

3GPP TSG RAN Meeting #92e
Electronic Meeting, June 14 – 18, 2021
Agenda item: 9.1

RP-211147

Motivation Paper for New WI of 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

Public Institution
Research Entity

Technical Support
Academy of Broadcasting Science (ABS)
Technical Support

industry regulation and administration

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

controlling shareholder

Radio & Television Bureau

Government

TV Station and Transmitters

Public Institution

Cable Network Company

Company

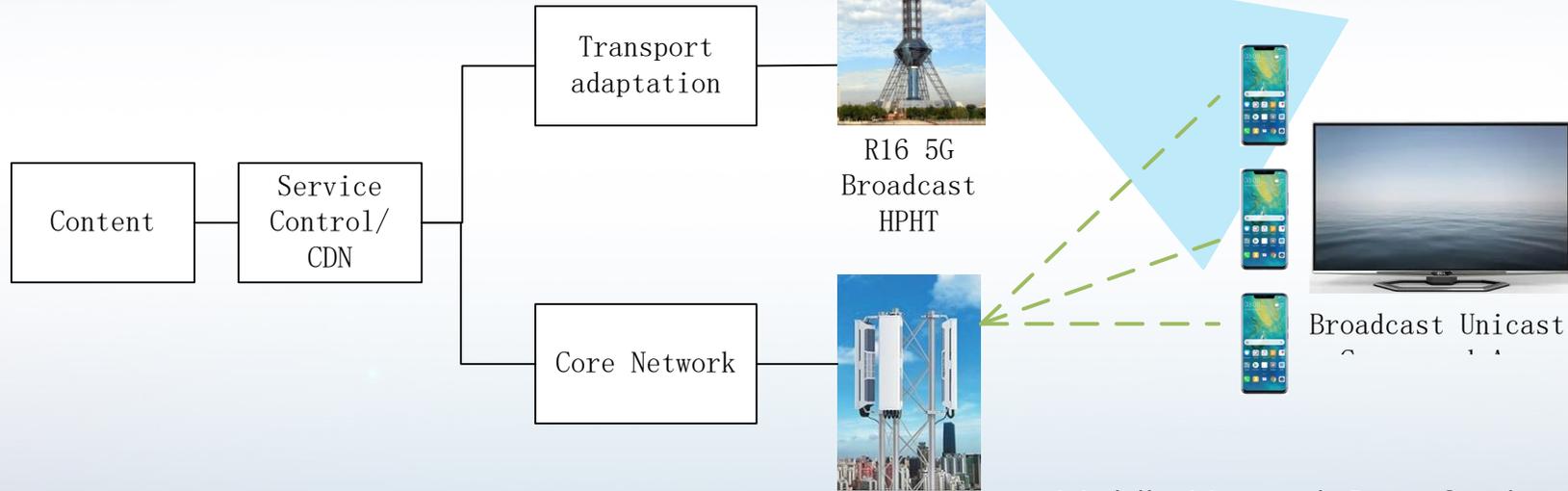
Commercial operation with
Public Affair responsibility

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 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.

Step 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.

Step 1: Converged Network

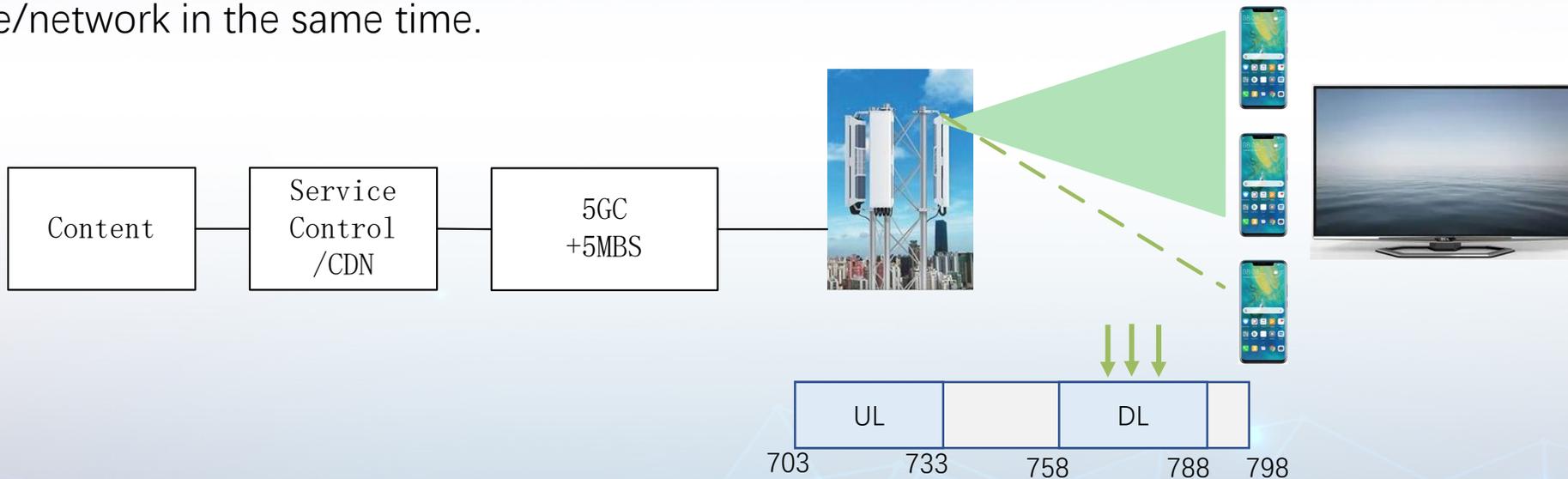
Mobile Network Base Station (LPLT) in Broadcast/Unicast Mixed Mode (R17 5MBS & NR_MBS);

Spectrum: IMT spectrum;

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

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

This solution would be adopted by a company who has both broadcast network and 5G license/network in the same time.



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

Our trials

- ABS tested R14 enTV (Standard compliant) and CBN tested R17 NR based broadcast (with proprietary design) in Beijing, China.
- Both results show the systems are workable, more details are in annex.

Step 2: NR Terrestrial Broadcast

- HPHT and LPLT 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 like
 - 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

Considerations of Rel-18 TV Broadcast Services

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

Thanks!

Annex 1: R14 enTV Trail Network

- 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

