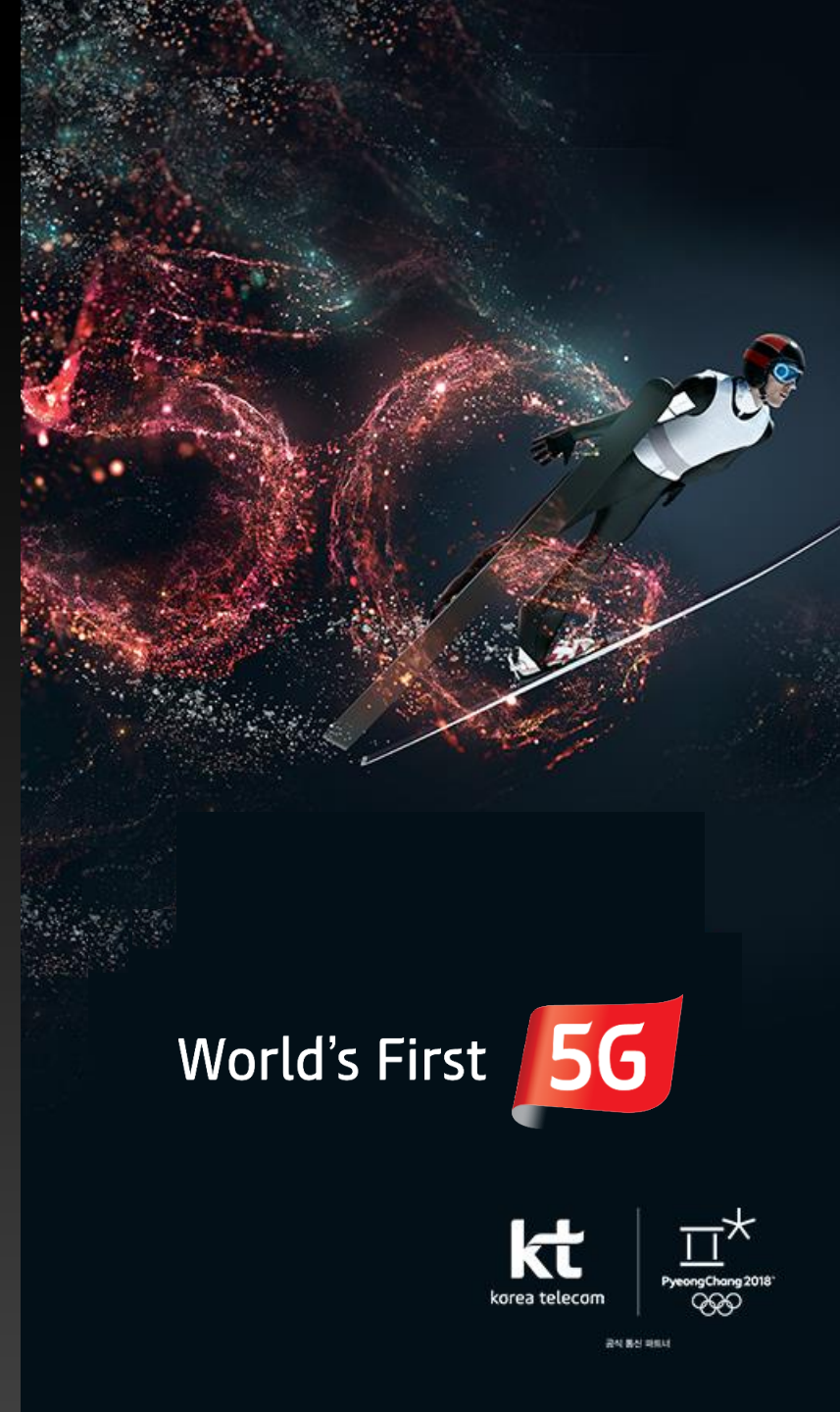


Status of KT's 5G trial service at PyeongChang Winter Olympic Games

Doyoung Kwak | 23th Feb 2018

PEOPLE TECHNOLOGY 



World's First 


korea telecom


PyeongChang 2018[®]
공익 통신 서비스

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1 **Future ICT revolution & 5G**

2 Global 5G trend & technology

3 KT's efforts on 5G trial & commercial

Future ICT Revolution – Big Blur (Fade out of Boundaries)

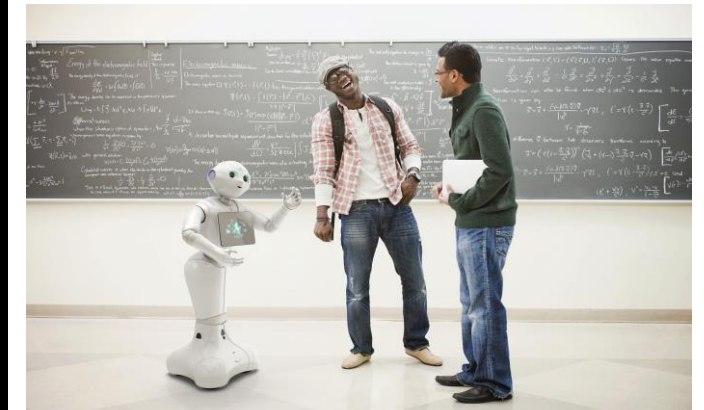
Hyper Reality



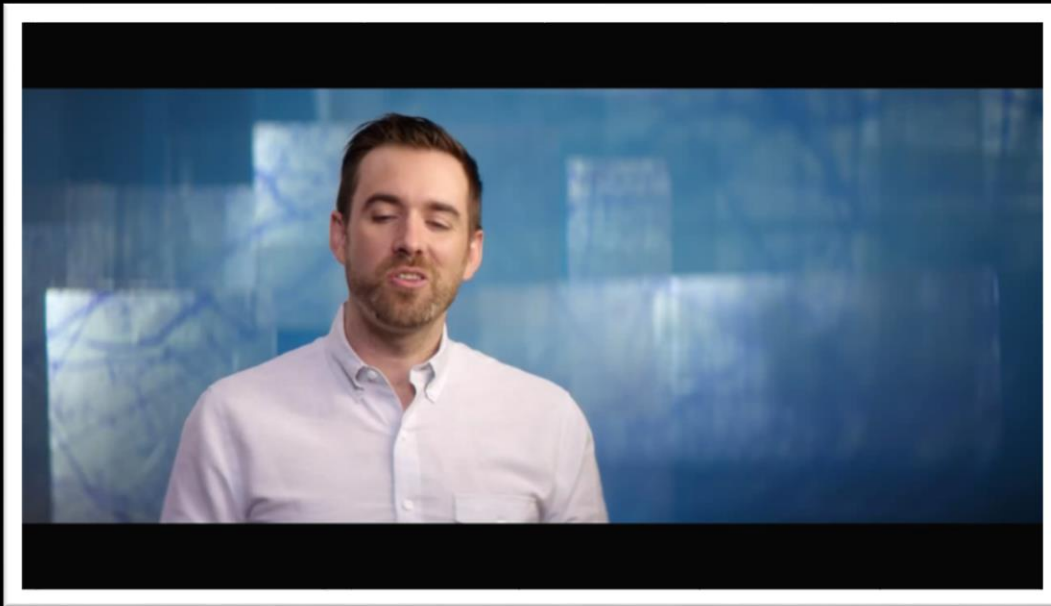
Complete Automation



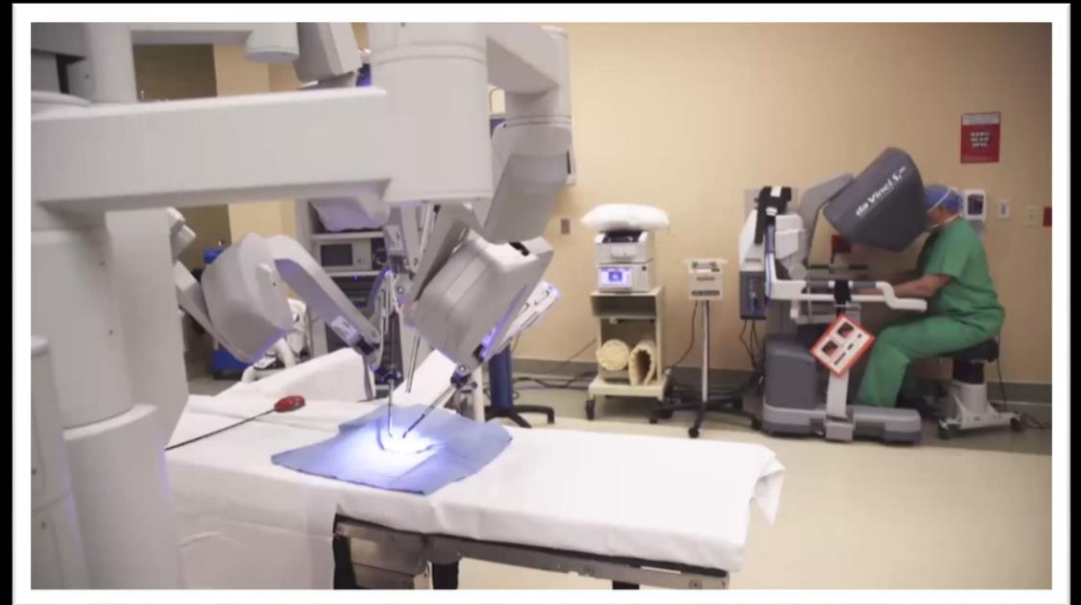
Next Intelligence



Future ICT Revolution – Big Blur in Reality & Virtuality



Future ICT Revolution – Big Blur in Distance & Space



Future ICT Revolution – Big Blur in Human & Machine



5G – the key of ICT future

5th Generation Mobile Network

5G



**Big Pipe
(eMBB)**

300Mbps → 20Gbps



Hologram

**Zero Latency
(URLLC)**

20msec → 1msec



Autonomous
Driving

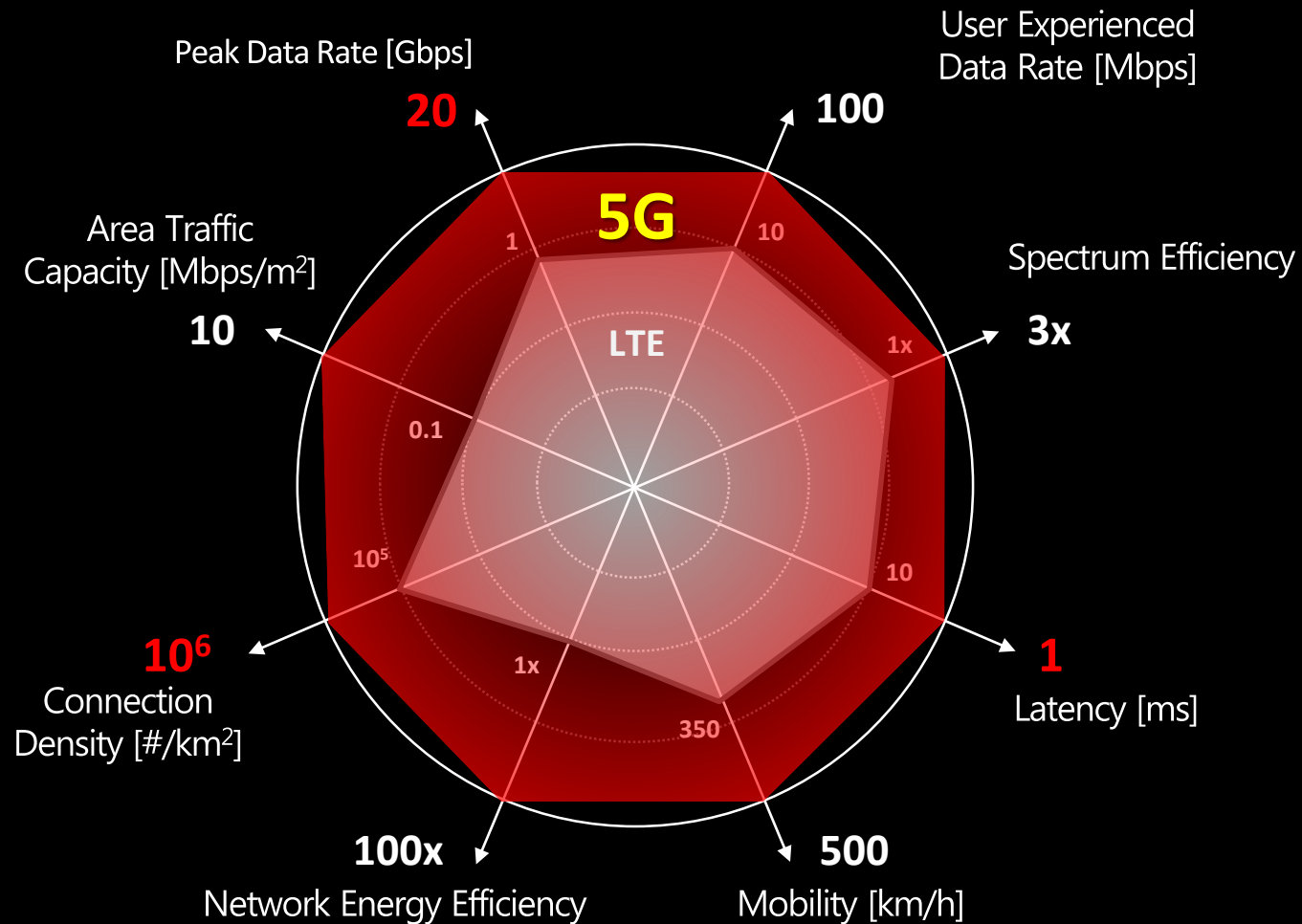
**Massive Conn.
(mMTC)**

200 → 2,000

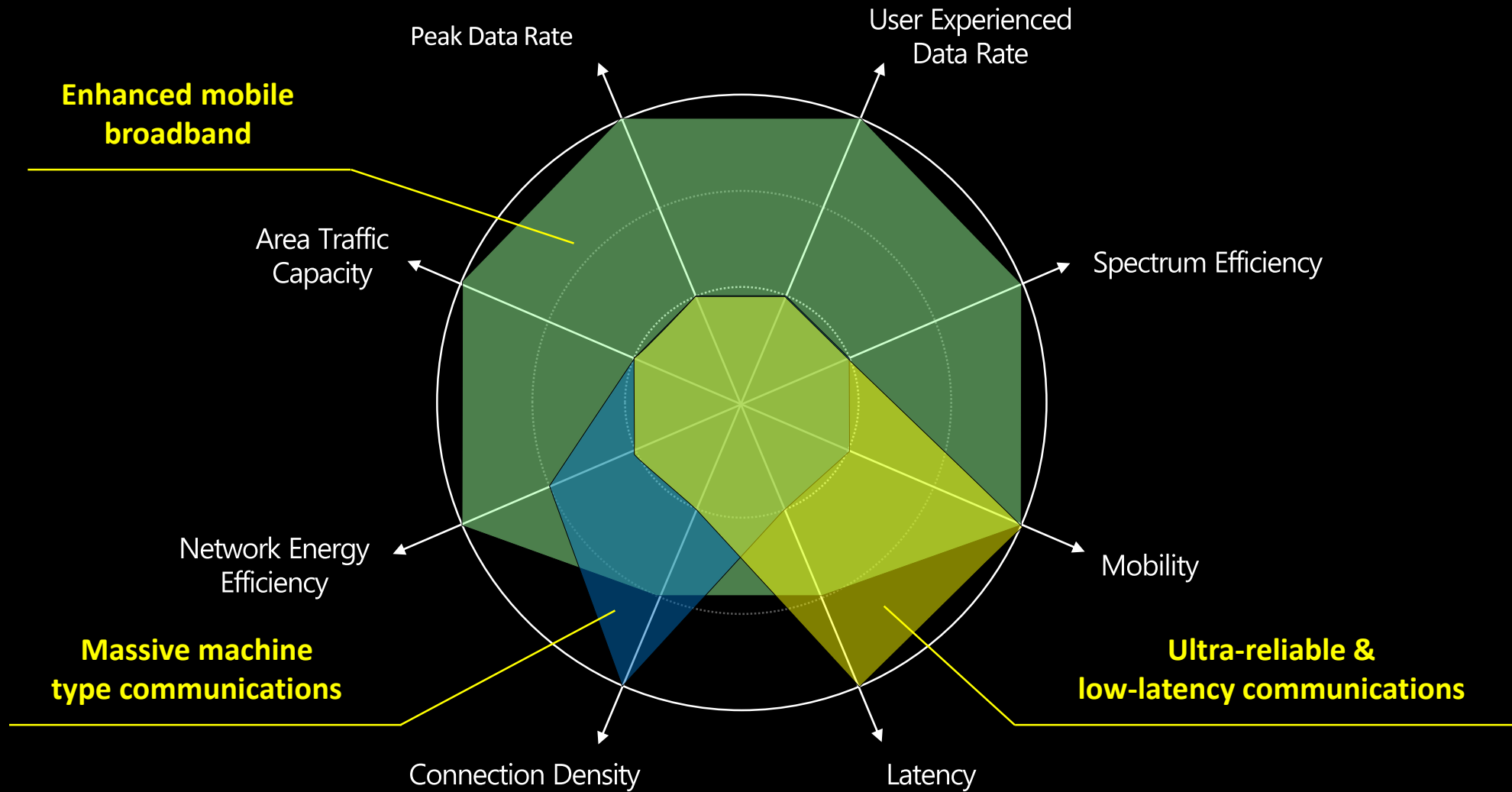


Sensors

5G Requirement (ITU-R M.2083)



5G Requirement according to the Usage Scenarios (ITU-R M.2083)



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1 Future ICT revolution & 5G

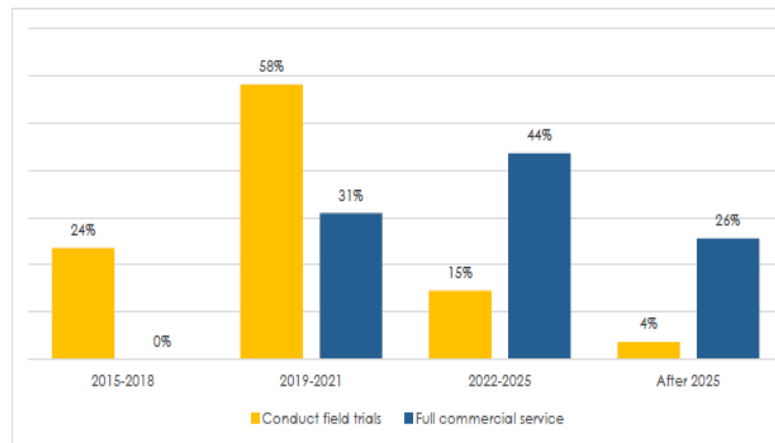
2 Global 5G trend & technology

3 KT's efforts on 5G trial & commercial

2015 vs 2017

TIA 5G Operator Survey (2015)

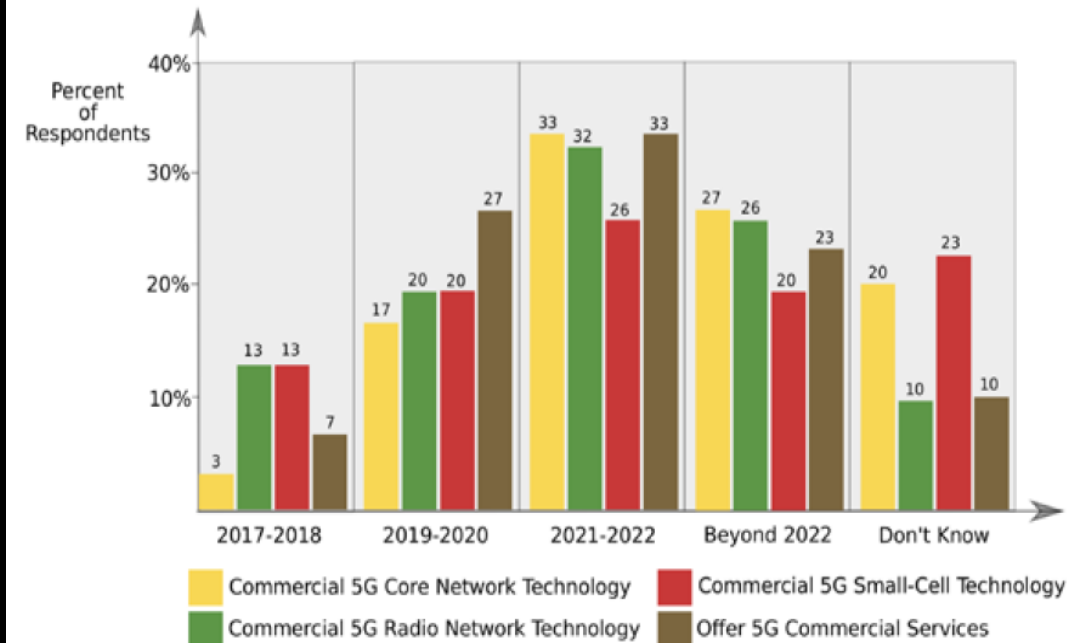
When do you think your company will reach the following development milestones for 5G? (n=57)



- Commercialization plan by 2018 : 0%
- Commercialization plan after 2022 : 70%

TIA 5G Operator Survey (Jan. 2017)

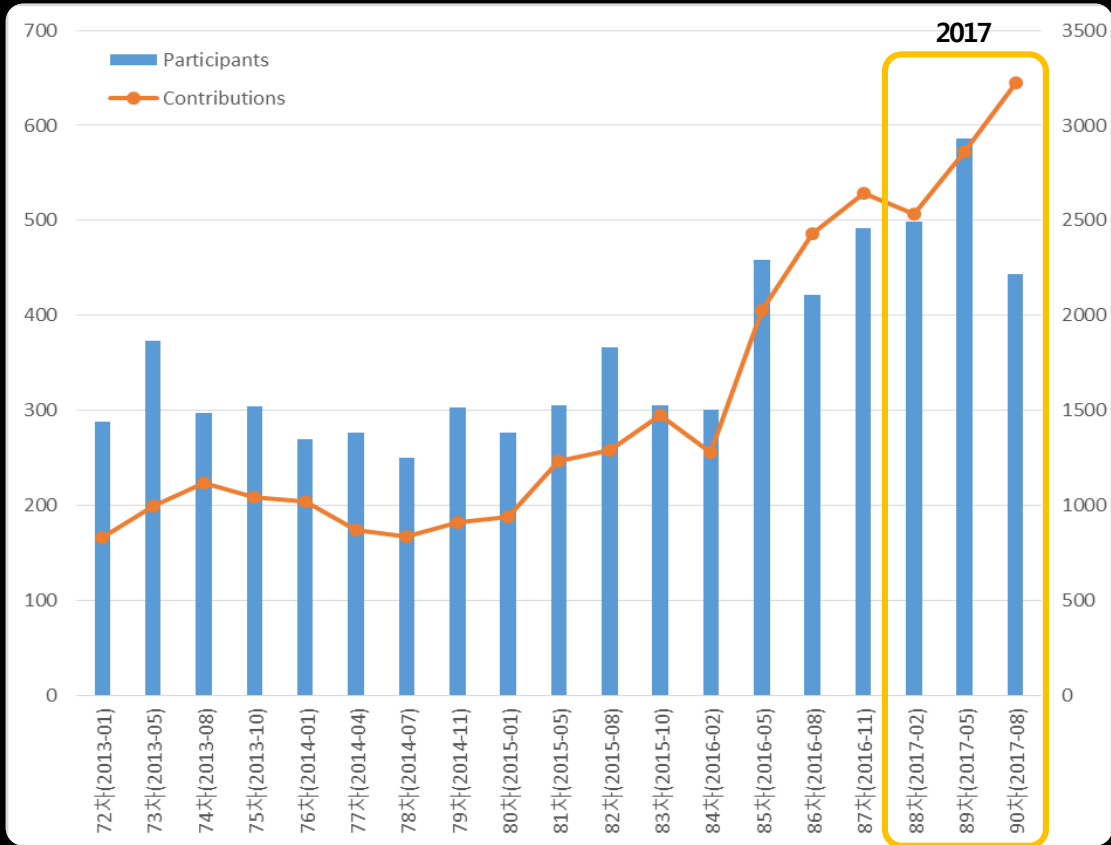
When do you expect your company will deploy?



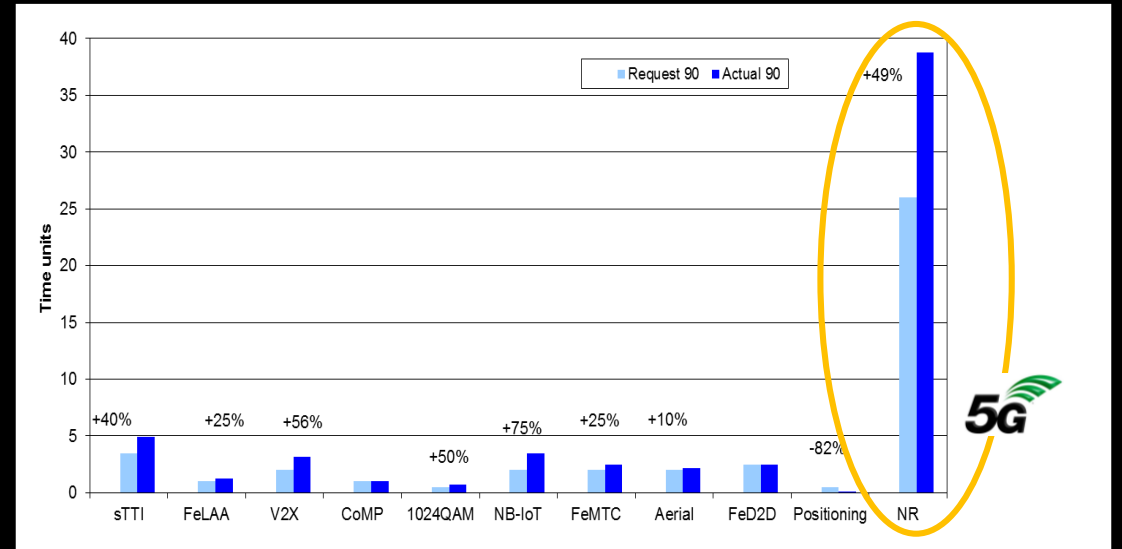
- **Commercial Network 13%, Commercial Service 7%** by 2018
- Commercial network deployment after 2022 : **26%**

Global 5G Competition in standardization

3GPP RAN1 Statistics



3GPP RAN1 2017 Q3 Time Budget



5G Phase spec. early drop is planned in Dec. 2017
 (3GPP RAN Plenary, 12.18~12.22)

Global 5G Competition in trial & commercial plan

Technology

Jul 27, 2017 04:41 PM ET

Verizon Confident 5G to Be Rolled Commercially in 2018

Trials up in eight of 11 trial markets, CFO says

By Jeff Baumgartner

Verizon Communications still sees 2018 as the commercial start as it continues to collect results from its initial batch of field trials. The company is testing 5G technologies to deliver speedy fixed-wireless broadband.

"[It's] too early right now to be more definitive...but we're still confident we will have a commercial product in-market during 2018," Verizon executive VP and CFO said in a call.

AT&T Eyes Late 2018 for Commercial 5G Services

The third-largest U.S. carrier said it will use 600 MHz spectrum to deliver 5G coverage from coast to coast.

"The 600 MHz spectrum will allow 5G to deliver ultimate experiences to T-Mobile's customers throughout the United States," said T-Mobile CEO John Legere. "We will support T-Mobile US with 5G commercial availability of the product and ecosystem support."

AT&T says it could deliver mobile commercial 5G services to consumers as soon as late 2018. Previously, the operator had indicated that commercial 5G services would not be ready until late 2019 or even 2020.

In a blog post, AT&T's CTO and President of AT&T Labs Andre Fuetsch praised the 3GPP for fast-tracking the non-standalone 5G New Radio (NR) specification to December 2017 instead of March 2018. This acceleration, Fuetsch said, means that key components of the 5G standards, like chipset development, can be completed months ahead of the full release of the 3GPP Release 15 5G standard.

Taking 5G Initiative KT to Launch Commercial 5G Services First



Jeon Hong-bum, senior executive director of KT Infra Research Center, is explaining the technologies included in the "KT 5G-SIG Standards" at a press meeting held on Nov. 8.

SEOUL, KOREA

9 November 2016 - 11:00am

Cho Jin-young

KT said on November 8 that it will provide commercial 5G services from 2019, one year ahead of the target year of global mobile carriers such as China Mobile and Verizon, via its KT 5G-Special Interest Group (SIG) organized a year ago. This early start is to lead the international standardization of 5G communications

News Feature | October 17, 2017

UK, Australia Raise Stakes On 5G and First Real-World 5G Trial

Telekom, Europe's largest mobile operator, has successfully completed its first real-world 5G trial. While, United Kingdom, the UK government has allocated £25 million in funding to support 5G trials as a way to shore up the country's economic growth. In a similar fashion, the UK government has announced a 5G road map for the country.



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Next phase of 5G trials starts in 2018

China Daily | Updated: 2017-10-28 09:34

China Daily aims to ensure firms can make pre-commercial products quickly

China Daily will start the third phase of 5G technical tests next year, as it aims to get pre-commercial products ready when standards on the next-generation communication technology are expected to come out in June 2018.

Wang Ku, director of the telecom development department at the Ministry of Industry and Information Technology, said at a news conference on Friday that "the third phase of technical tests is to ensure that companies are capable of making pre-commercial 5G products."

According to him, more efforts will be made to accelerate tests on network planning, systems, applications and other products of the industrial chain, which will help lay down a sound foundation for the fast development of a 5G network in China.

5G Technology

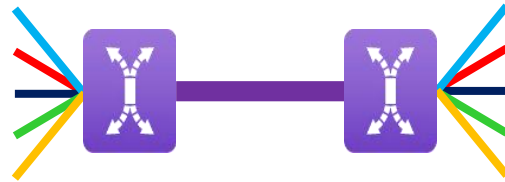
Cost Innovation & New Value Creation

RADIO



Wider Bandwidth
Increased Capacity
In-building coverage

ACCESS



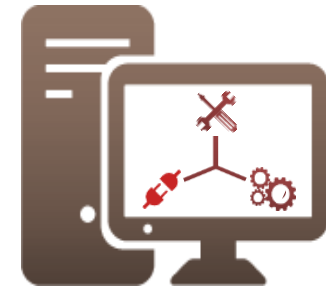
Front-haul traffic
Reduction

Core



Distributed
Edge Core

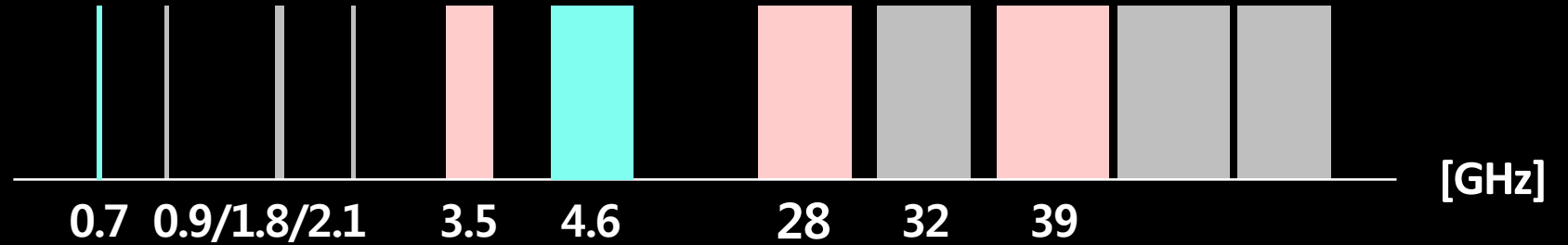
CENTER



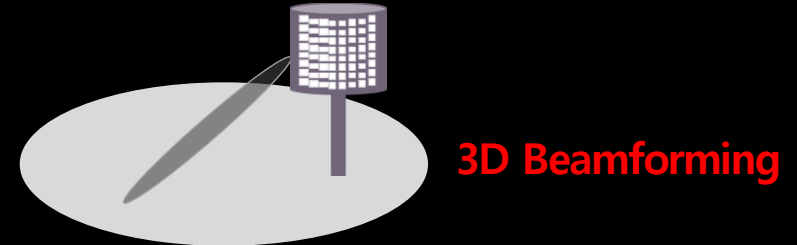
Intelligence
Operation

Technical Challenges : Radio

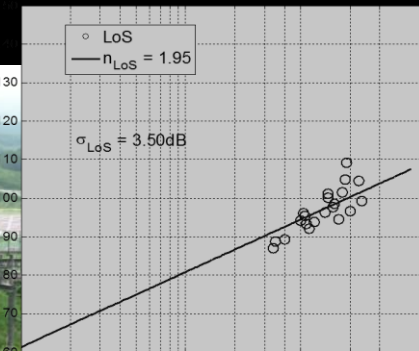
Spectrum



Higher Frequency → Shorter Cell Coverage



→ mmWave cellular = uncharted area

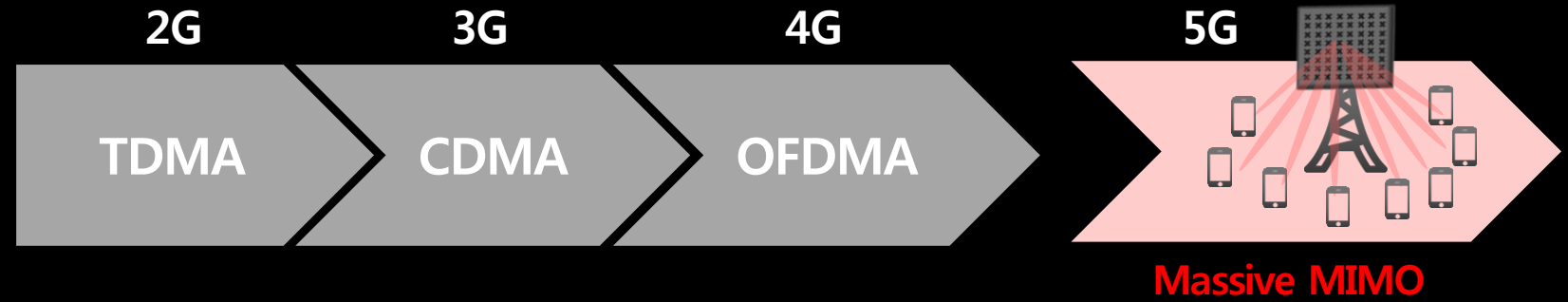


Channel modeling & Field test

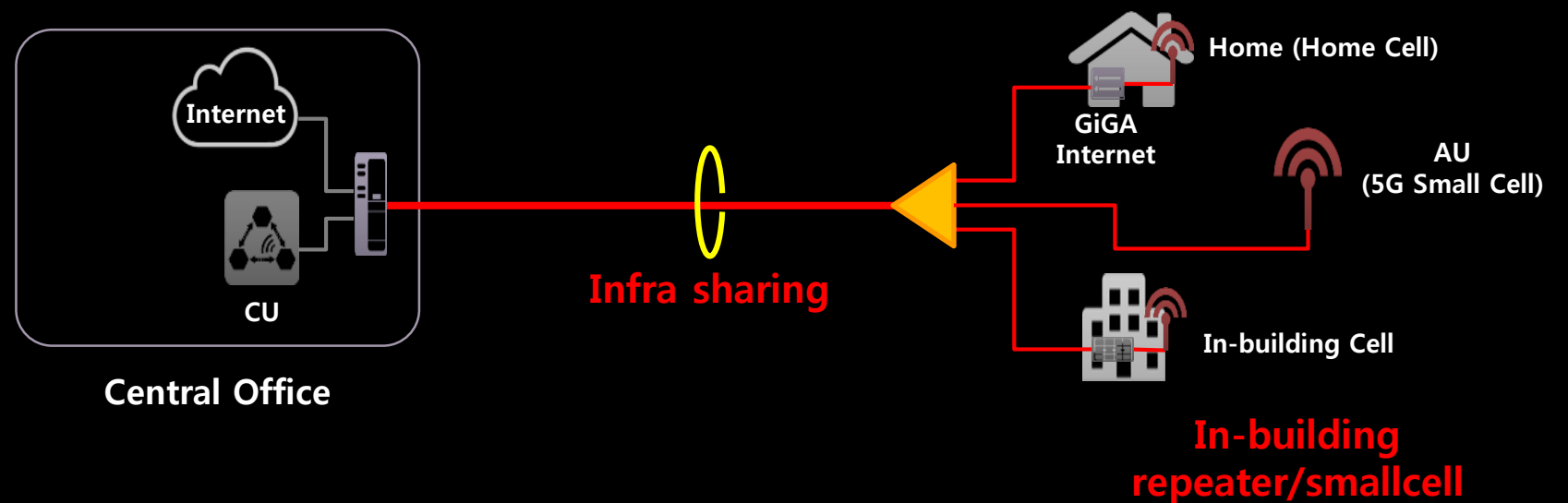
LoS path loss

Technical Challenges : Radio & Access

Radio

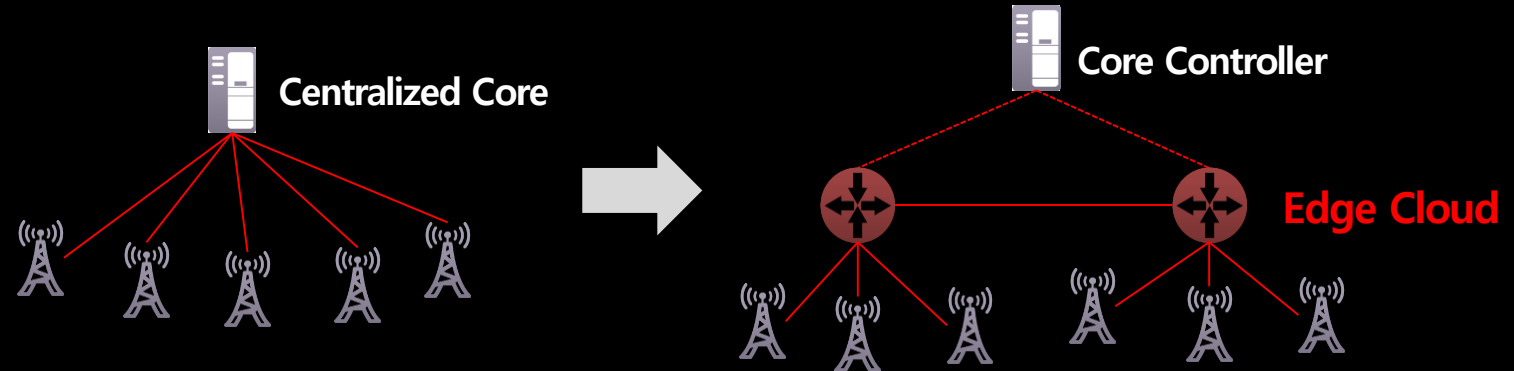


Access

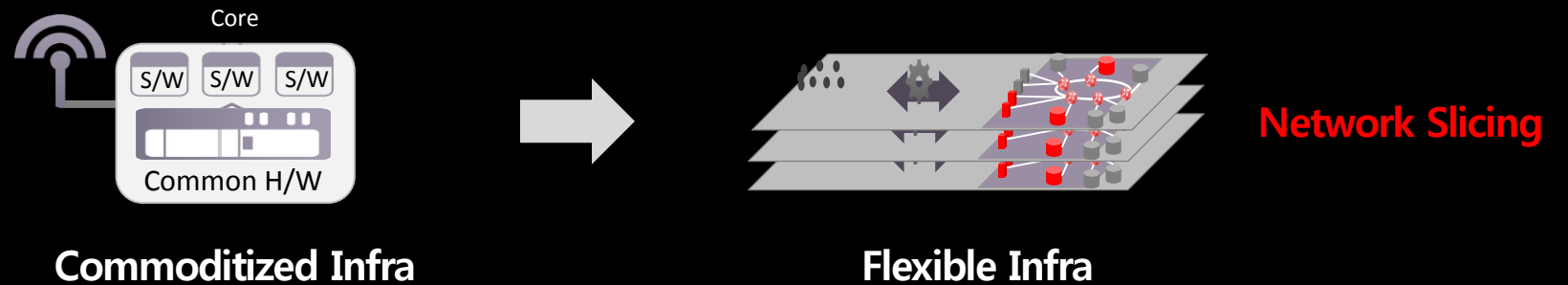


Technical Challenges : Core

Distributed
Core

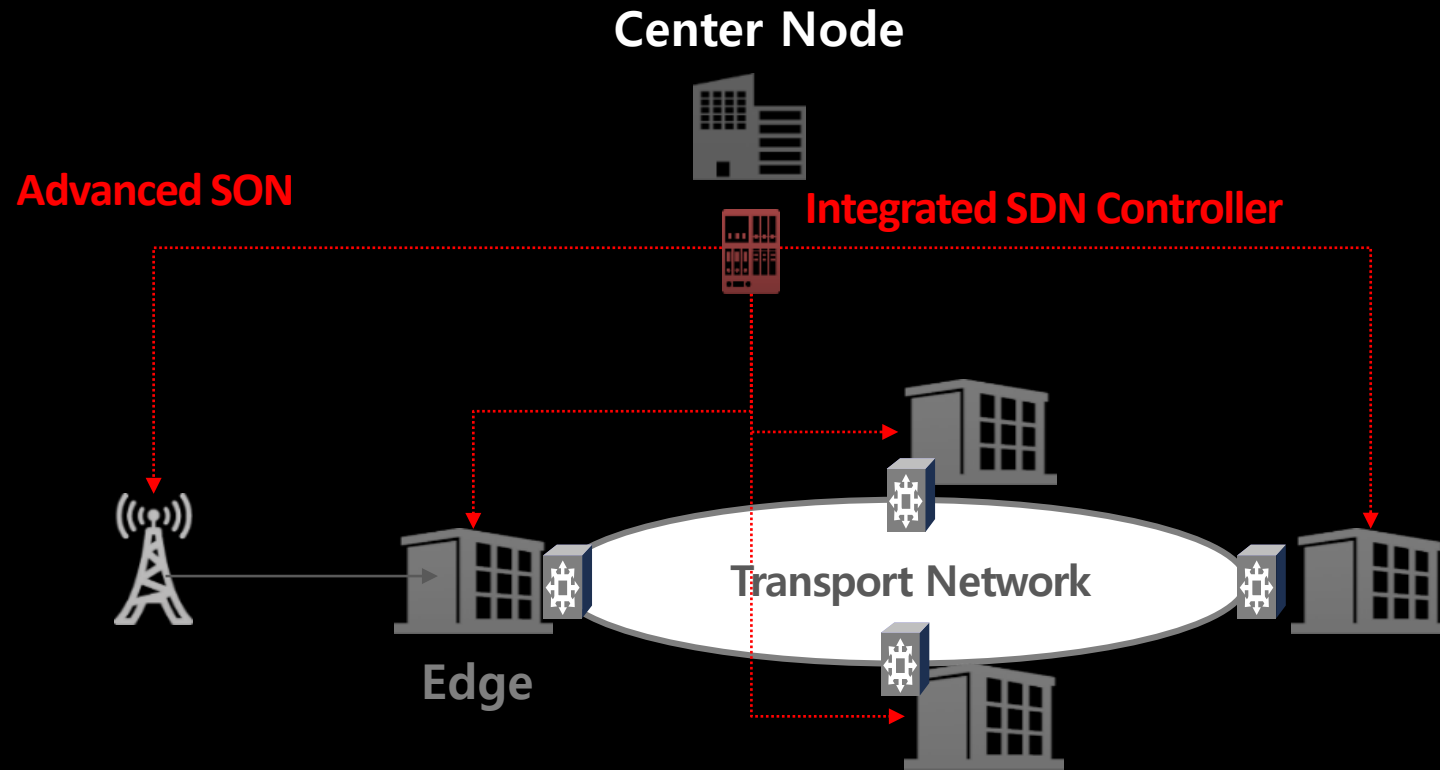


Network
Virtualization



Technical Challenges : Center

Intelligence
Operation



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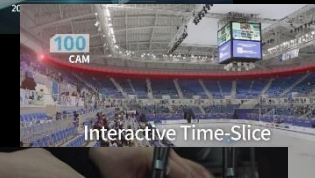
1 Future ICT revolution & 5G

2 **Global 5G trend & technology**

3 **KT's efforts on 5G trial & commercial**

kt's 5G Milestone

5G Trial Service in 2018 & 5G Commercial Service in 2019 (plan)



2015

2016

2017

2018

2019

5G Tech Development

5G Common Specification

5G Trial NW Development & Deployment

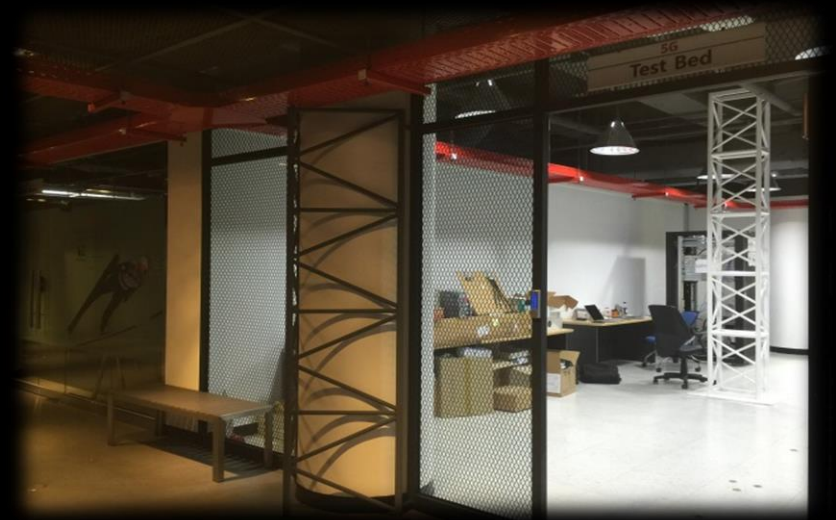
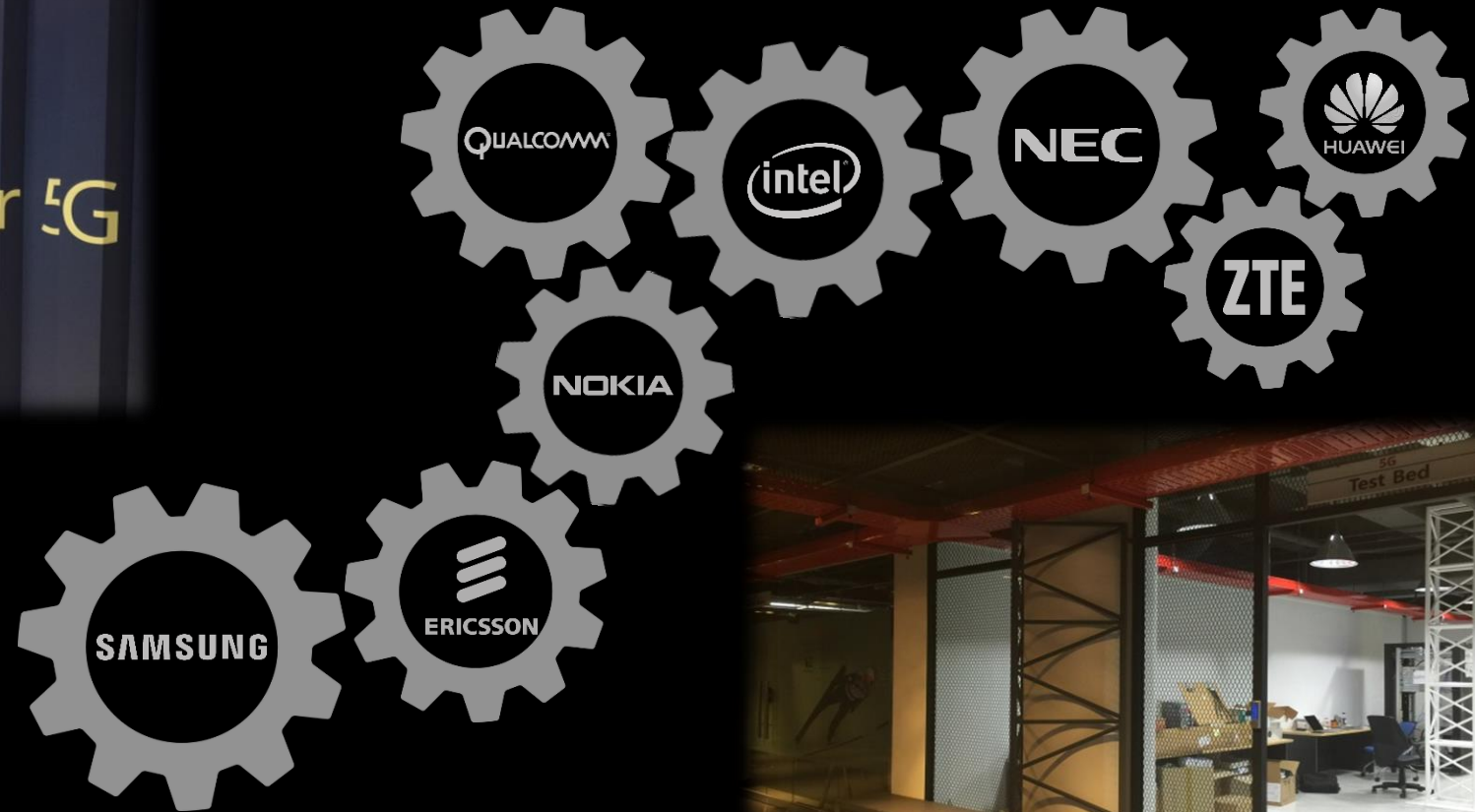
5G Trial Service

5G Commercial Service

kt 5G Trial – Global Alliance



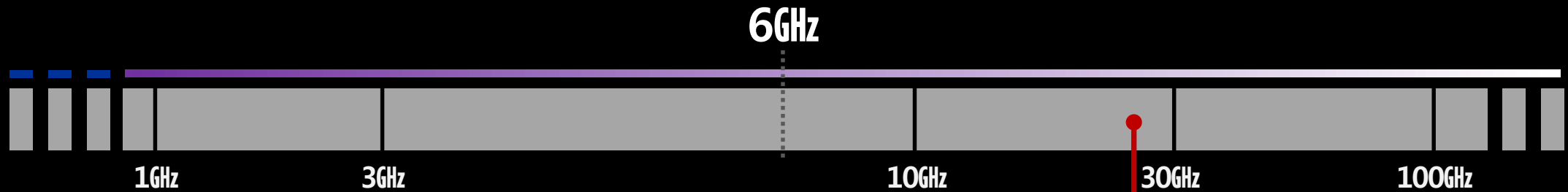
5G Innovation Laboratory (2015. 07)



5G Open ecosystem
with global leading vendors

kt 5G Trial – Spectrum

28GHz mmWave selected for PyeongChang 5G trial system/terminal



28GHz
(mmWave)

- Peak 20Gbps
- Ultra Wide Bandwidth

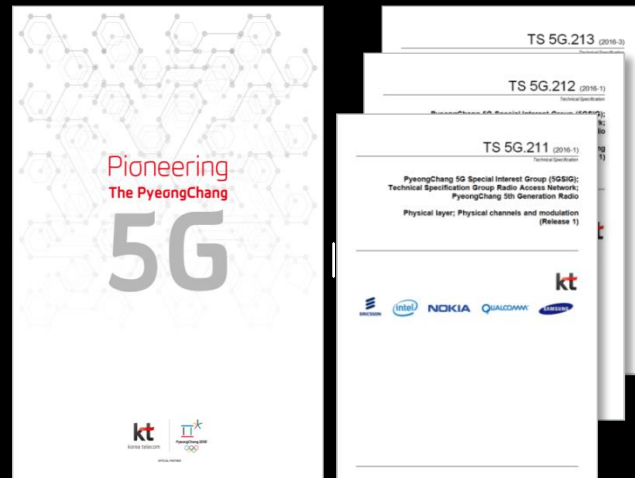
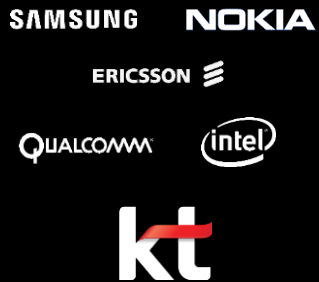
kt 5G Trial – Specification

The world first 5G common specification (June 2016)

General timescale of introducing new generation communication service : **5+ years**



KT PC 5G-SIG



10 months

Components	Details
Throughput	· Max. 20Gbps
Latency	· Less than 1ms (Downlink/Uplink)
Frequency	· 28GHz band / 800MHz BW
Waveform	· OFDM based
MIMO Support	· Hybrid Beamforming

kt 5G Trial – System / Terminal

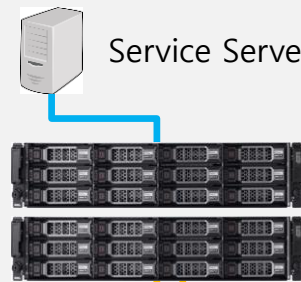
KT SIG Spec & SOC based 5G trial system & terminal

System

Central Office
Core (GW-C)



Branch Office
Core (GW-U), CU



Site
BBU, RFU



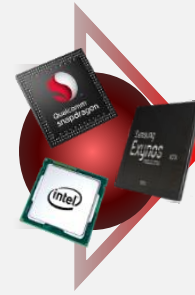
Optic Cable

Optic Cable

Terminal



FPGA based

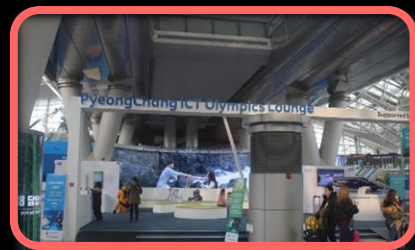


Smart Device



5G CPE

kt 5G Trial – Network Deployment




Airport
(ICN)

Seoul

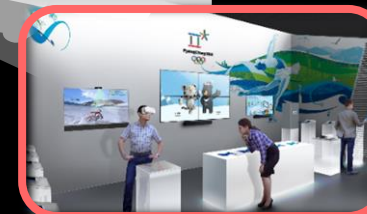
Bokwang

Gangneung

PyeongChang

Pangyo

Jeongseon



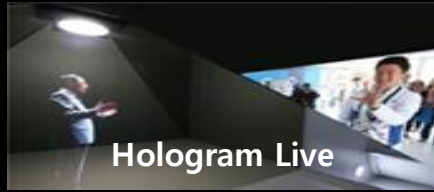
kt 5G Trial – Service

1st Test Event
('16.2)



Technology Securement

Rio
('16.8)



Technology securement &
Public relations

2nd Test Event
('17.02~03)



Application to real
games

U-20 World-Cup
('17.05~06)



Application to real games &
TV Broadcasting

Media Day ('17.3.14)




Autonomous Driving

PyeongChang
('18.02)



KT 5G Technology Trial
Service



**Closer than ever before
to bring 5G into Reality**

5G and Beyond

PEOPLE. TECHNOLOGY. 