

3GPP TSG RAN Rel-18 Workshop
Electronic Meeting, June 28 - July 2, 2021
Agenda item: 4.2

RWS-210653

Release 18 5G NR Terrestrial Broadcast

Academy of Broadcasting Science (ABS)

Brief Introduction to ABS

National Government, Ministerial level

National Radio and Television Administration (NRTA)

Local Government: Province, City and Country

Technical Support

industry regulation and administration

Public Institution
Research Entity

Academy of Broadcasting Science (ABS)

Technical Support

China Broadcasting Network Co. Ltd. (CBN)
5G License

controlling shareholder

Radio & Television Bureau

Government

TV Station and Transmitters

Public Institution

Cable Network Company

Company

Commercial operation with
Public Affair responsibility

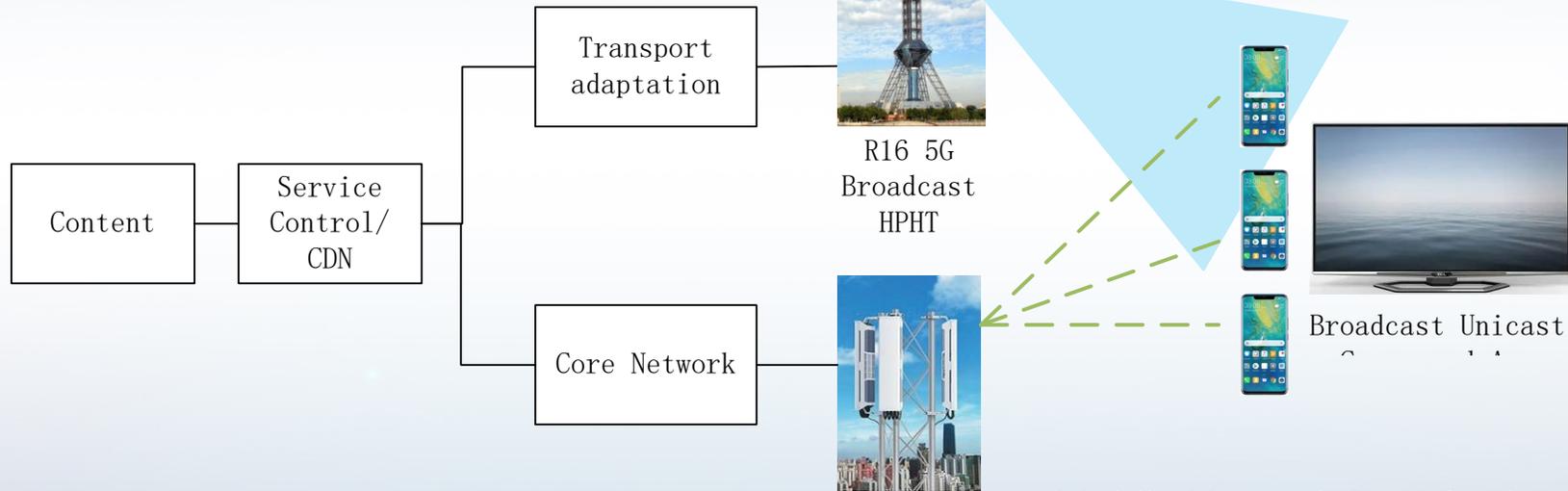
What we are doing

- On behalf of NRTA, we are leading the 5G broadcast standard development and trials.
 - For public broadcaster to provide TV/Radio service to people without subscription to network which uses 3GPP Rel-16 5G broadcast standard and deploys in Broadcasting spectrum.
 - To leverage and upgrade the existing broadcasting infrastructure to give vigor to traditional broadcasting industry.
- In Advanced Interactive Broadcast (AIB), a broadcast SDO in NRTA, we are leading the 5G broadcast standard development.
 - 3GPP Rel-16 LTE-based 5G Terrestrial Broadcast is endorsed as the radio access layer.
 - Core network is simplified to adapt to public TV service which is Free to Air, Receive Only and steady for a long period of time.
 - 3GPP SA4 5GMS and related technologies are adopted as one of options in media and transport layer.

Possible Step 1 In China

Option 1: Cooperated Network

- Broadcast and Unicast networks are different in spectrum, service, operator and industry regulator;
- Construction and evolution could be separated;



High Power High Tower broadcast, HPHT
Spectrum: Sub-700MHz (recommended)
Service: Public Linear TV/Radio
Operator: Broadcast Network Operator, BNO

- Broadcast and Unicast networks cooperate to provide Public Broadcasting, Linear TV/Radio, Media Streaming and new services to smart phone directly;

Mobile Network Base Station, LPLT
Spectrum: IMT spectrum
Service: Streaming/OTT (Commercial)
Operator: MNO
Unicast could even be OTT.

Possible Step 1 In China

Option 2: Converged Network

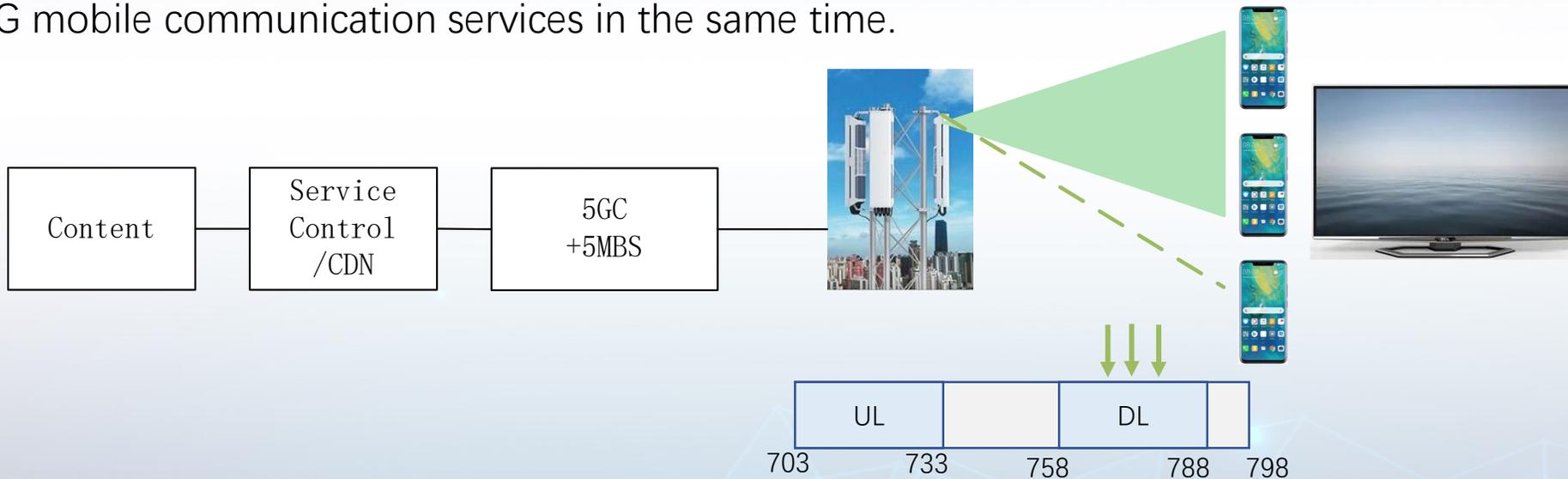
Mobile Network Base Station (LPLT) in Broadcast/Unicast Mixed Mode (R17 5MBS & NR_MBS);

Spectrum: IMT spectrum;

Service: Public Linear TV/Radio and Streaming (May be commercial);

Operator: MNO yes, BNO no, due to 5G license and the cost.

This solution might be suitable to a company who has various resources for providing both broadcast and 5G mobile communication services in the same time.



- Broadcast, Multicast & Unicast Converged network is useful for “venue broadcast”;
- FTA/ROM/SFN are missing in R17;

Evolution to NR

Step 2: NR Terrestrial Broadcast

- HPHT and LPLT are converged into NR standard;
- Different configurations meet different requirements from BNO and MNO or operator with mixed role.
 - LPLT unicast/multicast/broadcast mixed mode - for MNO or mixed role;
 - LPLT dedicated broadcast - for BNO if they want;
 - HPHT dedicated broadcast - for BNO;
 - HPHT cooperates with LPLT or any other bi-directional network - for BNO and/or MNO;
- 5GC support both NR terrestrial broadcast and R16 5G Broadcast;
 - UPF level unicast & broadcast convergence could largely reduce the interactive operation latency – e.g. package repairing, unicast and broadcast traffic continuity

Proposals on Rel-18 Terrestrial Broadcast

- Proposal 1: NR enhancement for Terrestrial Broadcast
 - New numerologies enabling large coverage;
 - Sub-frames and physical channel for broadcast;
 - MBSFN;
 - Definition of Downlink Only Broadcast bands in UHF;
- Proposal 2: Architecture enhancement for Terrestrial Broadcast
 - Support ROM/FTA in 5GC for both Rel-16 5G broadcast and NR based broadcast;
 - Dedicated broadcast;
- Proposal 3: LTE-based 5G terrestrial broadcast enhancement
 - Leftover of R17 new Channel Bandwidth on UHF band;
 - Cooperation of NR unicast and 5G broadcast;

Annex: enTV Trail Network in China

- Locations

- 3 sites in Beijing (Central Tower, Jinguang Building, Mingren Building)
- ISD: 10~13km; Height: 150, 200, 300m

- Configuration

- Power: 1KW
- Channel: DS43 (750~758MHz)
- Bandwidth: 5MHz

