

# Convergence of ATSC 3.0 and 5G in South Korea

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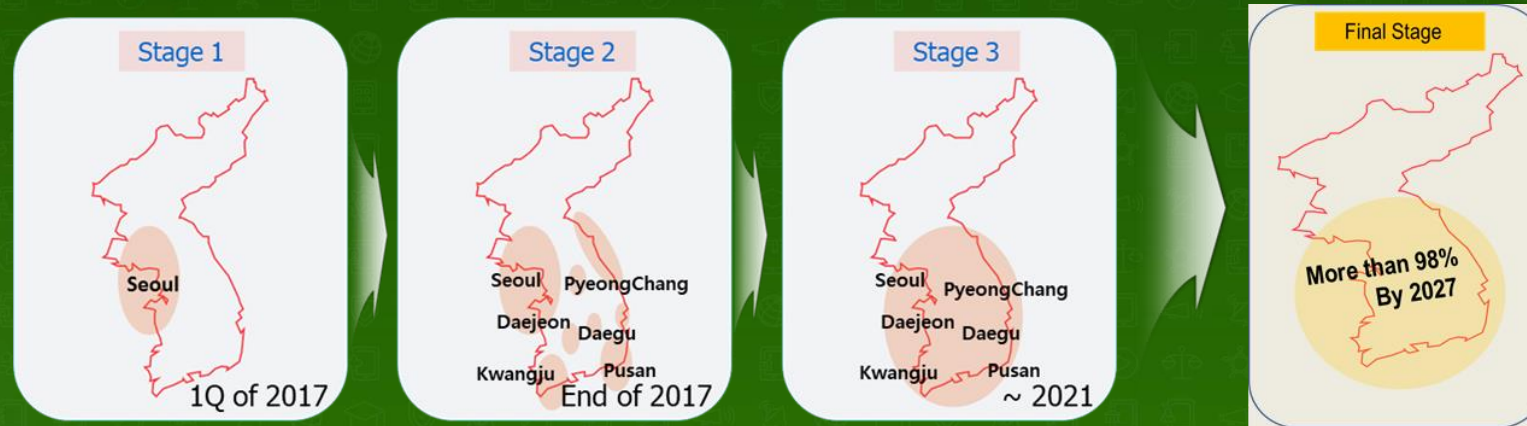


# WSIS+15 FORUM 2020



# ATSC 3.0 Status in S. Korea

- ATSC 3.0 delivering 4K-UHD started in Seoul metro area (May 2017), extended to major cities (Dec. 2017), and will be nationwide by 2021
- New frequency bands in 700 MHz were assigned for ATSC 3.0 (Simulcasting: ~ 2027)



- Successfully demonstrated high quality mobile broadcast + 4K-UHD in a single RF channel for 2018 Winter Olympics (PyeongChang)



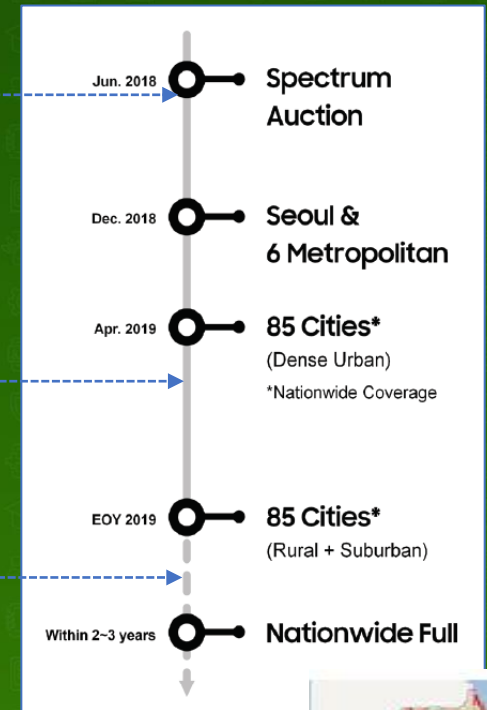
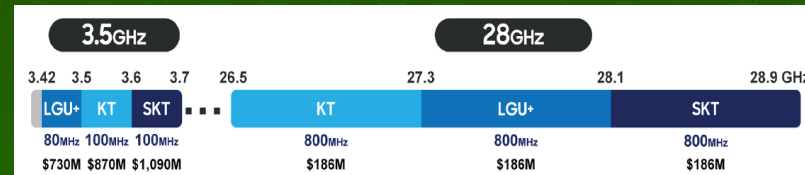
ATSC 3.0 mobile receiver installed in a shuttle bus over Olympic village



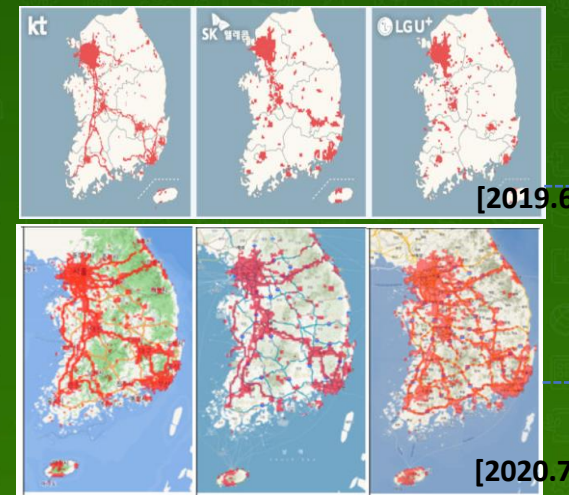
Inside the bus introduced by WRAL-TV (U.S.)

# 5G Status in S. Korea

- South Korea switched on the first mobile 5G network (April 2019, SKT/KT/LGU+), bringing the new technology officially into the first stage of global adoption.
- In South Korea, 5G subscribers surge hitting 1 million in just 69 days



- Spectrum auction for the new freq. bands in 3.5GHz (280MHz) and 28GHz (2.4GHz) is completed in June 2018.
- At first, 5G commercial service has started on dense urban areas of 85 major cities.
- Within the next 2~3 years, a perfect nationwide coverage will be constructed at a similar level to 4G LTE.





# Pros and Cons of Broadcasting and Broadband

## ATSC 3.0-based terrestrial broadcasting

- Free of charge
- HPHT (high-power high-tower)
- Guaranteed QoS (irrelevant to number of users)
- Narrowband & limited-capacity
- Limited indoor/underground/mobile reception

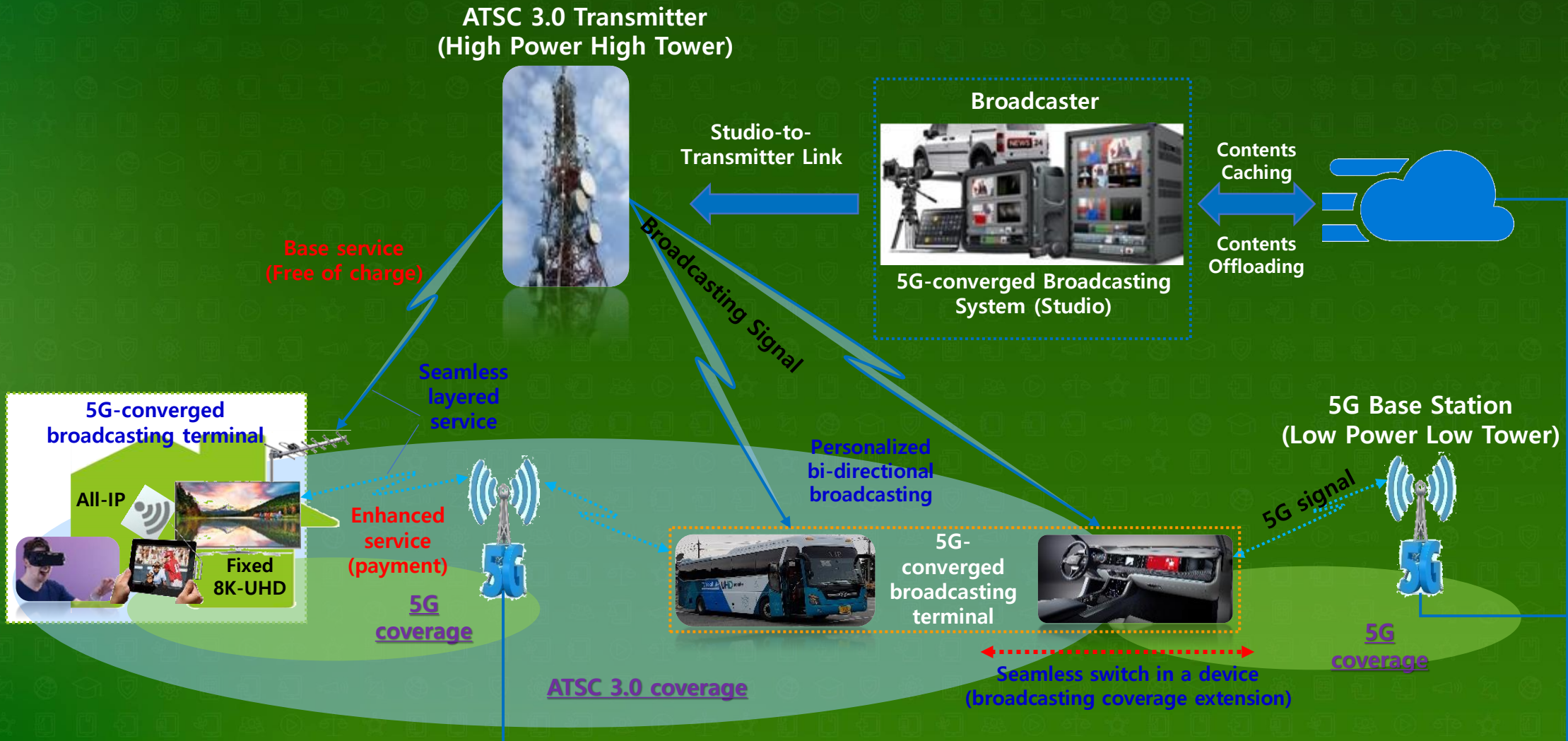
## 5G-based mobile broadband

- Payment
- LPLT (low-power low-tower)
- QoS depending on number of users
- Broadband & high-capacity
- Easy indoor/underground/mobile reception

## *Convergence of broadcasting and broadband*

- Possible to reduce mobile service payment
- Possible to provide high-quality & personalized services
- Possible to provide anytime/anywhere seamless multimedia services

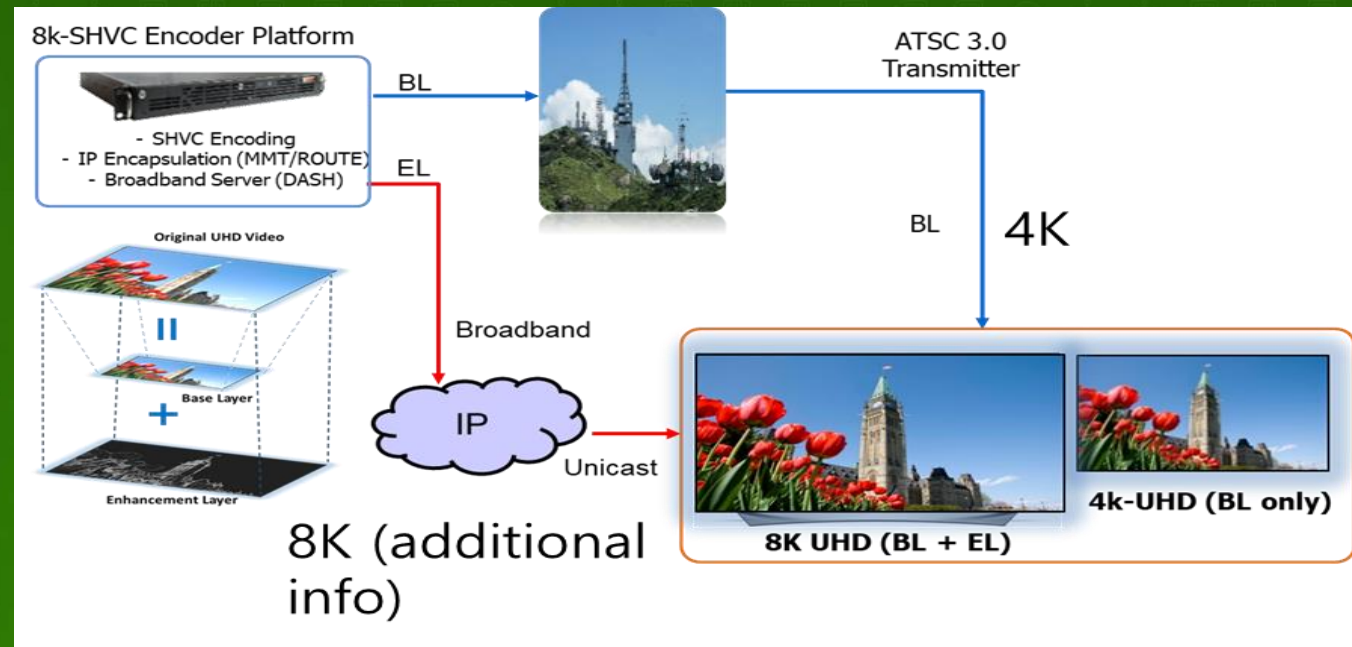
# Convergence Concept of ATSC 3.0 and 5G





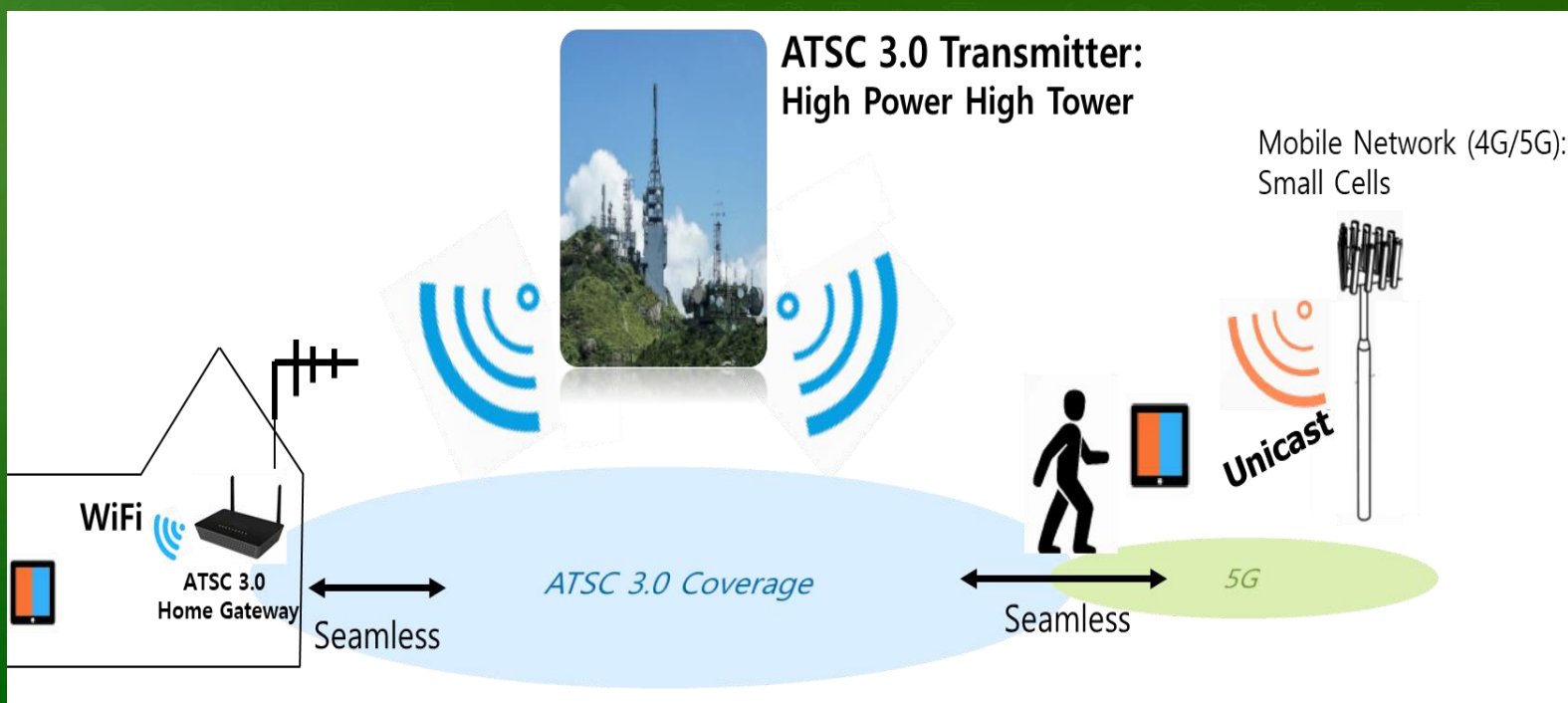
# Convergence Scenario: Scalable 8K-UHD

- Efficient 8K-UHD distribution within the existing ATSC 3.0-ready TVs
  - Layered video encoding (aka Scalable HEVC (SHVC)) with two layers
    - 'Base layer (BL)' containing 4K-UHD content
    - 'Enhancement layer (EL)' with metadata to enhance the 4K BL into 8K-UHD video
  - Distribution via broadcasting (BC) and broadband (BB)
    - BC-only user can watch 4K UHD (free of charge)
    - If BC and BB links are both available, user can get 8K-UHD for the same content



# Convergence Scenario: Seamless Switch in Device

- IP-based ATSC 3.0 transmission allows convergence with Broadband networks
- ATSC 3.0 transmission (HPHT) takes the dominant consumption of video traffic
  - Broadband networks cooperating for coverage extension (deep indoor, mobile) and interactive services thru Unicast
  - Seamless switching between different networks (ATSC 3.0 ↔ 4G/5G, WiFi)
    - ➔ Viewers are not aware of the change of network



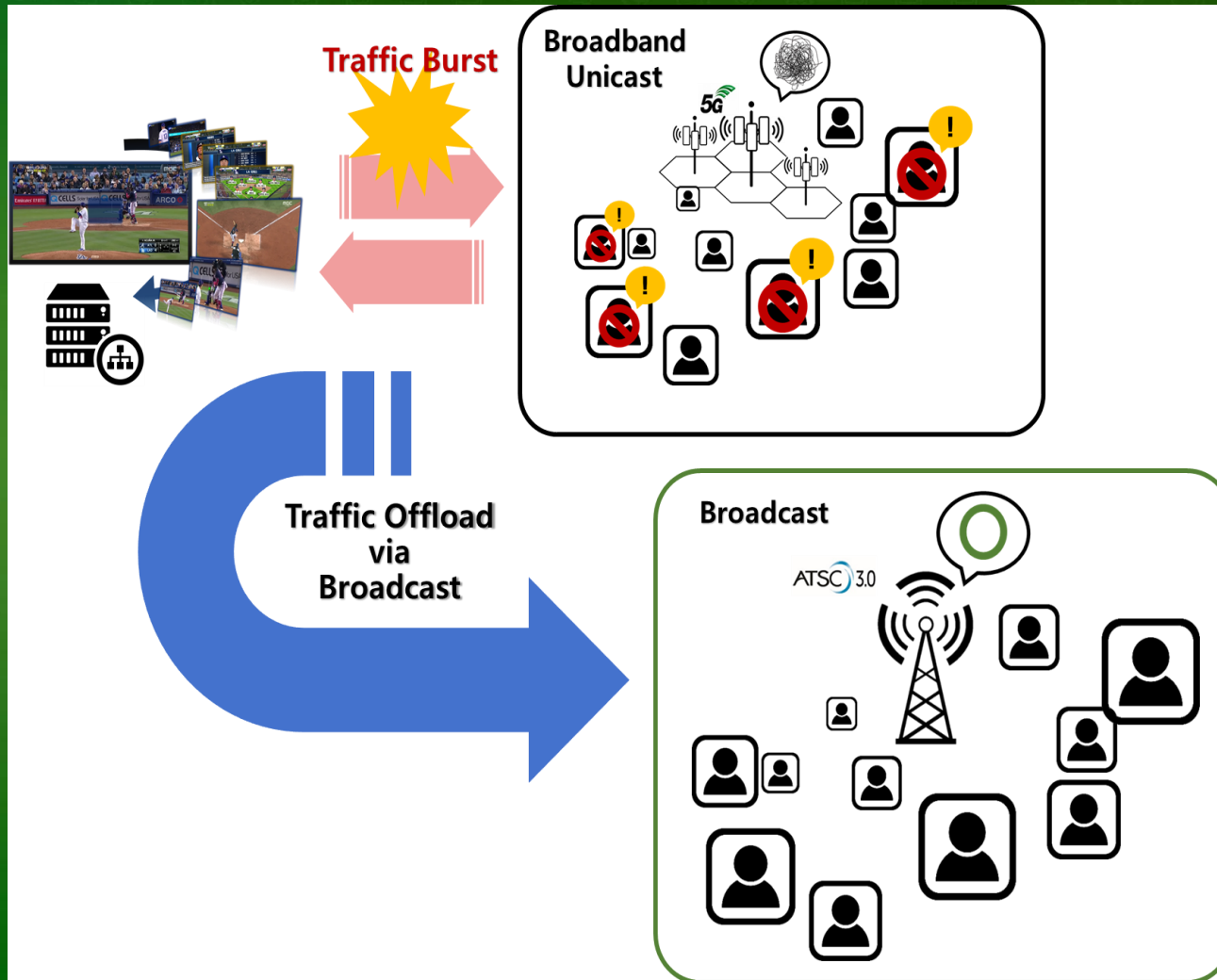
## 2. Seamless Handoff of BL (Mobile) between Broadcast and Broadband



<Field verification in S. Korea>



# Convergence Scenario: Broadcasting Offloading



- **Traffic offloading to prevent network congestion**

- Service traffic is kept monitored at the network
- Popularly requested contents are offloaded into broadcast delivery

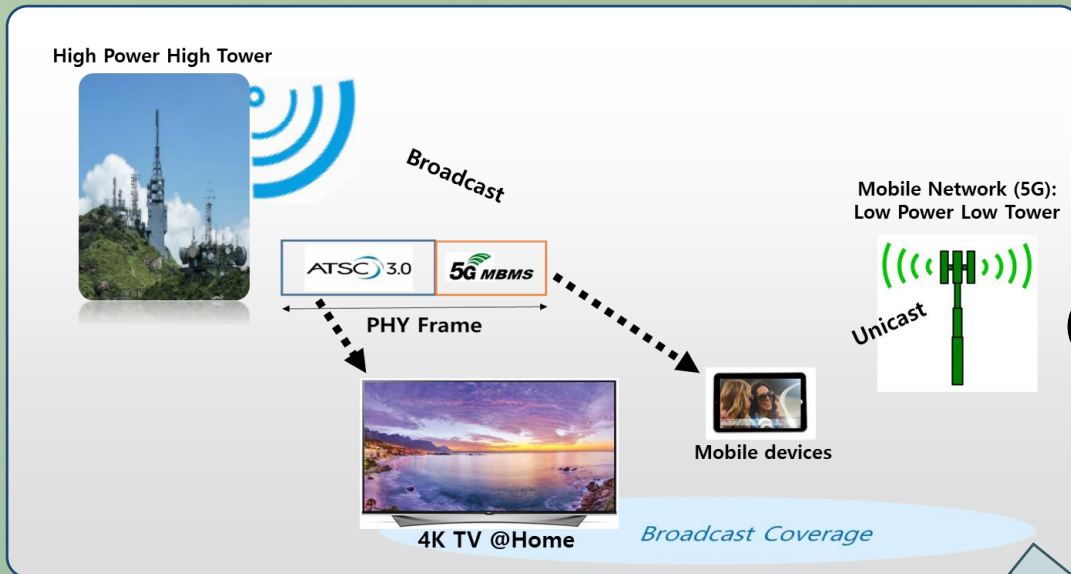
# Thank You!



# Convergence Concept of ATSC 3.0 and 5G

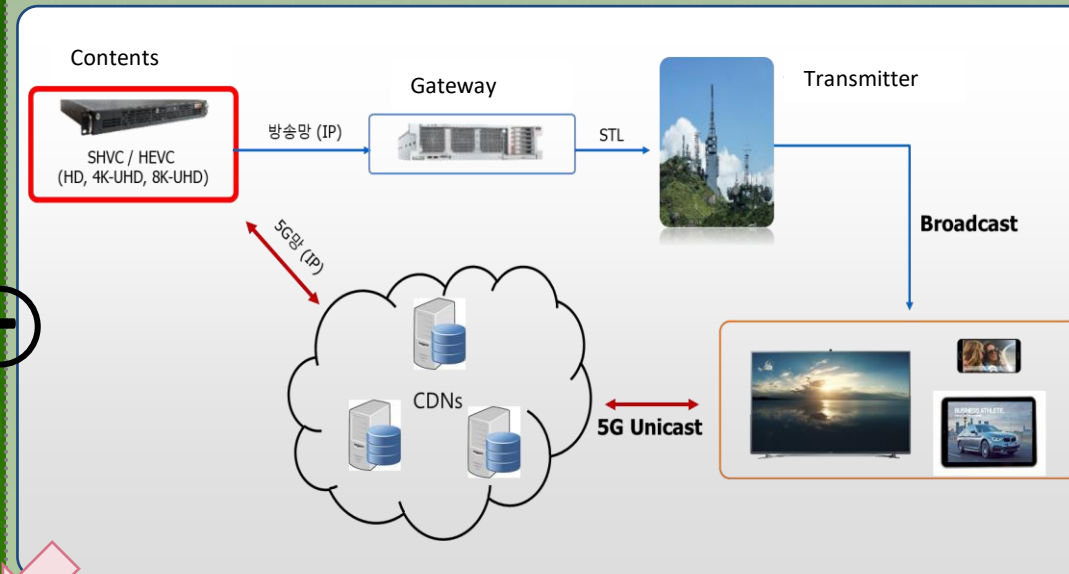
## 5G-ATSC 3.0 Physical-Layer Convergence

- HPHT-base 5G-MBMS & ATSC 3.0 terrestrial broadcasting service (UHF & VHF)
- Time-divisioned in a single RF channel
- Backward compatible with the existing ATSC 3.0 TVs and possible for 5G-terminal to receive broadcasting contents



## 5G-ATSC 3.0 IP-Layer Convergence

- All IP-base ATSC 3.0 can converge any IP-base networks (4G/5G, WiFi, etc.)
- Free of charge contents delivered via a large-coverage broadcasting network
- Additional data (e.g., meta-data) delivered via broadband (payment) to provide enhanced service



HW/SW implementations and field verification in South Korea

