



ATSC 3.0 base Terrestrial UHD Broadcasting in S. Korea



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- ❖ Why ATSC 3.0 in S. Korea?
- ❖ On-going and planned services in S. Korea
 - Single Frequency Network (SFN)
 - Mobile HD
 - Advanced Emergency Alert (AEA)
- ❖ Summary

ATSC 3.0 base Terrestrial UHD Status in Korea (1)

Commercial Launch

- ATSC 3.0 base terrestrial 4K-UHD broadcasting 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 UHD broadcasting
- Existing HD (ATSC 1.0) and new UHD services must be **simulcasted by 2027**, and then the existing HD service will be switched off



ATSC 3.0 base Terrestrial UHD Status in Korea (2)

Consumer Devices

- TV, Set-top box, and others (dongle receiver, home gateway) are available in market

TV



STB



Others



- Dongle receiver for existing device
- Home gateway for WiFi re-distribution

ATSC 3.0 base Terrestrial UHD Status in Korea (3)

2018 Winter Olympics (PyeongChang)

- Successfully demonstrated HD mobile and 4K-UHD in a **single RF** channel



Why ATSC 3.0 in Korea UHD? (1)

ATSC 1.0 Developed in 1993

Computer
DOS ... Windows 3.1



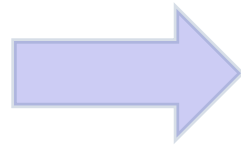
Cell Phone
Analog 2G



Dial-up Modem
19.2 kbps



VCR - analog



- First digital broadcasting standard
- HD video & 5.1 digital audio
- Electronic program guides & caption

Revolution in 1993

Modern Digital World

WiFi 802.11ac 1300 Mbps



HDMI
2.0

Smart Phones



But, Old-fashioned TV



Why ATSC 3.0 in Korea UHD? (2)



Enhanced TV

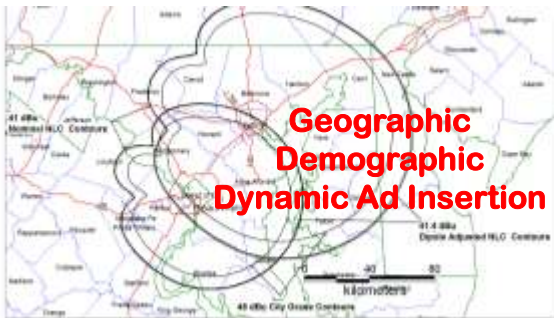
Mobility



Quality



UHDTVs



Geographic
Demographic
Dynamic Ad Insertion

Targeting



Datacasting

Navigation Updates

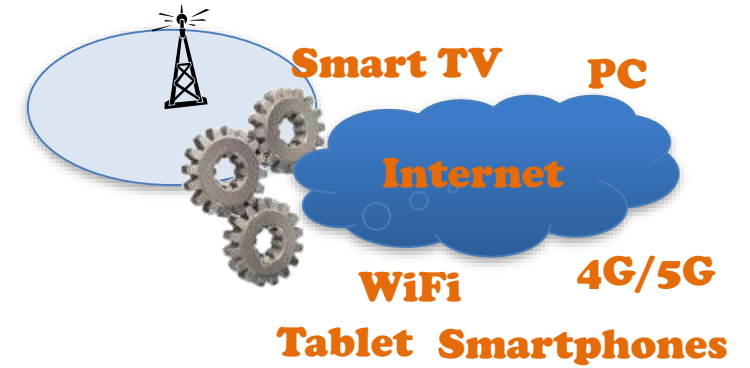


Multimedia Files



Apps and Data

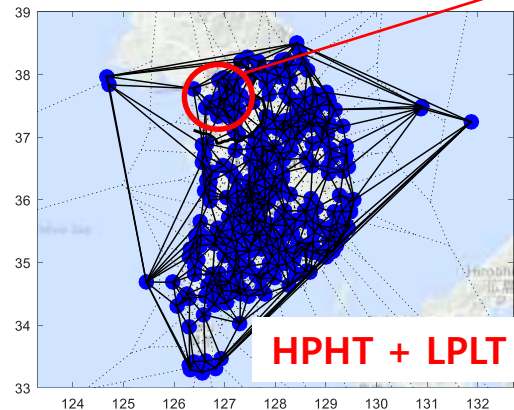
Convergence



On-going and Planned Services: SFN

Single Frequency Network

- New frequency bands in **700 MHz** were assigned for UHD broadcasting
- HD and UHD simulcasting is mandatory → No more frequency resource!!



Seoul area: 10 TXs (a few more later)

On-going and Planned Services: Mobile HD

Mobile HD Trial

- Several field trials (in SFN) verified feasibility of mobile HD service:
 - SFN → uniform & stronger field strength
 - ATSC 3.0 PHY → robust reception performance & simultaneous service (HD and UHD)

ATSC 1.0 + T-DMB



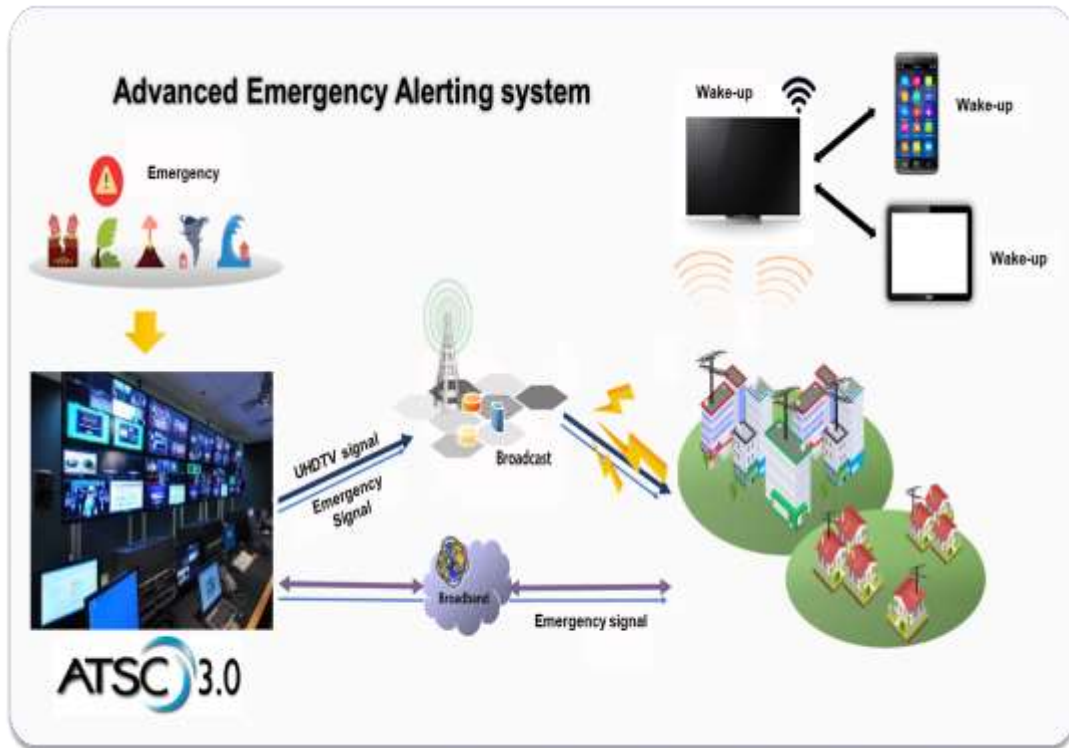
ATSC 3.0 UHD



On-going and Planned Services: AEA

Advanced Emergency Alert

- ATSC 3.0 AEA service was launched in September 2019: **wake-up and rich media**



ATSC 3.0 Emergency Alert System Launches In South Korea

Using a terrestrial UHD broadcast network, South Korea believes system will be nationwide by 2022.

Michael Balderston · Updated: Sep 30, 2019 · Original: Sep 30, 2019.



SEOUL—The global development of ATSC 3.0 continues with an announcement over the weekend that South Korea has launched a UHD Emergency Alert Service that is based on ATSC 3.0 technology. The Korean Ministry of Information and Communication made the announcement during the 2019 Broadcast Industry Promotion Week.

The new system uses a terrestrial UHD broadcast network to deliver disaster related information, but at this time it will work in tandem, not as a replacement, for Korea's existing telecom-based alert system. The Korea IT Times reports that the addition of ATSC 3.0 signals is meant to enhance the country's alerting process by offering backup and covering "blind spots" not covered by telecom signals.



➤ Terrestrial UHD Status in S. Korea

- ATSC 3.0 standard was selected for UHD broadcasting
 - ✓ Enhanced TV: mobility, better quality (UHD), personalized service (targeted AD)
 - ✓ Datacasting: navigation update, multimedia file delivery, apps and data
 - ✓ Convergence: any kind of IP-base broadband system
- Commercial launch in 2017 and nationwide by 2021 (new spectrum: 700MHz band)
- Simulcasting of existing HD service and new UHD service by 2027

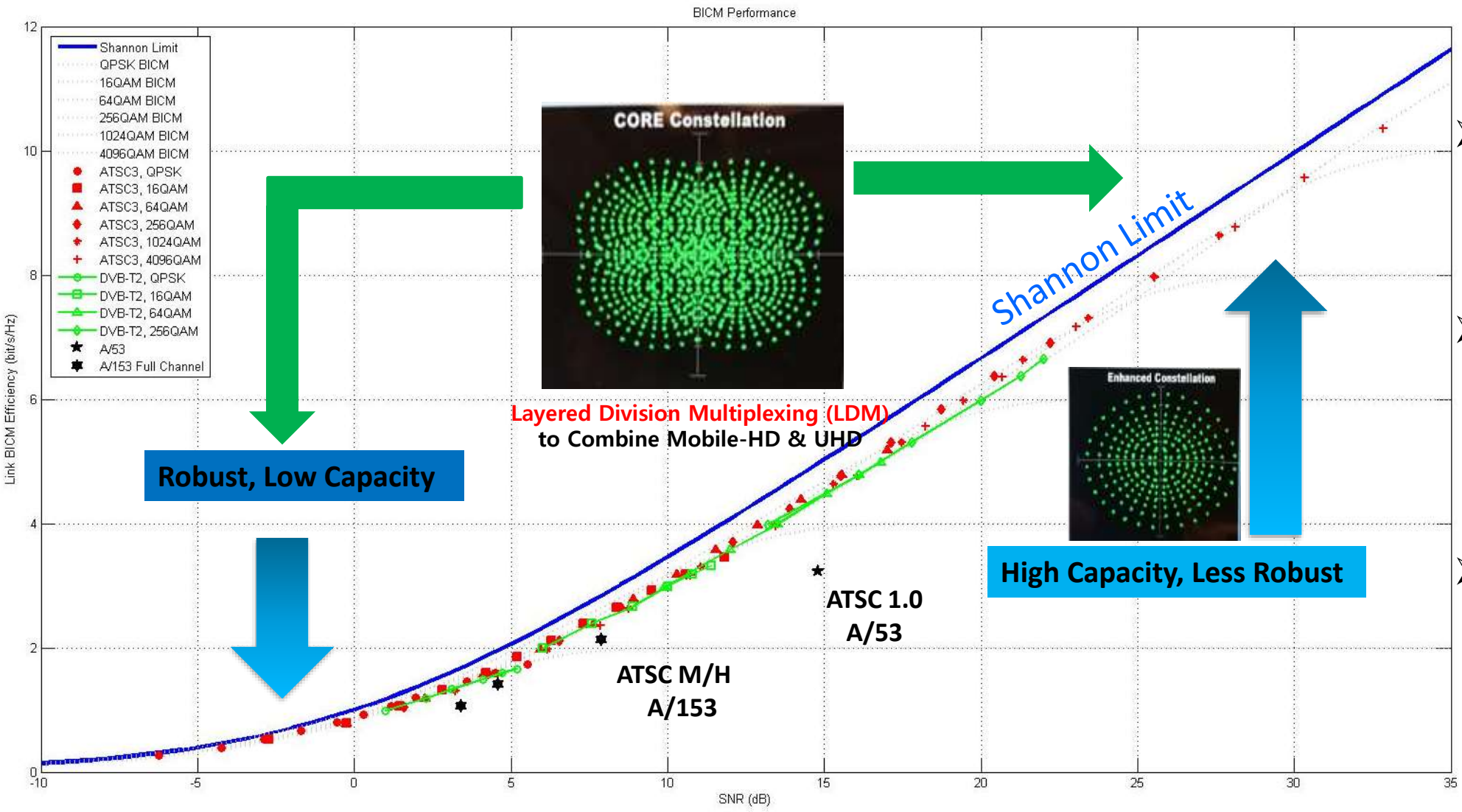
➤ On-going and Planned Services

- Single frequency network → uniform and strong field strength → mobile & indoor service
- Simulcasting of mobile HD and fixed 4k-UHD in a single RF channel
- Advanced emergency alert to support wake-up and rich media
- Future convergence with 4G/5G/WiFi



Thank You!!

Why ATSC 3.0 in Korea UHD? (3)



➤ **Flexibility:**
provide large range of operating modes

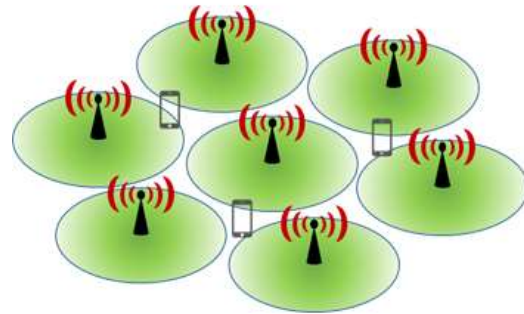
➤ **Robustness:**
for mobile or deep indoor reception (~ -6 dB SNR)

➤ **Spectral efficiency:**
better efficiency when services are multiplexed → LDM, SHVC

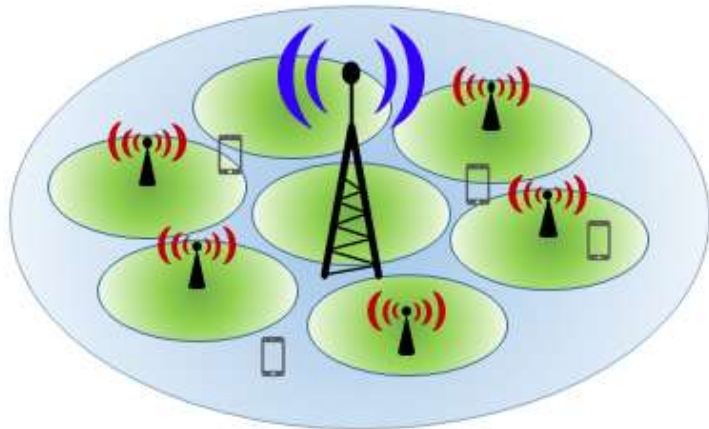
On-going and Planned Services: Convergence (1)



HPHT Broadcast (ATSC 3.0)



LPLT Mobile Network (5G)



Convergence of Broadcast and Broadband

- Broadcast (ATSC 3.0)
 - High power high tower (HPHT)
 - One-to-many transmission: efficient for simultaneous deliveries
 - May need additional LPLTs for robust mobile/indoor services

- Mobile Network (5G)
 - Low power low tower (LPLT)
 - Unicast, availability of uplink
 - Network can be congested (packet drop, latency)

- ➔ A service using converged network takes the benefits from the both networks
 - More capacity
 - Coverage extension
 - Realistic/Interactive services

On-going and Planned Services: Convergence (2)

Convergence (4G/5G/WiFi etc)

- ATSC 3.0 is world 1st all-IP system so that it can be connected to any kind of IP-base system
- Plan to converge with 4G/5G system



- ATSC 3.0 Broadcast (HPHT) takes dominant consumption of A/V traffic
 - Broadband can be cooperated (interactivity, hybrid, coverage extension) thru Unicast
- Seamless switching between Broadcast and Broadband networks