicts how **high speed and low latency** can enable new use cases

5G Applications

QUECTEL[®]

**Router
Gateway
CPE**



**Notebook
Tablet**



**UAV/
Autonomous
Vehicles**



**Security
Surveillance**



And many more.....

5G Application - Gateway/Router/CPE/FWA

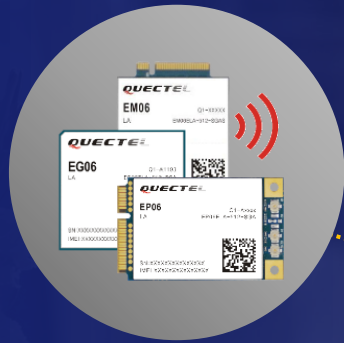
QUECTEL[®]



- DTU
- Consumer Router
- Industrial Router
- VoIP
- Server

5G Application - Notebook/Tablet

- Consumer Laptop
- Industrial Laptop
- Global Roaming
- eSIM
- Microsoft Certificate



5G Application – UAV/Autonomous Vehicles

QUECTEL[®]



- Sensing
- Route planning
- Real time updating of other vehicles and surroundings
- Cooperative driving

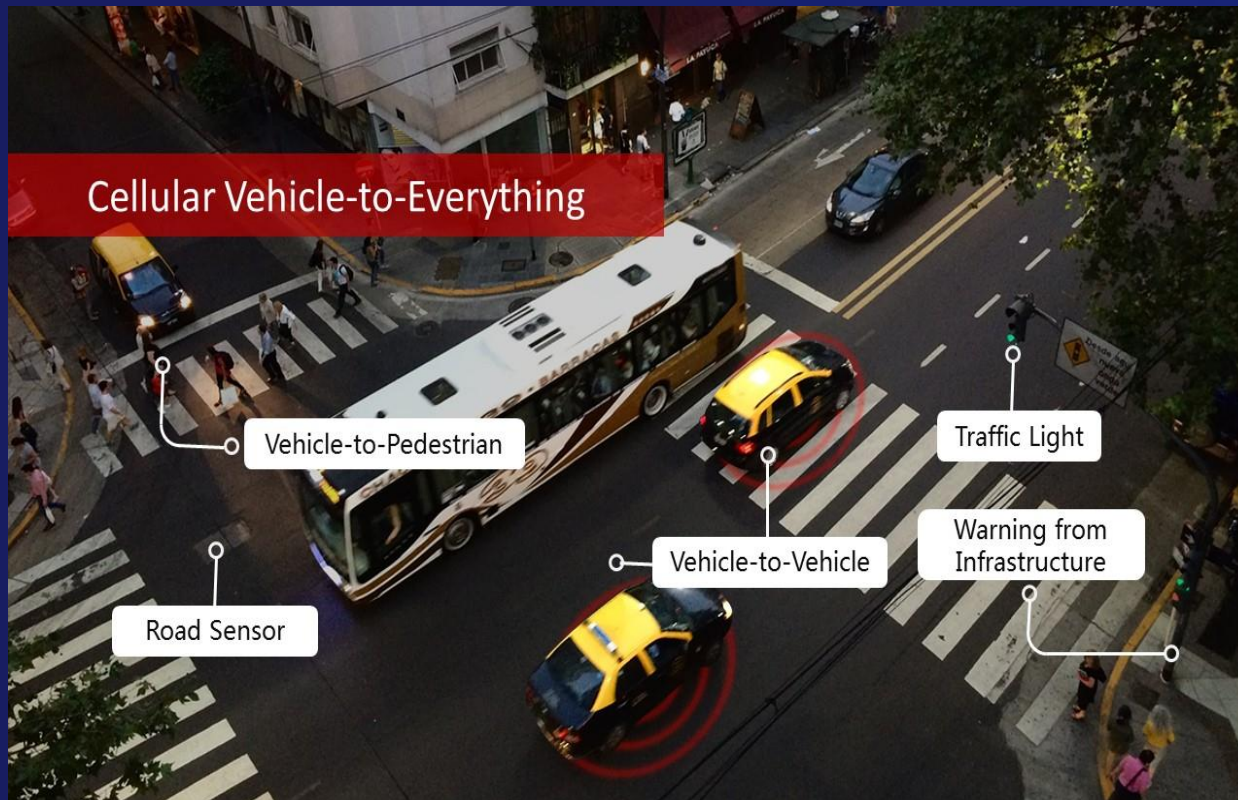
5G Application - Security/Surveillance

QUECTEL[®]

- Alarm System
- Video Surveillance
- Intrusion Detection



Cellular Vehicle-to-Everything (C-V2X)



- **Global Roaming**

C-V2X is an obvious use case of 5G as always-connected car and autonomous vehicle need high speed and low latency backbone to be realized. The new radio interface provides ability for higher level of predictability.

C-V2X immediately offers a robust platform to provide the vehicle with enhanced situation awareness. This is clear that due to advancements in autonomous driving and commercialization of its level-1 and level-2, the car OEMs are poised to accelerate C-V2X projects more aggressively. The competition to create the best driverless car has never been hotter and it will be further fueled by the 5G rollout.

Needless to add that the 5G will be going to offer more facilities for the connected vehicles as it can provide in-vehicle entertainment, makes journey even more pleasant.

Augmented and Virtual Reality (AR/VR)



- **VR Health – Simulated Environment with AI Trainer for physical Therapy**
- **Customer user experience in retails – VR eye tracking to record where consumers looked at → place products they want to sell most**
- **\$5.5B market by 2023, ~6x of 2018** (Source : BI Intelligent)

5G users would enjoy immersive experiences as AR/VR mainly target entertainment market segment. Nevertheless, AR/VR have also become an undoubted part of digital economy and are transforming it. For instance, AR/VR will change how engineers design new products.

5G Application – Medical Surgery

QUECTEL[®]



- Surgery collaboration by controlling robots remotely using AR/VR.
- Extremely low latency
- Higher efficiency and more procedures can be done

5G Application – Portable Transmitter

QUECTEL[®]



- High-speed communication of video, audio and data
- Support full 4K resolution
- Real-time reports on the news media



About Quectel



- Founded in October, 2010
- **HQ in Shanghai and Hefei R&D Center, China**
- Stock Code: **603236.SS**
- 50+ Sales Offices, 90+ Distributors and 1000+ Employees Worldwide
- Monthly production capacity over **9 Mpcs**
- More than **5000+** customers worldwide



Target Applications



Telematics & Transport

- Automotive OEM
- Vehicle Tracking
- Asset Tracking
- Ship Tracking
- Fleet Management
- OBD
- Vehicle DVR
- Special Purpose Vehicle (SPV)
- Usage-Based Insurance (UBI)



Energy

- Electricity Meter
- Gas Meter
- Water Meter
- Heat Meter
- Smart Grid
- Wind Turbines
- Solar Panel
- Charging Pile



Payment

- Wireless POS
- Cash Register
- ATM
- Vending Machine
- Top-up Machine



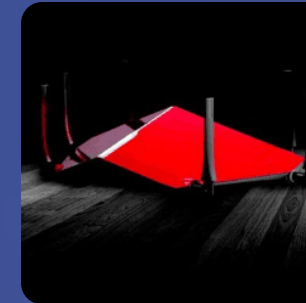
Security

- Alarm
- Video Surveillance
- Intrusion Detection
- Smoke Detector
- Gas Detector
- Motion Sensor
- Asset Protection



Smart City

- Street Lighting
- Traffic Light
- Sharing Economy
- Smart Elevator
- Smart Parking
- Parking Meter
- Toll Collection System
- Digital Signage
- Advertisement Display
- Trash Bin Remote
- Monitoring
- Outdoor LED Lighting



Gateway

- DTU
- Consumer Router
- Industrial Router
- VOIP
- Server
- Wi-Fi Hotspot



Industry

- Industrial PDA/ Scanner
- Industrial PC
- Rugged Tablet PC
- Pipeline Monitoring
- Robot
- Flowmeter
- UAV
- Industrial Refrigerator
- Indoor Air Monitoring
- Water Valve/ Pump Control



Life & Healthcare

- Personal Tracker
- Pet Tracker
- Wearable
- Home Automation
- Elderly Monitoring
- Remote Medical Equipment
- Glucometer
- Blood Pressure Monitor
- Recreational Machine
- Patient Monitoring
- Laptop



Agriculture & Environment

- Trail Camera
- Food Traceability
- Farmland Monitoring
- Farm Machinery Management
- Meteorological Station
- Wildlife Tracking
- Irrigation
- Environmental Monitoring

Global Presence



North America

- Canada**
Toronto, ON
Vancouver, B.C
- United States**
Chicago, IL
Houston, TX
Orange County, CA
San Diego, CA
Point Roberts, WA

**Shanghai HQ,
Hefei R&D Center**

● 50+ sales offices

90+ distributors
Service 4000+
customers
Modules are sold to
150+ countries

Europe

- Denmark**, Copenhagen
- France**, Sophia Antipolis/ Paris
- Germany**, Berlin/ Munich/
Stuttgart
- Italy**, Milan
- Poland**, Warsaw
- Russia**, Moscow/ St. Petersburg
- Romania**, Timisoara
- Slovenia**, Ljubljana
- Sweden**, Stockholm
- Spain**, Barcelona
- Turkey**, Istanbul
- The Netherlands**, Eindhoven
- UK**, London/ Birmingham

Latin America

- Argentina**, Buenos Aires
- Brazil**, Sao Paulo
- Mexico**, Mexico City

Africa

- South Africa**
Johannesburg

Asia Pacific

- Australia**, Sydney/ Melbourne
- India**, Mumbai/ Bangalore/ Delhi
- Indonesia**, Jakarta/ Bandung
- Israel**, Tel Aviv
- Korea**, Seoul
- Japan**, Yokohama
- Philippines**, Manila
- Singapore**
- Thailand**, Bangkok
- Vietnam**, HoChiMinh City/ Hanoi

Greater China

Shanghai Headquarters

- Beijing
- Chengdu
- Chongqing
- Changsha
- Foshan
- Guangzhou
- Fuzhou
- Hefei
- Huizhou
- Hangzhou
- Ji'nan
- Kunming
- Ningbo
- Nanjing
- Qingdao
- Suzhou
- Shenyang
- Shenzhen
- Taipei
- Wuhan
- Wulumuqi
- Xi'an
- Zhenzhou
- Zhongshan





THANK YOU!
Stock Code: 603236.SS

