



Huawei experience in
5G test network
deployments

5G Industry Progressing, And it's Now the Reality



	Rel - 15		Rel - 16
NSA NR	SA NR		Full IMT 2020 NR
eMBB		eMBB/uRLCC/mMTC	
CPE NSA		Smartphone NSA/SA	



Smartphone/
IoT Modules
eMBB/IoT/V2X

Global 5G User

400M

Forecast: Ovum

5G Population
Coverage

22%

Forecast: GSMA



5G Trial

Pre-Commercial 5G

Commercial 5G

Global Massive 5G Deployment



5G Phase I Target to Greatly Improve User Experience & Reduce Cost per Bit



~10x

User Experience



~1/10

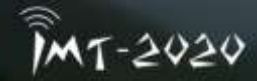
Latency



~1/10

Cost Per Bit

Results of field tests of 5G in the framework of IMT-2020



Highest
cell capacity

C-band: 200MHz

28 Gbps

Smallest
Latency

0.368 ms

Mass
connectivity

1.08 bln.

Most part E2E systems



Most varied Spectrum

- 3.5 GHz
- 26 GHz
- 4.9 GHz
- 39 GHz

Comprehensive IOT tests

Chips
Measuring devices

Many Use case

4k Video

Connected Car

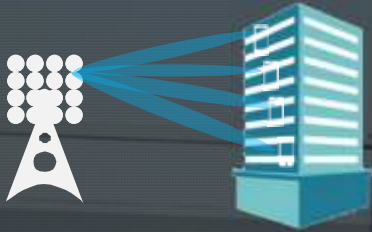
5G

High & Low Band Hybrid Networking

High Efficiency in Mobility



C-band MU-MIMO



- 10+Gbps@200MHz BW
- 3D Beamforming
- 26 Layers

28GHz MU-MIMO



- 40+Gbps@1GHz BW
- 8 Users
- 16 Layers

C-band & 28GHz Dual Connectivity



- 5Gbps+15Gbps
- 8 + 8 Layers

C-band & 28GHz Mobility



- Inter-cell & Intra-cell
- 6+ Gbps at 300m @ 28GHz
- 50 km/h



Compact Design for Verification in Commercial Environment

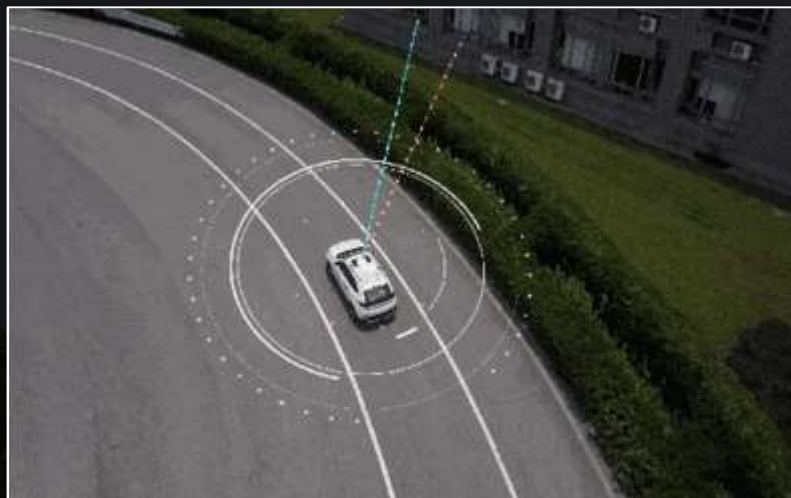


Unified platform for low & high band

5G NR Based Tele-operated Driving(ToD) (Trial)



5G NR



5G NR Driving with tele-control

E2E Latency: < 10ms

Reliability : 99.999%

For HD FoV Uploading : 50Mbps



UL Live Video

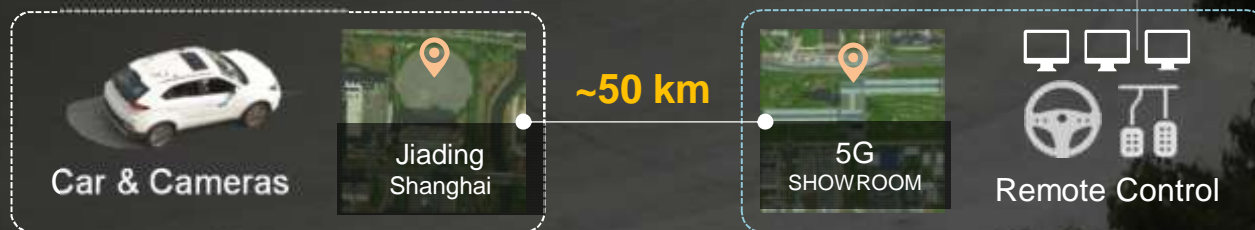
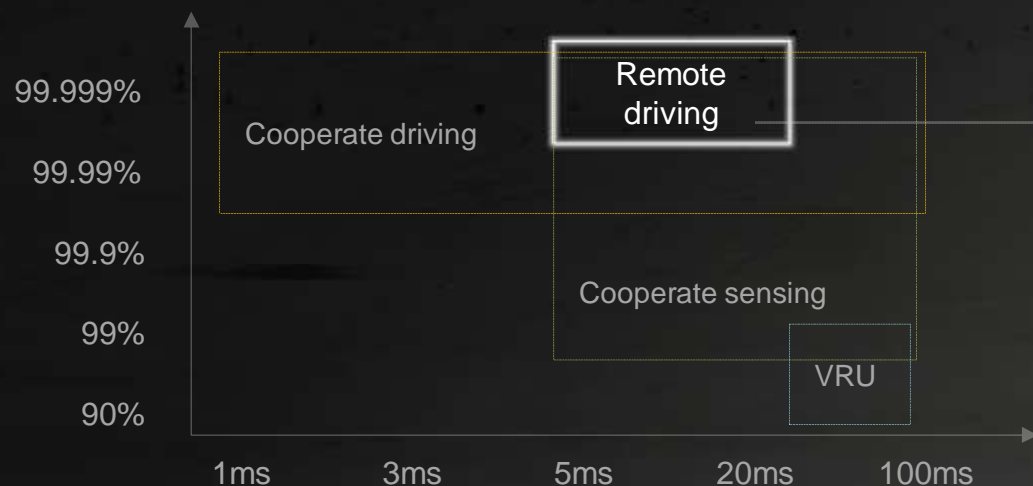


DL Remote Control

Transmission



Scalable Joint KPIs for Connected Car



Sub6G Multi-User Field Trial

Higher Spectral Efficiency on 5G NR



5G NR Massive MIMO

>11Gbps

Cell
Average Rate 

- 12 UEs of both static and mobile types, 24 Layers

Ultra U-Plane Latency

<0.5ms

U-plane
Delay 

- new frame structure and numerology

Tokyo • Japan

23 TUE

4.5GHz

200MHz



Che'Nelle VR Live Show from NTT 5G with Tokyo Skytree

340m



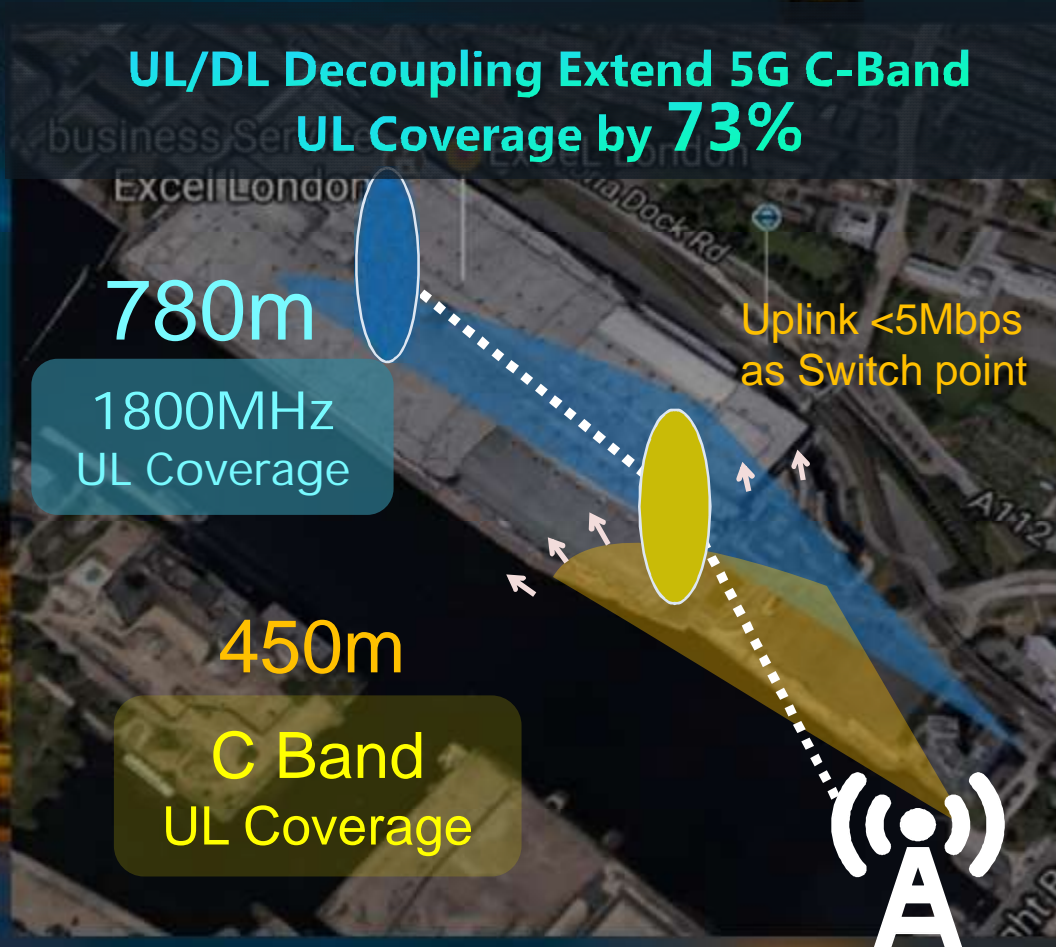
DL 4.52Gbps / UL 1.55Gbps

5G BTS@340m height, 5G UE@1.2Km distance by mmWave 28GHz



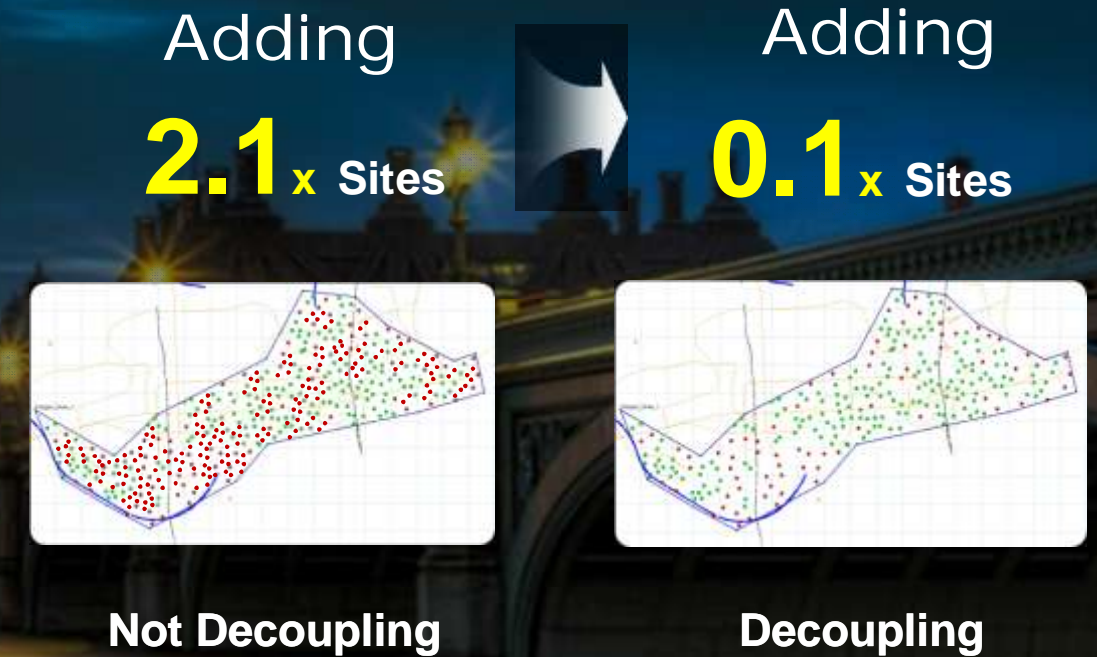
5G Key Feature Live Demo in London

73% 5G C-band Coverage Extended by UL/DL Decoupling



2017.11.15, MBBF London ExCel 5G Test Field

Reducing the Demand of New 5G Adding Sites



Analysis Based on Current Network in Shenzhen, China,
Target: O2I Scenario, DL 50Mbps & UL 5Mbps @ Edge

Rostelecom & Huawei: Future-oriented 5G showcase



Radio, core, transport

Site survey

Showcase MOU

2Gbps/360 VR video
4K video/VR football

Pilot Zone

Innopolis, Republic of Tatarstan

5G Application

Demonstration of 5G case, and affects mobile objects (AR / VR)



VR Football



4K Video

Transmit video in 4K mode for wireless broadband access

360 ° VR live video. scenario for "safe city", "smart house" and others



VR 360



2Gbps speed

Demonstration of peak speeds 2.1 Gbps per sector

President Visit and Experience 5G Service



Tatarstan president enjoyed VR football



President, Rostelecom, Huawei joint interview



On 21st, May. **Rostelecom**, **Huawei** and **Tattelcom** opened an experimental zone in Innopolis where launched **5G technology based on Massive MIMO**

Rostelecom speech



Huawei speech



The president of Tatarstan visited and experienced VR football, VR 360 and other 5G service. Over 40 media visited and interviewed

3GPP-Based 5G Pre-Commercial Network in Leading Cities

10+

3GPP-Based 5G Pre-Commercial Network



Toronto, Canada



London, UK



Berlin, Germany



Tokyo, Japan



Dubai, UAE



Seoul, Korea



Milan, Italy



Shanghai, China

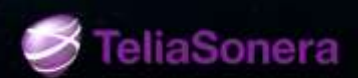
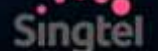


Beijing, China

...

30+

Leading Operators



**Under the joint efforts,
Let's Make 5G a Global Success**

Thank You!

