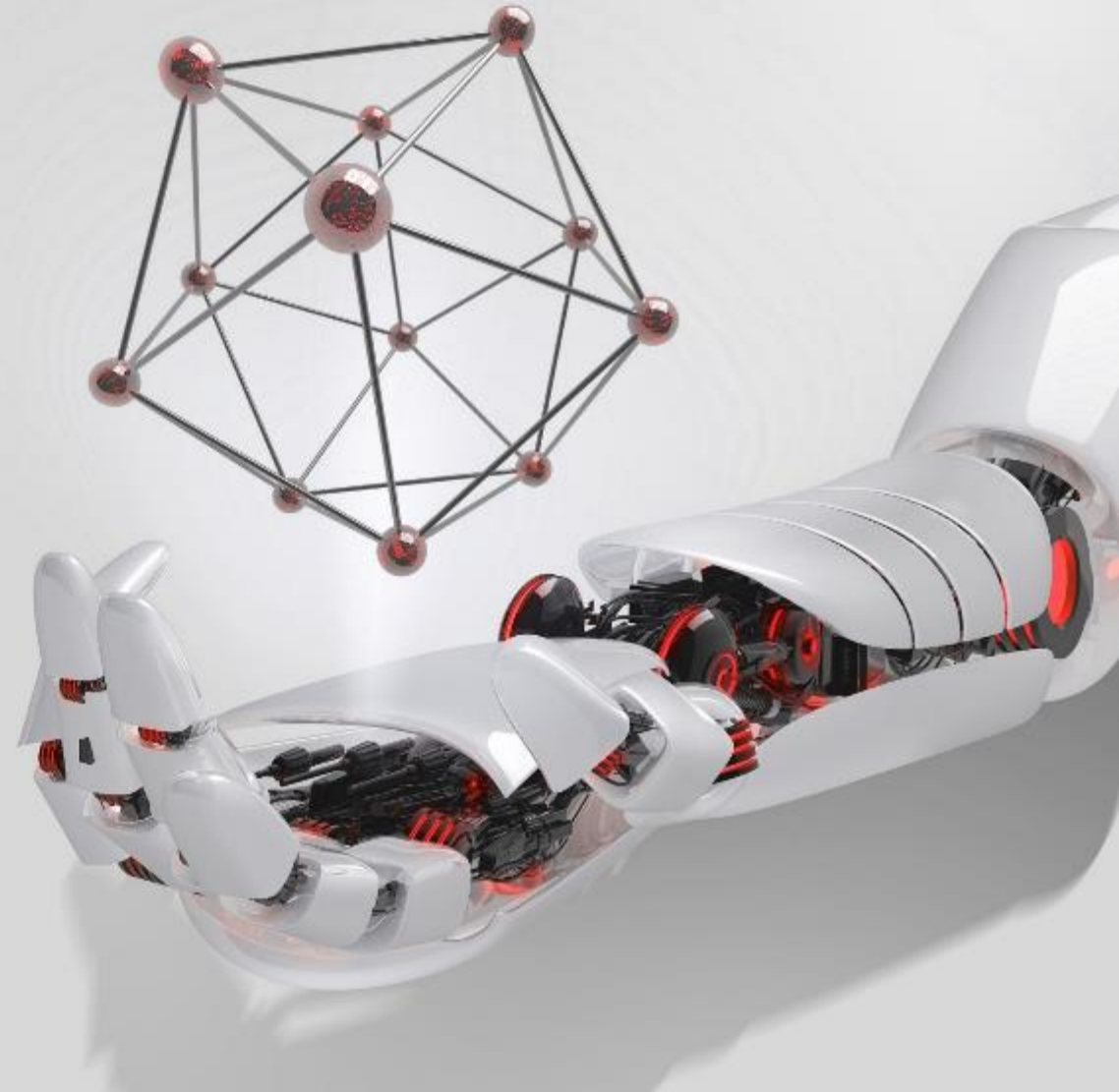


# 5G is ON

6<sup>th</sup> of June 2019



Argyriadis Vassilis

Network Solutions Director – Huawei Greece



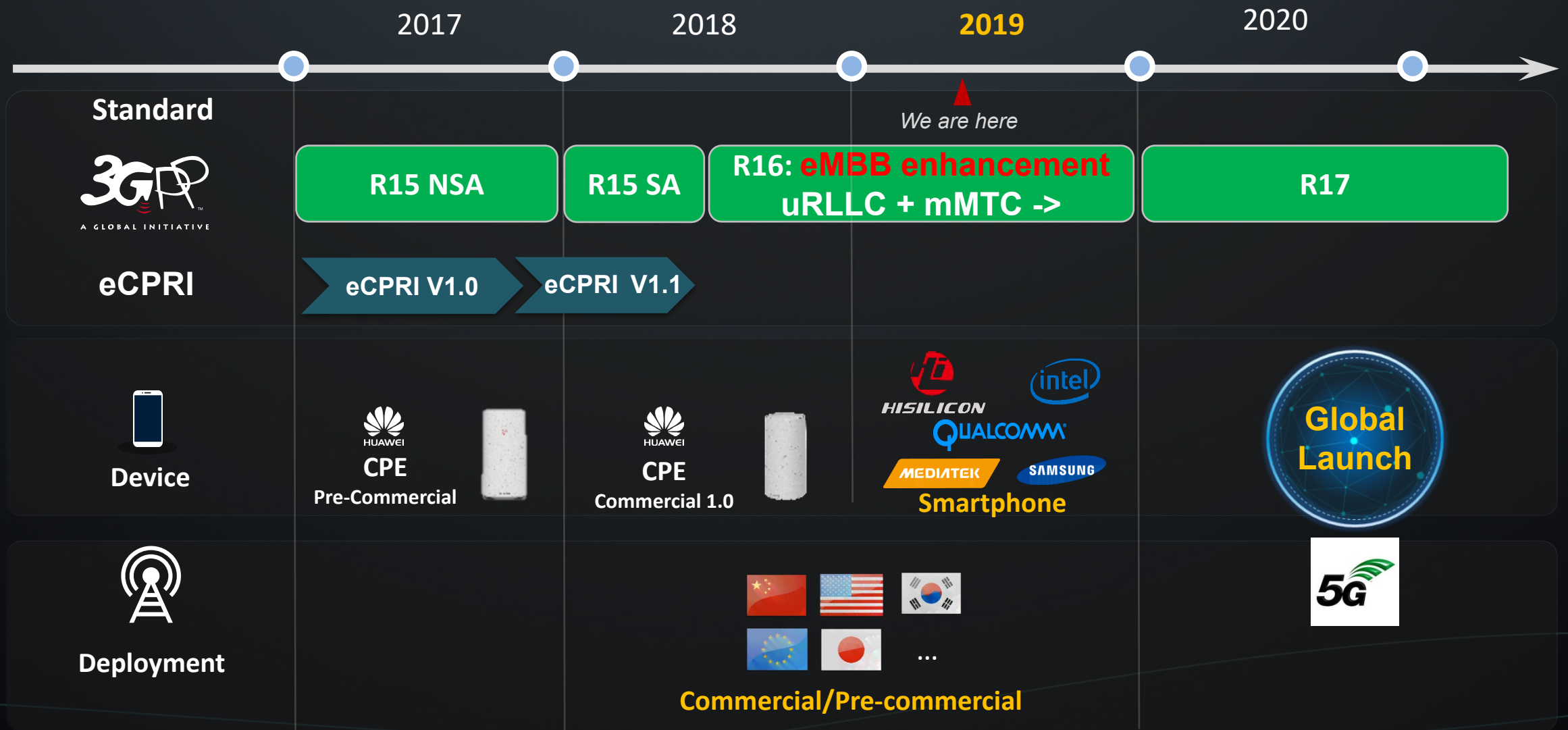
## How to persuade the market?

Some operators agree that 5G is the trend but are skeptical about 5G business models. They won't deploy 5G until they see successful experience from other carriers. How to start 5G and make breakthrough?

## How to achieve scale deployment in the market?

5G is only a tool for brand competition? Its use cases and scale deployment progress are still not clear. How to encourage operators to deploy 5G in scale?

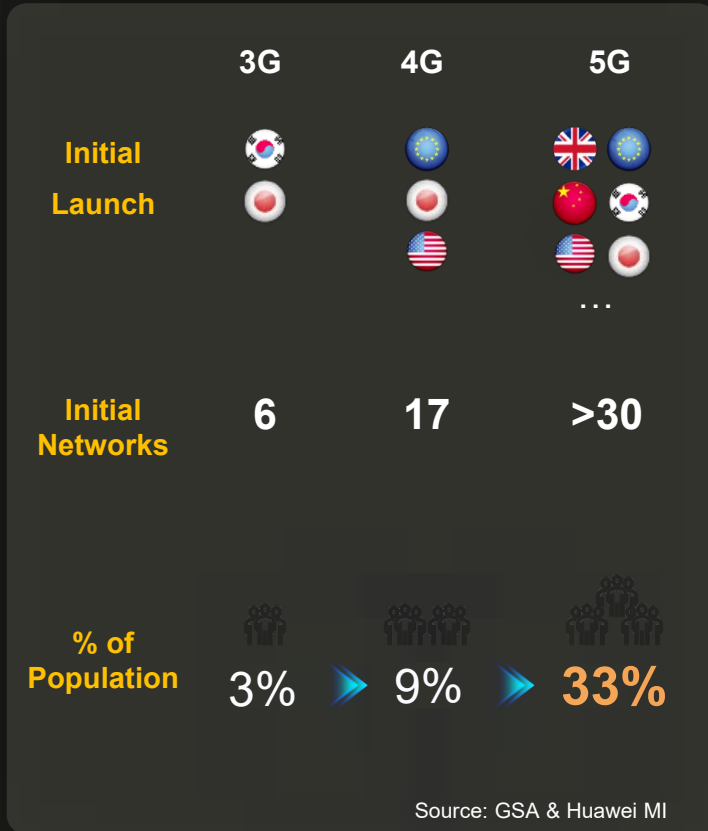
# 5G Industry is Available in 2019



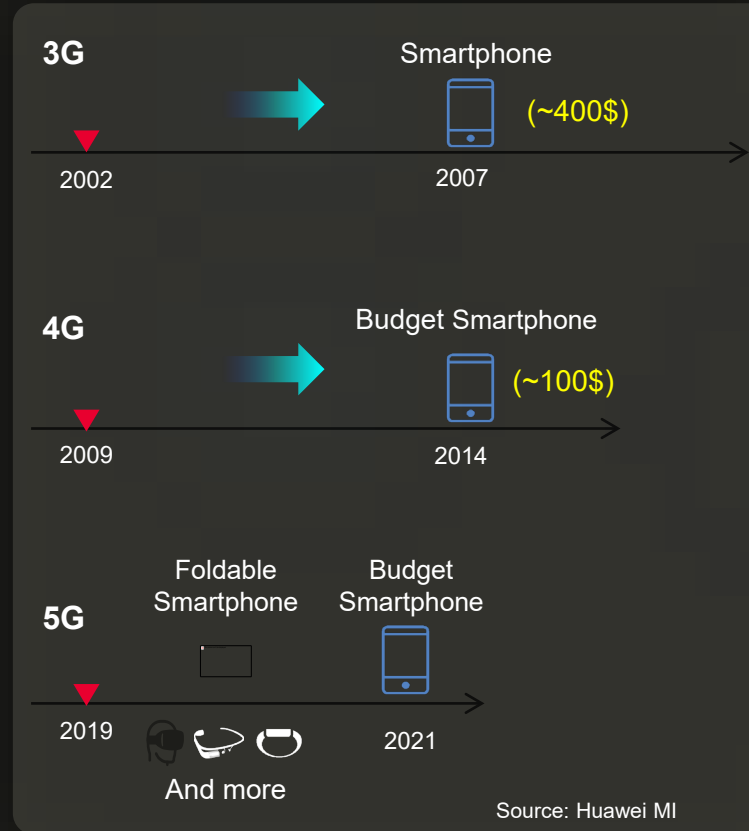
SA: Standalone Architecture  
NSA: Non-Standalone Architecture

# 5G Forecast: Fastest Ever, 500M Subs @ 3 Years

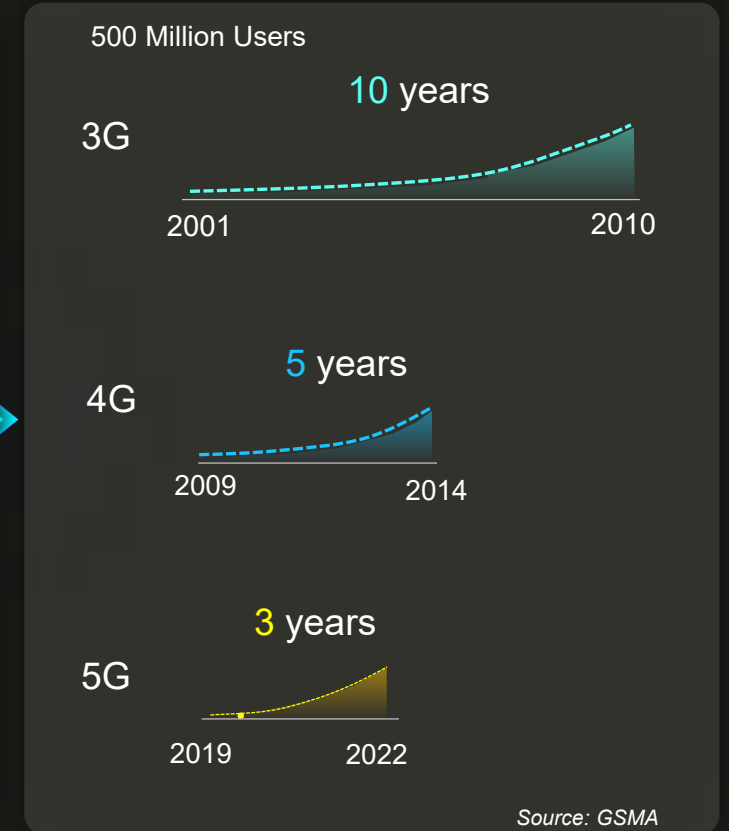
## Larger Scale Commercialization



## Device Industry Drives 5G Development



## 5G User Base Growing Faster



In MWC, GSMA Increased 5G Connection Forecast @ 2025: 1.2 billion -> **1.4 billion**



# 5G Offerings

Data Value

- Experience Based / GB Cost Leadership
- Restructuring B2C Biz Model: From Quantity to Quality
- Video Experience and Gaming Monetization

5G Fiber

- Full scenario 2C, 2H, 2B - Full service 4K, AR, VR
- 5G Air Fiber Redefining Wireless Broadband
- 5G WTTx as a Key Broadband Enabler

Cloud X

- Cloud Gaming
- Cloud PC/Robot/VR

Industry X

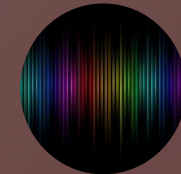
- Manufacturing
- Smart X

# 5G Enablers

Powerful

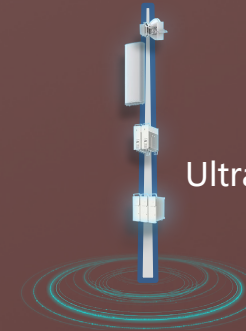


Massive MIMO



Wider and more Spectrum

Simple



Ultra-Lean Site

Fast deployment

Easier operation

Smoothen evolution

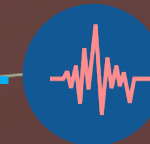
Efficient



Energy



Integration



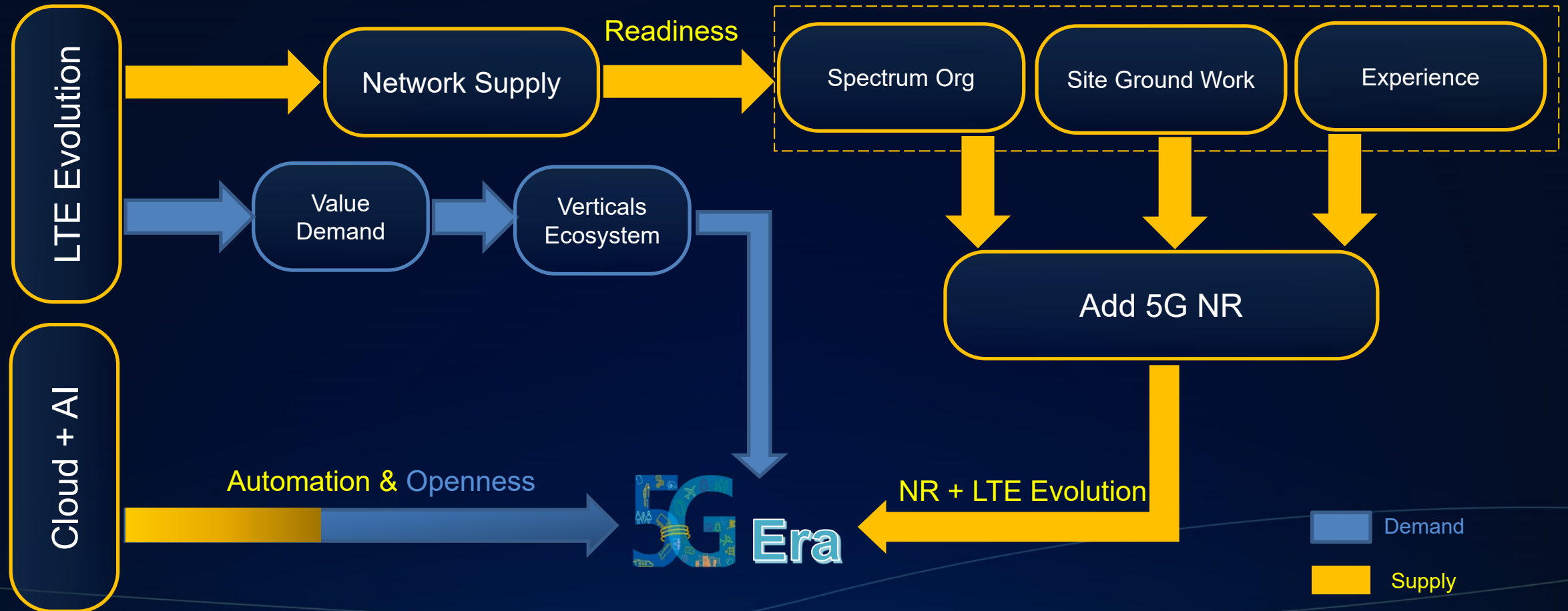
spectrum



operation

# 5G Commercialization & Readiness

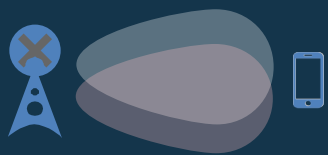
## Requires Investment in both Supply & Demand



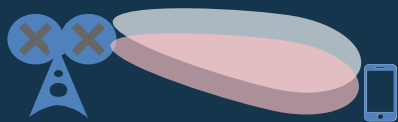


# M-MIMO is the Key Enabler of 5G Experience

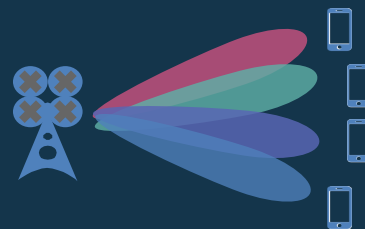
More Antennas Brings More Capacity and Better Coverage



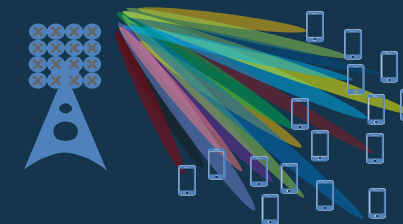
2T2R



4T4R

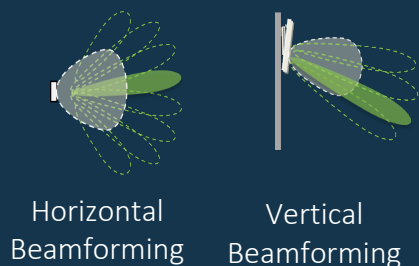


8T8R

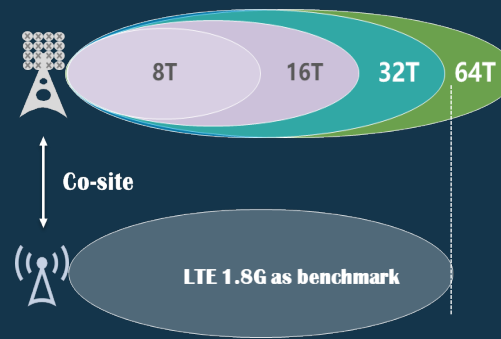


32/64T64R

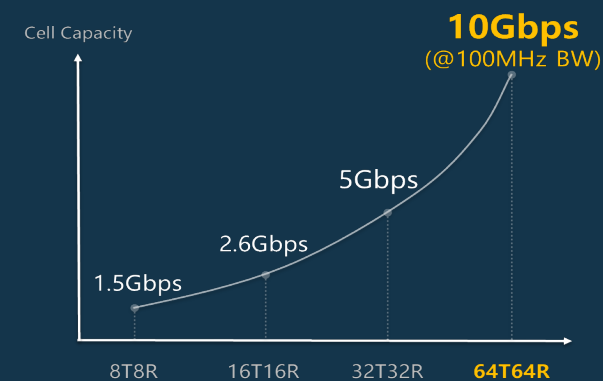
Multi-Dimension Coverage with 3D-Shaping



64T Co-coverage with LTE 1.8GHz



64T Provides 10Gbps Cell Capacity



# 5G Transport Networks

## Characteristics

### E2E Automation

- Fast deployment
- Fast troubleshooting
- Fast optimization



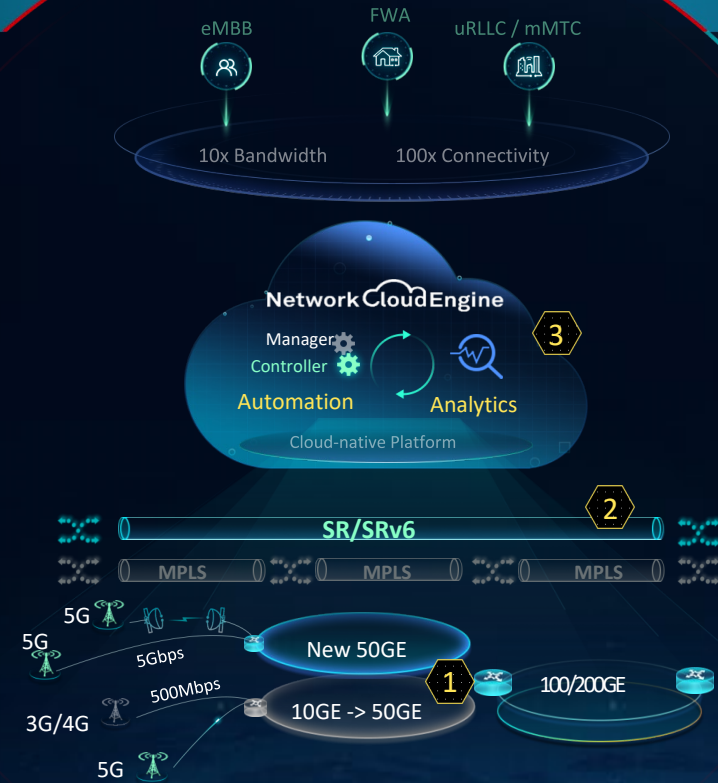
### Hybrid Bearing

Unified transport for 4G & 5G



### Affordable Upgrade

For 10x capacity growth



- 1 Build 10GE to site & 50GE access ring on demand
- 2 Implement E2E SR/SRv6 for 5G
- 3 Introduce NCE for E2E automation

## Solutions

### NCE

- Unified automation across legacy & new with **convergent** Controller & Manager
- SLA visibility** with analytics

### Hybrid

MPLS & SR

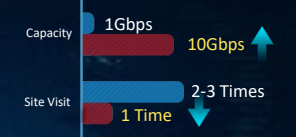
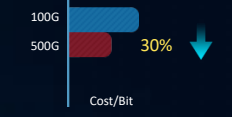
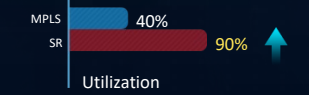
- NP based programmable SR
- Software upgrade: MPLS -> SR/SRv6
- Industry's 1st commercial SRv6

### 50GE

- 30% cost/bit saving with 50GE PAM4
- Single fiber BIDI, 80km distance
- 10+ carriers deployment

### MW

- 10G bps @ 6~42G Hz, 20G pbs @ Super Dual Band
- Single antenna **dual bands**, single ODU 4 **channels**, software expansion





# LGU+ Selects 32T, Deploys 10K Sites in 4 Months



## Major Challenges to Deploy 5G

### Space Limitation

Rooftop site can only provide space for on pole

### Load Limitation

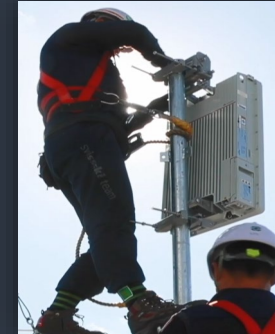
Rooftop Pole can only bear upto 25KG load

### Power Limitation

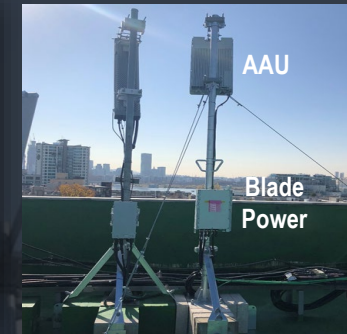
Existing Power Can't Accommodate 5G



Easy to Carry



Fast Installation



Independent Blade Power

2 men/site @~2 hours

No modification to existing power

## Huawei Compact M-MIMO 32T32R

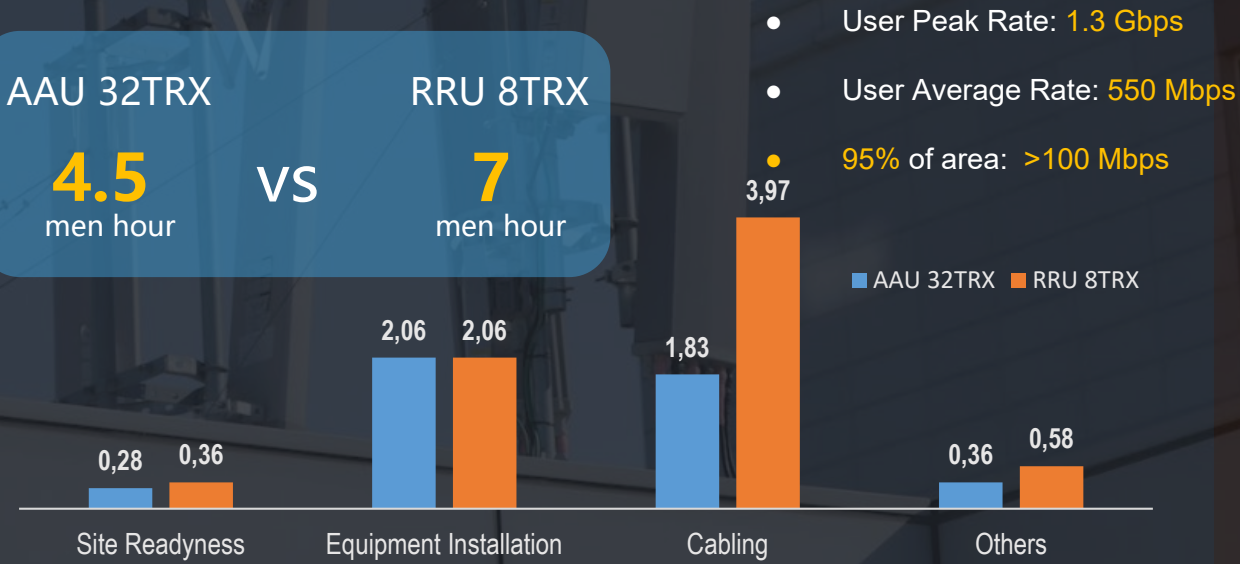
AAU 32TRX

RRU 8TRX

4.5 men hour

VS

7 men hour



35% time saving compared to 8TRX

# FWA Extends Higher Capacity to Home Broadband

Detached house



Building Complex



Rural area



Industrial park / CBD



**Service**

Super broadband: Up to **xGbps**

8K/4K Video, Cloud VR, Cloud Gaming

Super broadband: Up to **1Gbps**

4K Video, Cloud Gaming

Fast broadband

HD Video

Super broadband: Up to **1Gbps**

8K/4K Video-con, Cloud PC, vertical applications

**Matured technology and complete terminals**

5G Router Pro



5G Outdoor CPE



5G Mobile WiFi



5G Module



**Diversified existing services ready to be launched**

Cloud PC/Gaming



Cloud VR



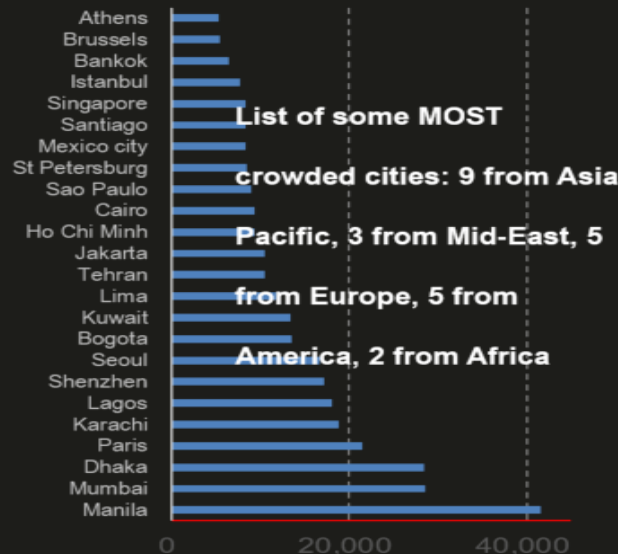
4K TV & live broadcast



**Pioneer telcos take the lead in 5G FWA**



**High population density calls for 5G**



Source: citymayors.com

**3.93Gbps/Site**  
@64T64R,100MHz,4R UE, DU/U

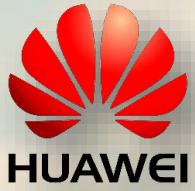
**100Mbps/home**  
@Fiber like experience

**393Homes/Site**  
@ 10% Convergence ratio

# Take Away – Key Messages

1. C-Band become primary band for 5G – **Reshuffle Spectrum** to allow 100MHz blocks for all
2. Excessive **Spectrum costs** will slow down 5G Network deployment
3. **Simplify 5G Site Licensing** process to accelerate deployment
4. Take **5G deployment** as an initiative, parallel with UFBB in order to **assist** towards to the **broadband** and **digital maturity** of our country.





**Time to Build 5G Networks**

Picture source: Getty Images

**Thank You.**

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