

LG Uplus views on 5G NR evolution path with option 5/7x

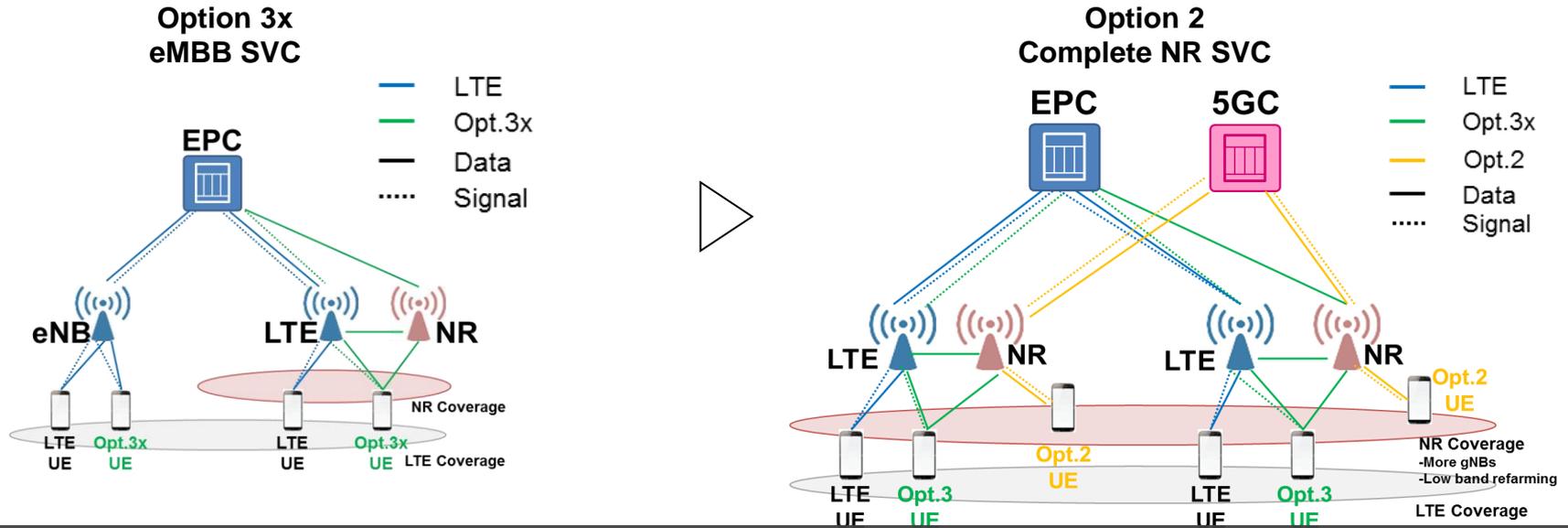


• Timeline

- Plan for finalizing all NR architecture options was endorsed [1]
- Option 3, 2 and 5 were finalized excepting maintenance parts and ASN.1 updates



- **Key functionalities from Option 5, LTE-5GCN, were identified in [2]**
 - 5G NAS message transport, 5G security framework except that data integrity protection is not supported, Unified Access Control, Flow-based QoS, Network slicing, SDAP, NR PDCP, Support of UEs in RRC_INACTIVE state



Taking direct path from Option 3 family to Option 2

Observation 1

It requires **high cost** for having wide **NR coverage** from deploying more gNBs or reformatting low band

Observation 2

5GC functions can be used within **NR gNB coverage only**

Observation 3

Interruption time will be **huge** for having inter-RAT handover while **voice & real-time services** which will be longer than 100ms with N26 (MME-AMF interface), and even longer without N26 (For voice, it is assumed that VoNR and VoLTE are supported in this operator)

Taking intermediate path with Option 5/7x

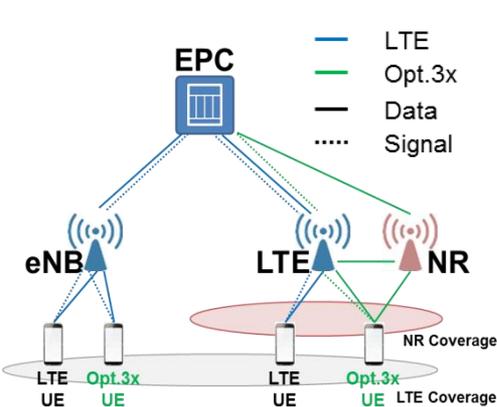
Observation 4

It provides **wide 5GC function coverage** with **cost-effective** way by upgrading eNB to eLTE(ng-eNB) over deployed LTE coverage rather than newly deploying more gNBs or refarming low band in near future

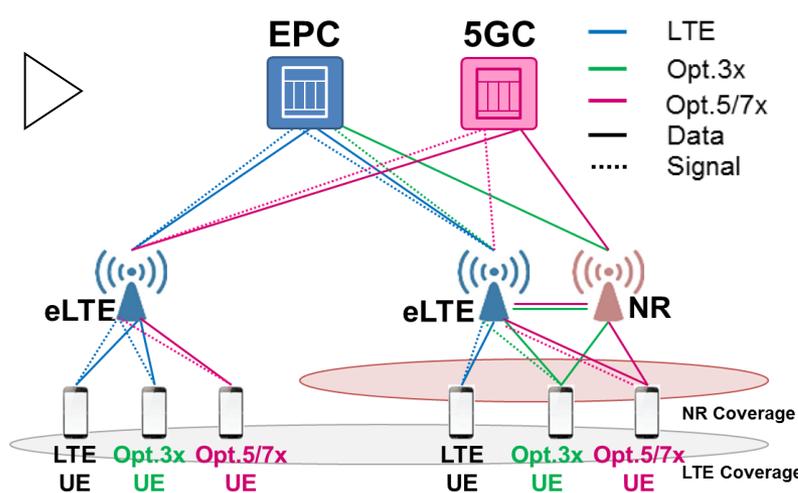
Observation 5

Interruption time can be **minimized** for having Xn handover while **voice or real-time service** which will be less than 50ms
 (For voice, it is assumed that VoNR and VoLTE are supported in this operator)

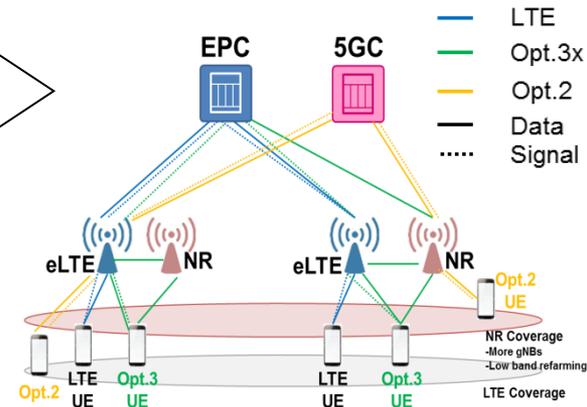
Option 3x
eMBB SVC



Option 5/7x
eMBB/Limited URLLC SVC



Option 2
Complete NR SVC



Taking direct path from Option 3 family to Option 2,

Observation 1 : It requires **high cost** for having wide **NR coverage** from deploying more gNBs or refarming low band

Observation 2 : **5GC functions** can be used within **NR gNB coverage only**

Observation 3 : **Interruption time** will be **huge** for having inter-RAT handover while **voice & real-time services** which will be longer than 100ms with N26 (MME-AMF interface), and even longer without N26 (For voice, it is assumed that VoNR and VoLTE are supported in this operator)

Taking intermediate path with Option 5/7x,

Observation 4 : It provides **wide 5GC function coverage** with **cost-effective** way by upgrading eNB to eLTE(ng-eNB) over deployed LTE coverage rather than newly deploying more gNBs or refarming low band in near future

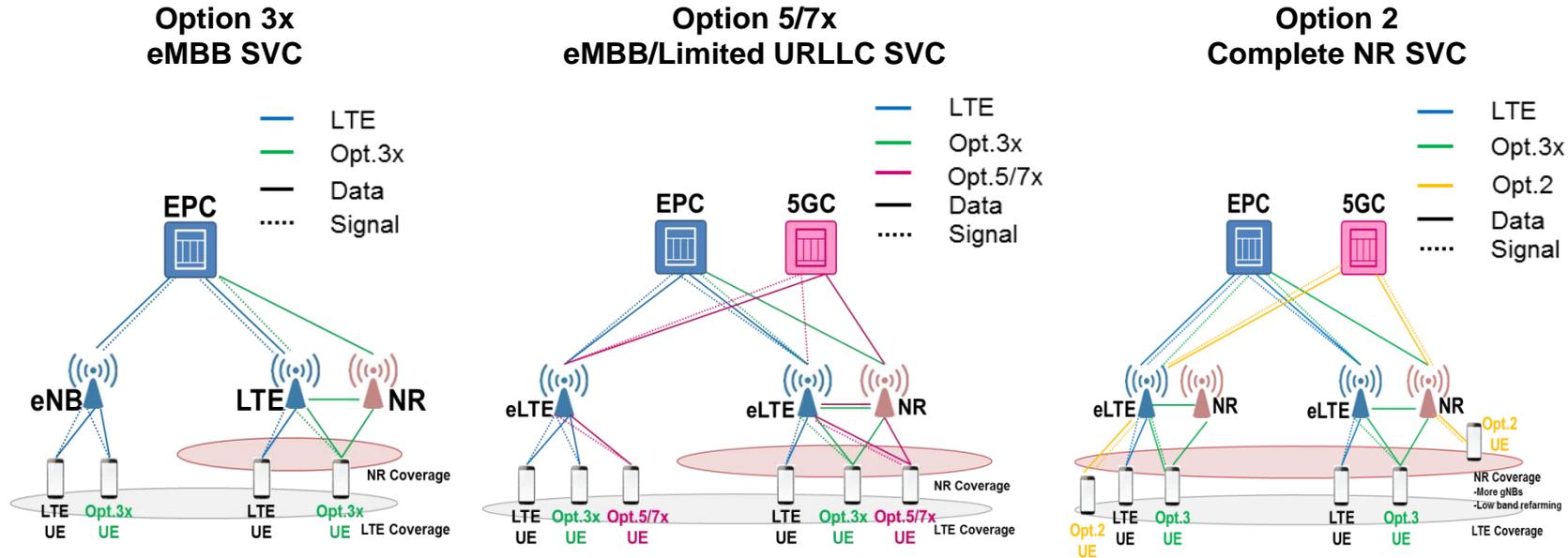
Observation 5 : **Interruption time** can be **minimized** for having Xn handover while **voice or real-time service** which will be less than 50ms

(For voice, it is assumed that VoNR and VoLTE are supported in this operator)

[1] RP-180554 Plan for finalizing all NR architecture options

[2] RP-180862 WI summary of LTE-5GCN

Appendix. Summary for each option



Option 3x UE

Option 5/7x UE

Option 2 UE

Data Rate

NR+LTE

NR+LTE

NR

Delay
(RTT bet. UE and GW)

LTE air delay for LTE coverage
 NR air delay for NR coverage
 + Wired path delay
 [Not Guaranteed]

LTE air delay for LTE coverage
 NR air delay for NR coverage
 + Wired path delay
 [Guaranteed]

LTE air delay for LTE coverage
 NR air delay for NR coverage
 + Wired path delay
 [Guaranteed]

NW Slicing

Not Support

Support

Support

Voice

VoLTE

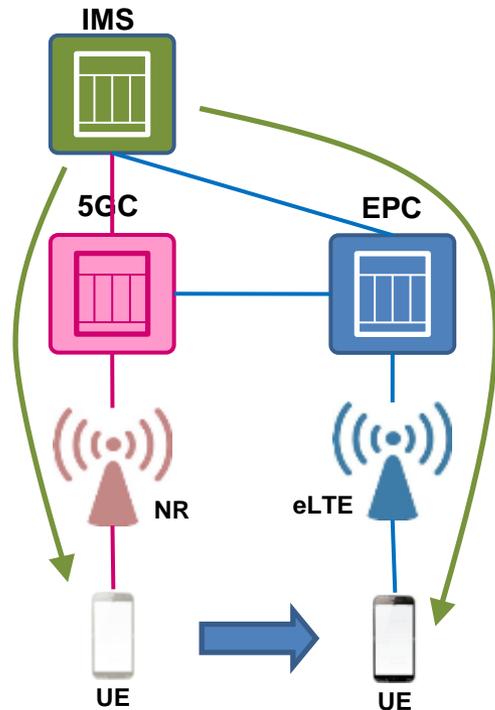
VoLTE

VoNR

• Voice and real-time service benefits (inter-RAT)

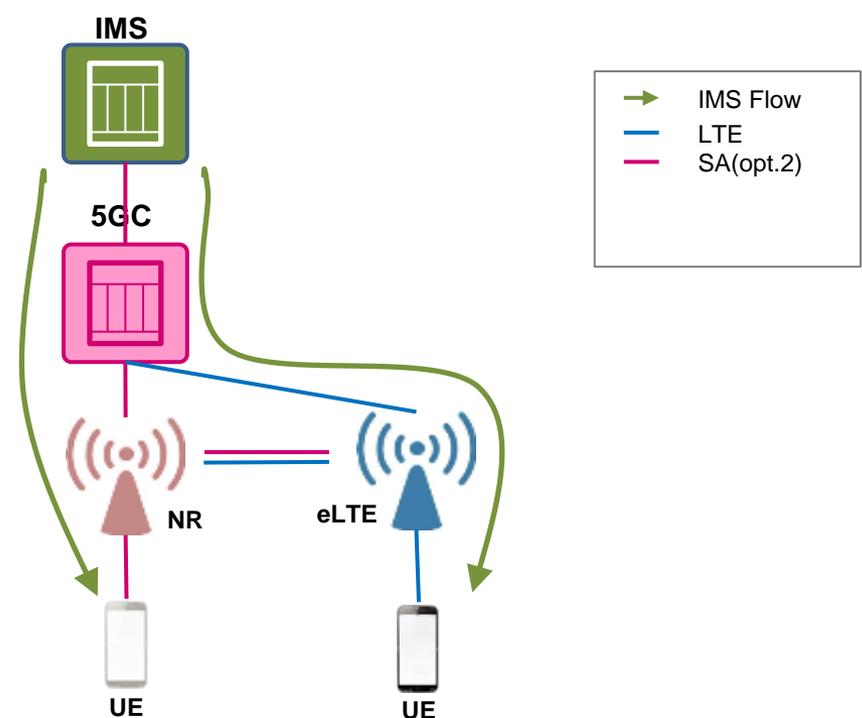
- Inter-RAT handover is inevitable for initial 5G deploying
- Interruption time is essential for voice and real-time service.
- From option 2 to option 5 handover case can reduce interruption time than from option 2 to option 1 or 3 case.

* From opt.2 → opt.1 or 3 Handover



- * Interruption time
- Longer than 100ms (w/ N26 interface)
 - Even longer than above (w/o N26 interface)

* From opt.2 → opt.5 Handover



- * Interruption time
- Around 50ms