

# VOICE OVER 5G – EVOLUTION, DEPLOYMENT, TECHNOLOGY AND TESTING ASPECTS

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**ROHDE & SCHWARZ**

Make ideas real

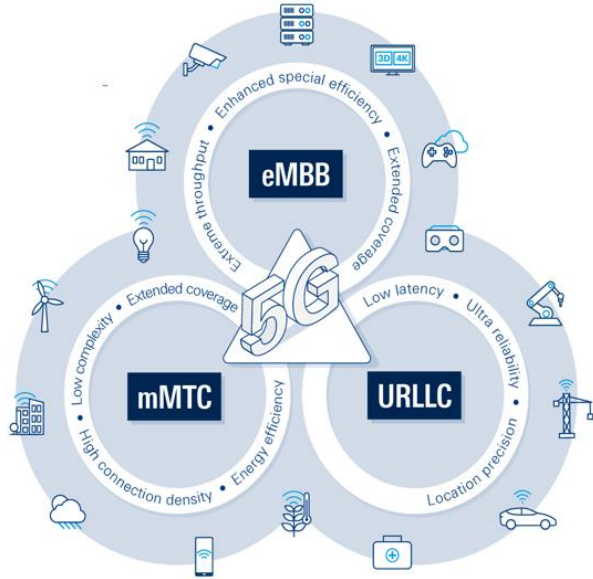


# AGENDA

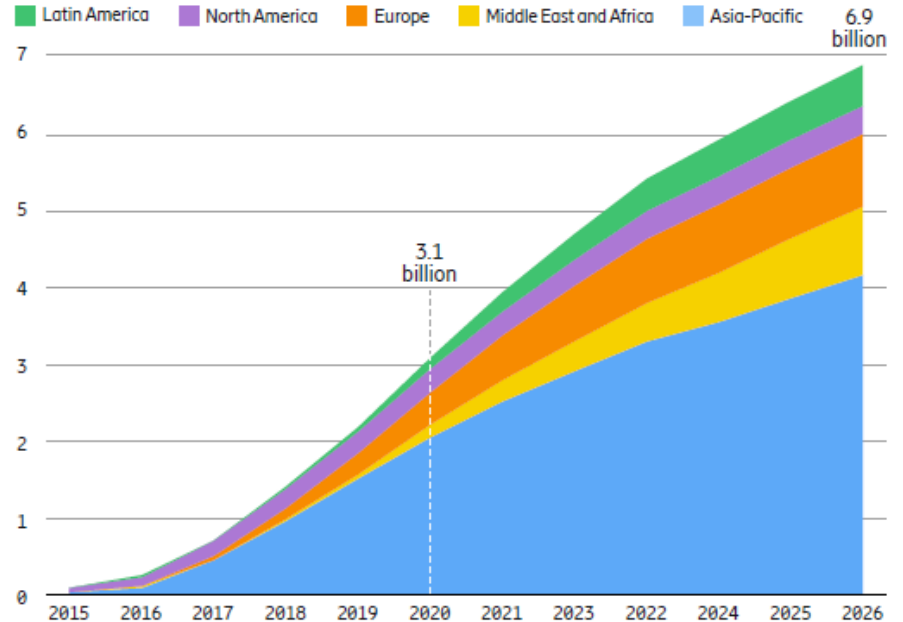
- ▶ Voice aspects in 5G networks
- ▶ Various deployment scenarios for voice
- ▶ Supplementary voice services
- ▶ Test setup and challenges for 5G voice aspects
- ▶ Voice in 5G – live demo using the R&S®CMX500 mobile radio tester



# VOICE ASPECTS IN 5G NR - MOTIVATION



Voice and communications services are still growing!



(source: Ericsson mobility report November 2020)

The well-known 5G NR use case triangle  
ITU vision of IMT 2020

# VOICE ASPECTS IN 5G NR

In 3GPP, the used term is voice over IP. This implicits the usage of the IP multimedia subsystem (IMS).



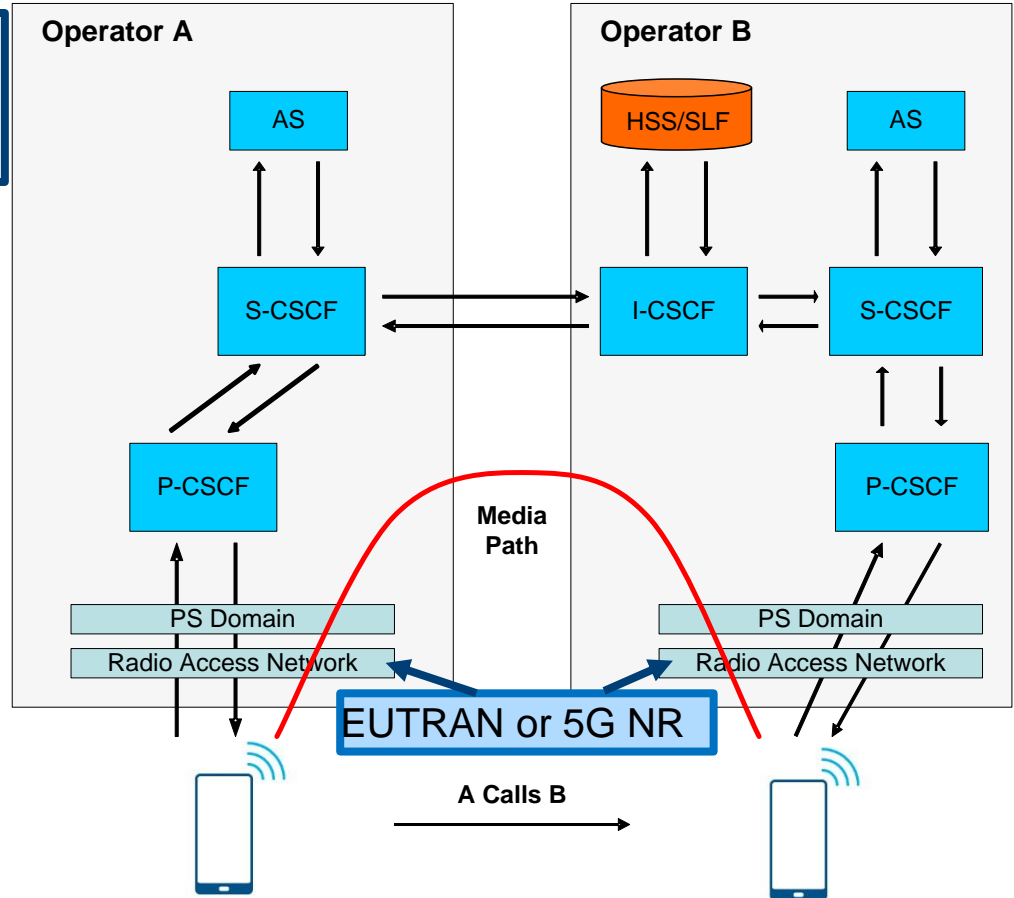
Voice over NR



Video over NR



Emergency calls + eCall



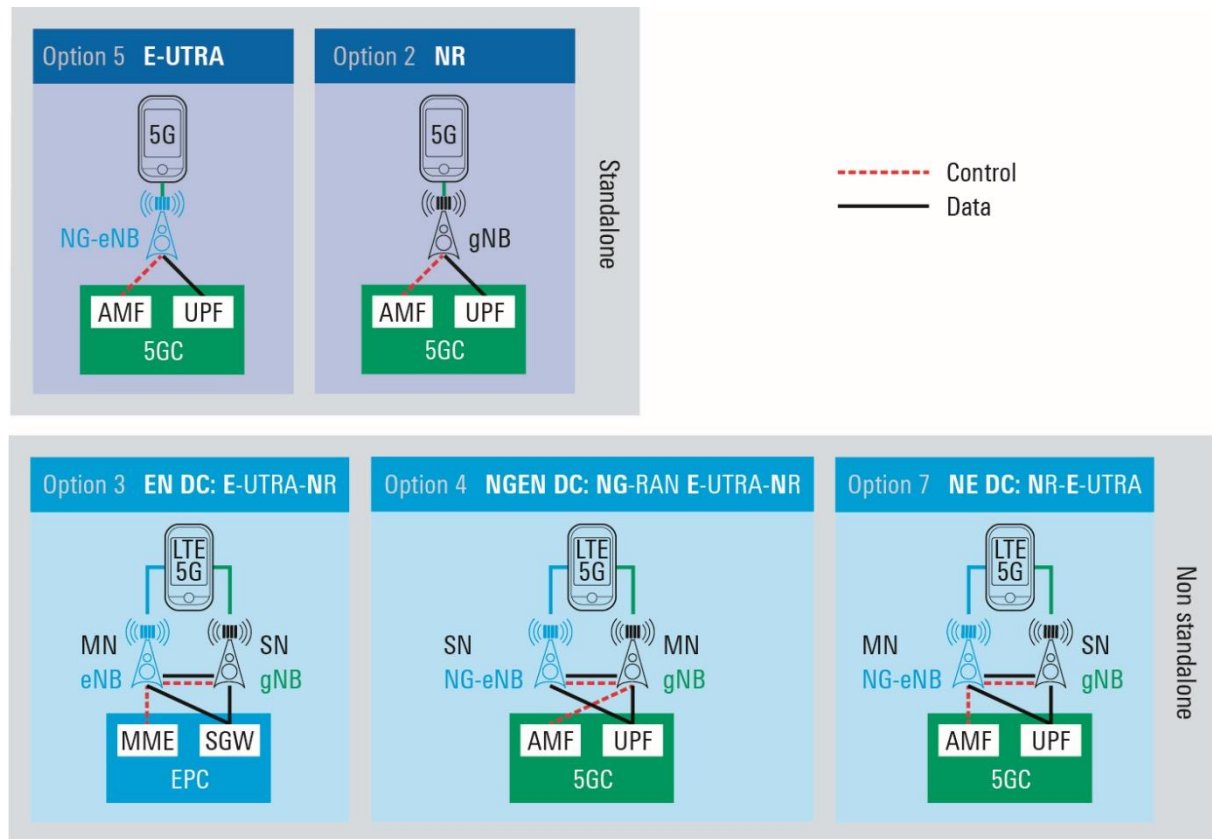
# 5G NR VOICE ASPECTS – DEPLOYMENT OPTIONS

There is no single technical solution for voice in 5G!

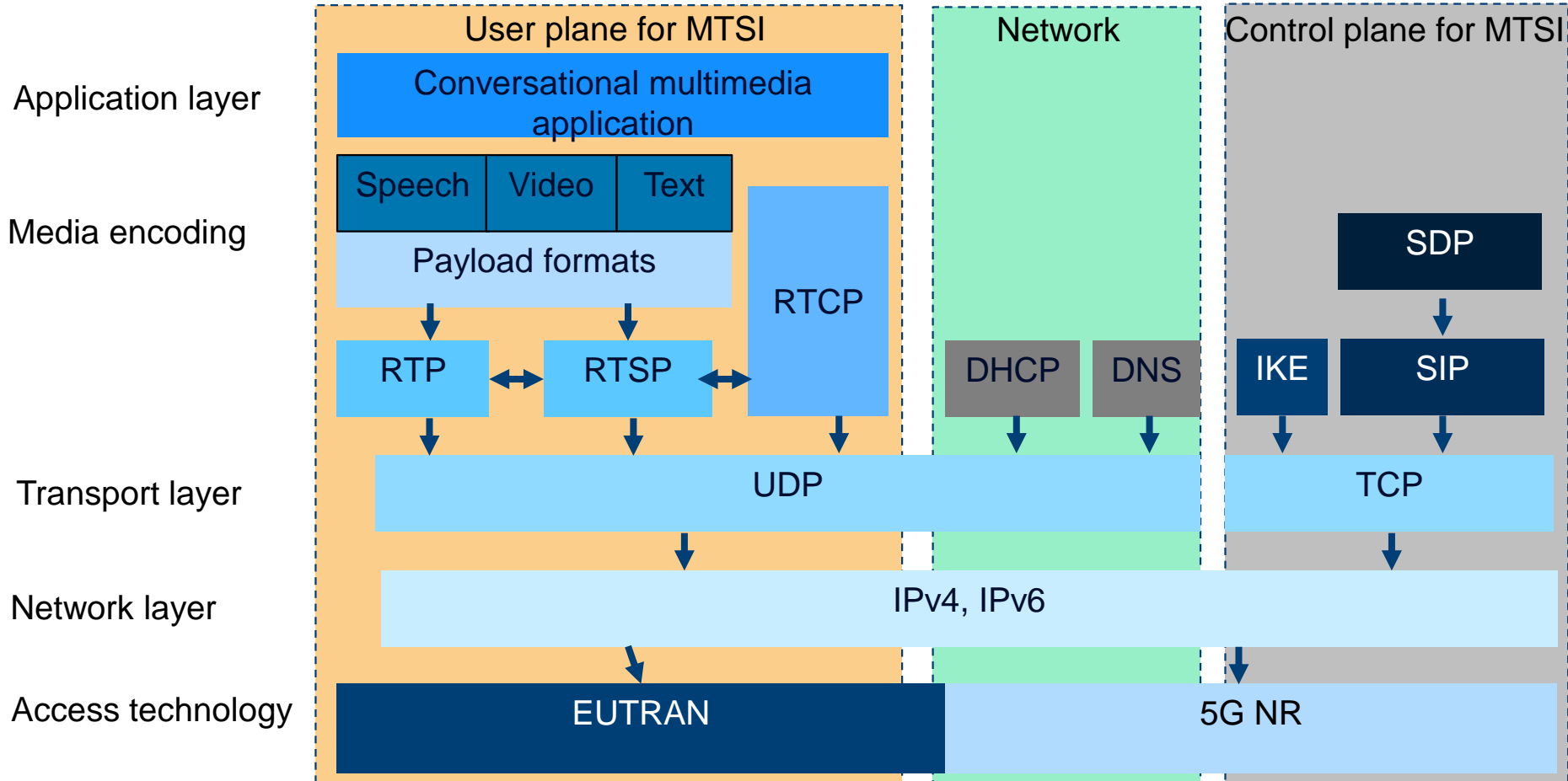
Various scenarios are possible: 2 questions to understand the background:

- What RAT is available and does it support voice? EUTRA or NR?
- What core network is available and does it support voice? 5GC or EPC?

Emergency calls are treated differently!



# MTSI: MULTIMEDIA TELEPHONE SERVICES FOR IMS





# USEFUL DOCUMENT FOR VOICE SERVICES OVER 5GS + IMS

GSM Association

Non-confidential

Official Document NG.114 - IMS Profile for Voice, Video and Messaging over 5GS



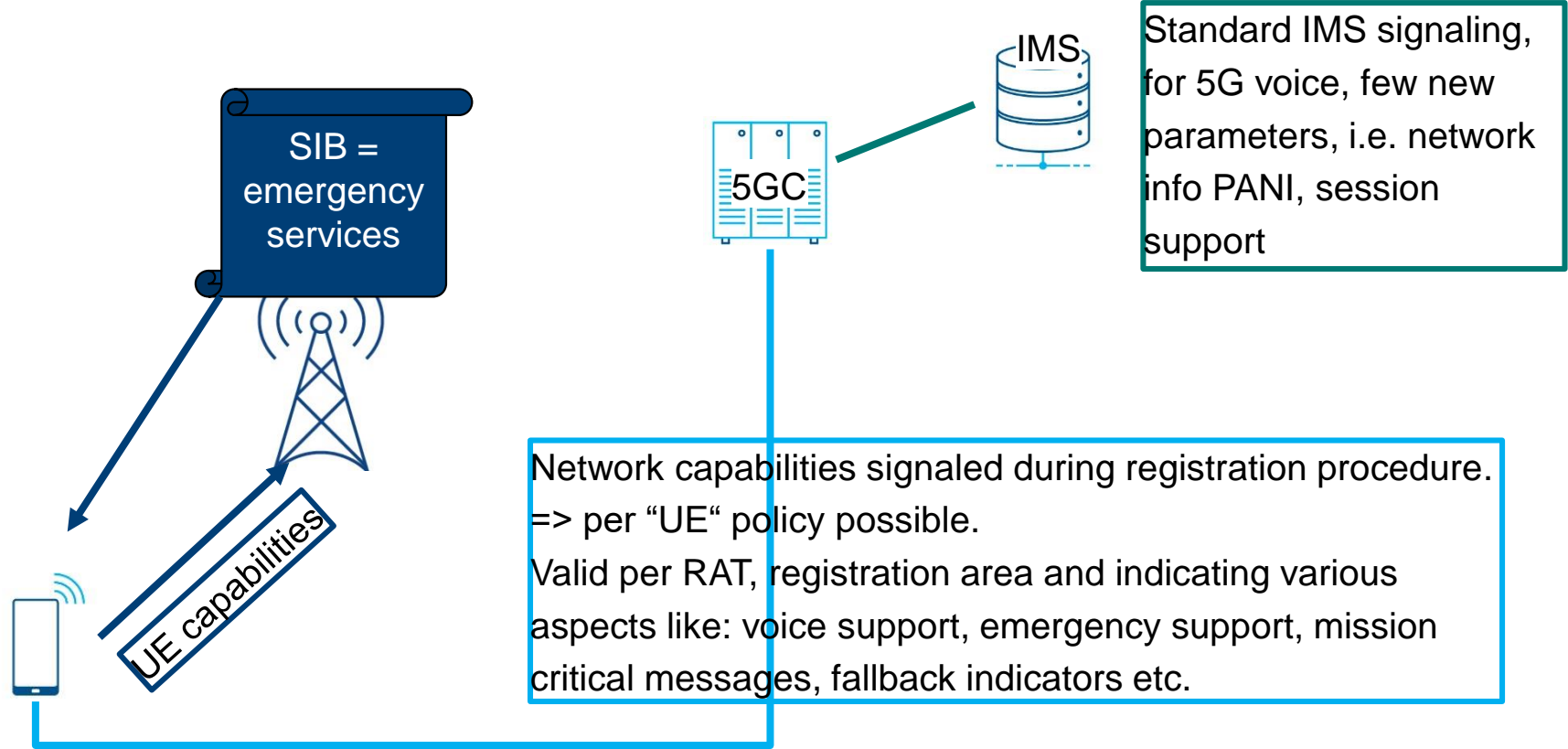
**IMS Profile for Voice, Video and Messaging over 5GS**

**Version 1.0**

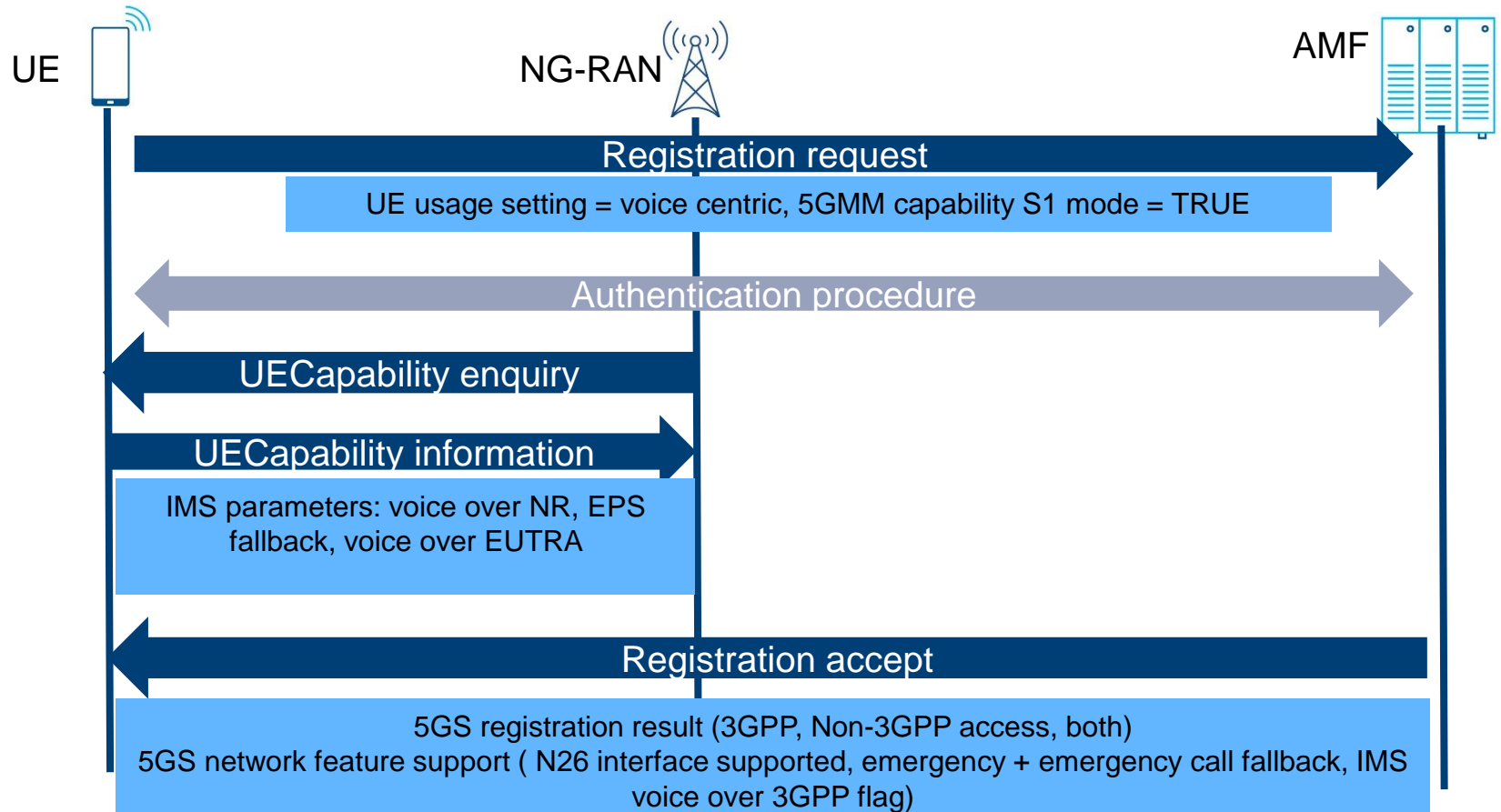
**07 August 2020**



# VOICE SUPPORT – SIGNALING ASPECTS



# 5GC REGISTRATION PROCEDURE ASPECTS (FOCUS ON VOICE)

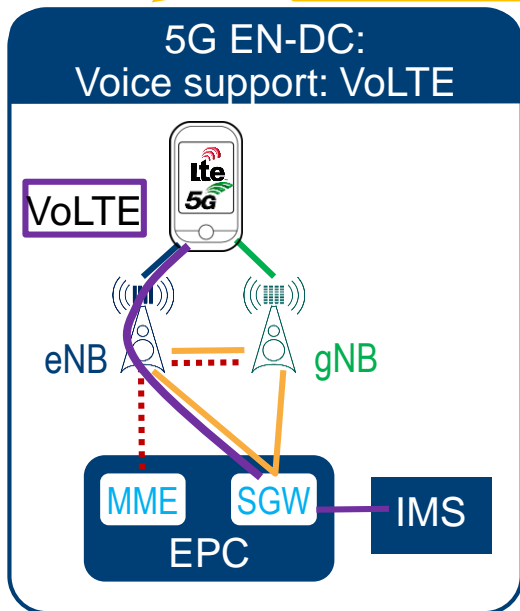


# 5G NR VOICE ASPECTS AND POSSIBLE DEPLOYMENTS

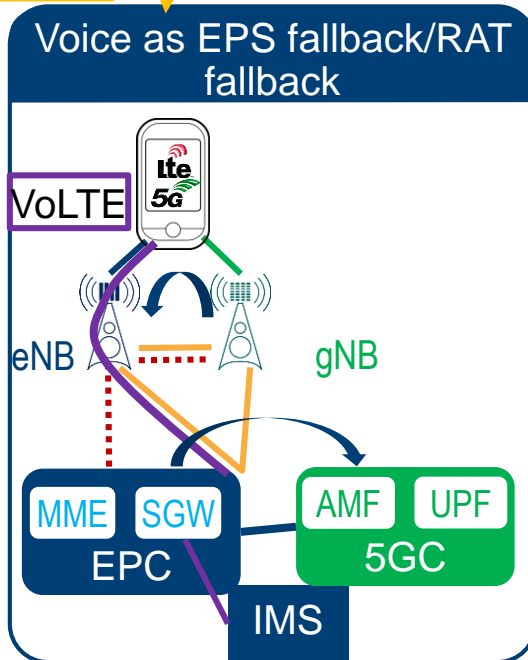
2G/3G circuit switched voice

Handover 4G ↔ 2G/3G

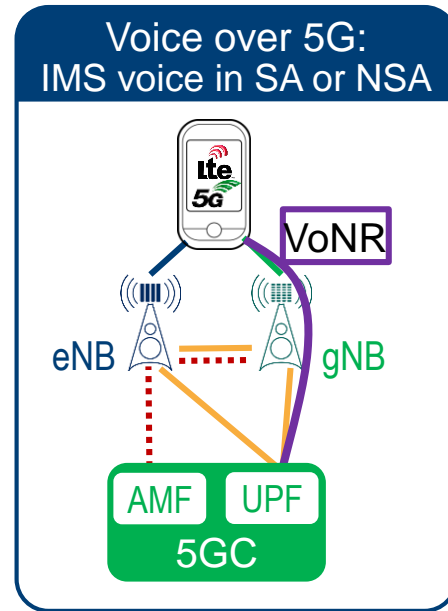
SRVCC\*Rel. 16



- Dual connectivity: VoLTE + 5G data
- ⇒ UL coverage due to higher freq. 5G band
  - ⇒ Battery consumption

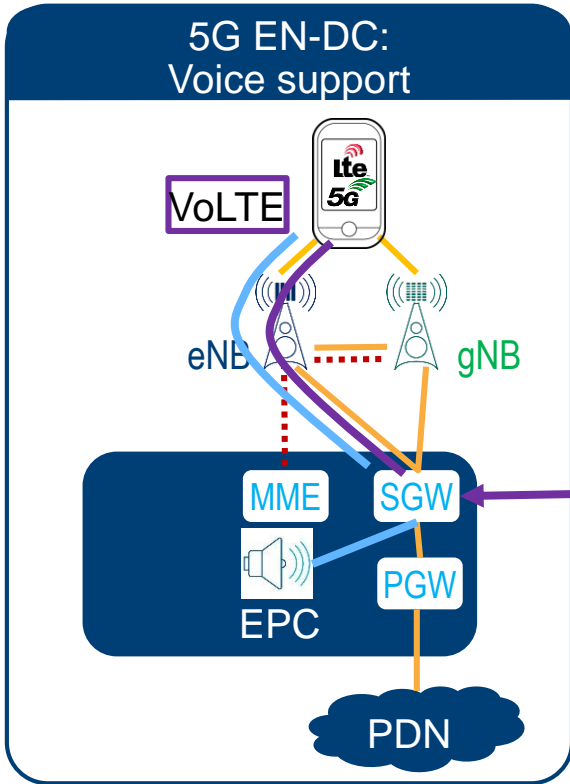


- EPS fallback: VoLTE only
- ⇒ Handover to EPC or EUTRA during call setup



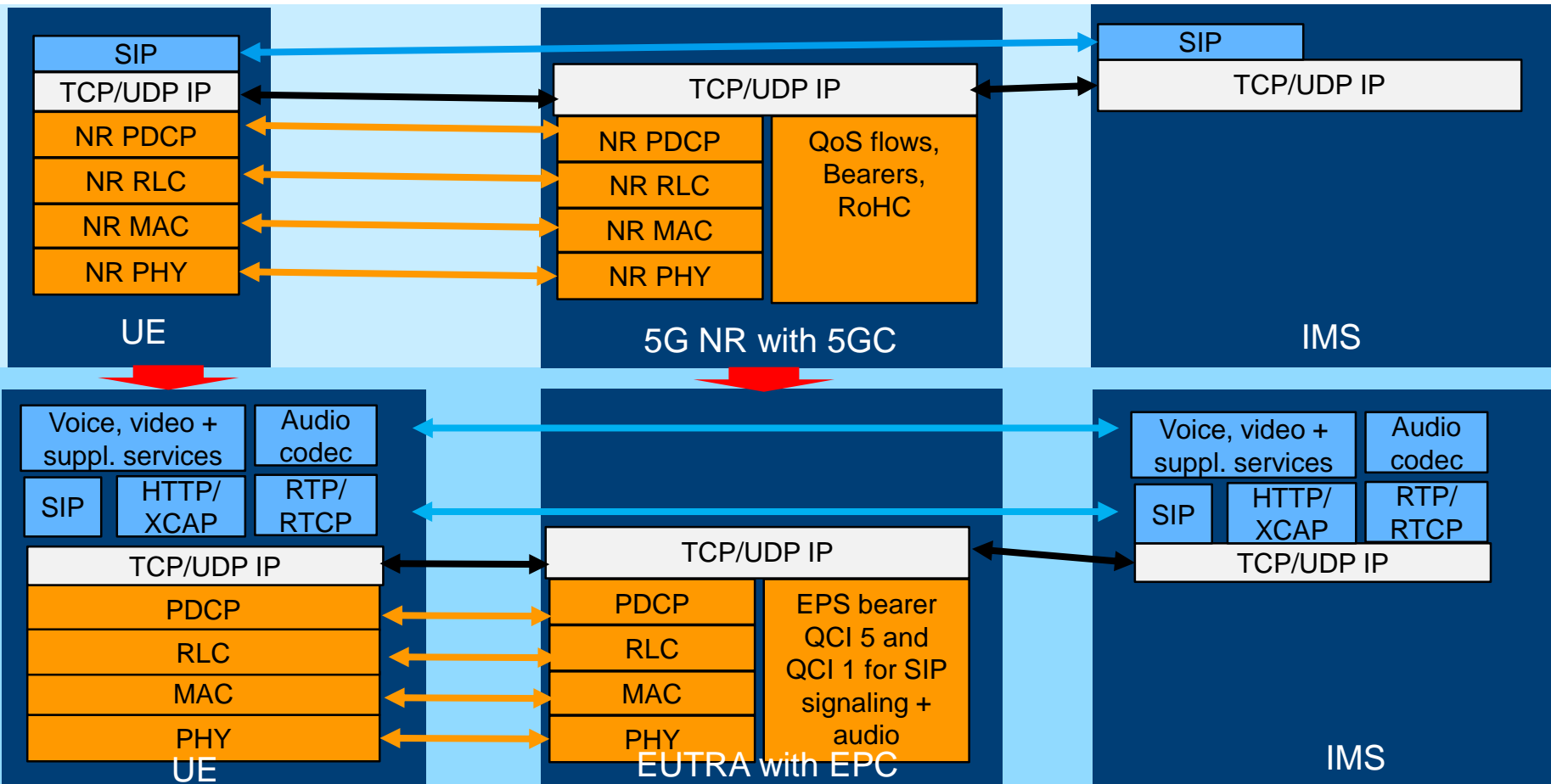
- Voice over 5G NR
- ⇒ Voice over NR and 5GC
  - ⇒ 5G coverage needed, risk of large #handovers/call drop

# VoLTE IN 5G – OPTION 3 NSA MODE WITH IMS

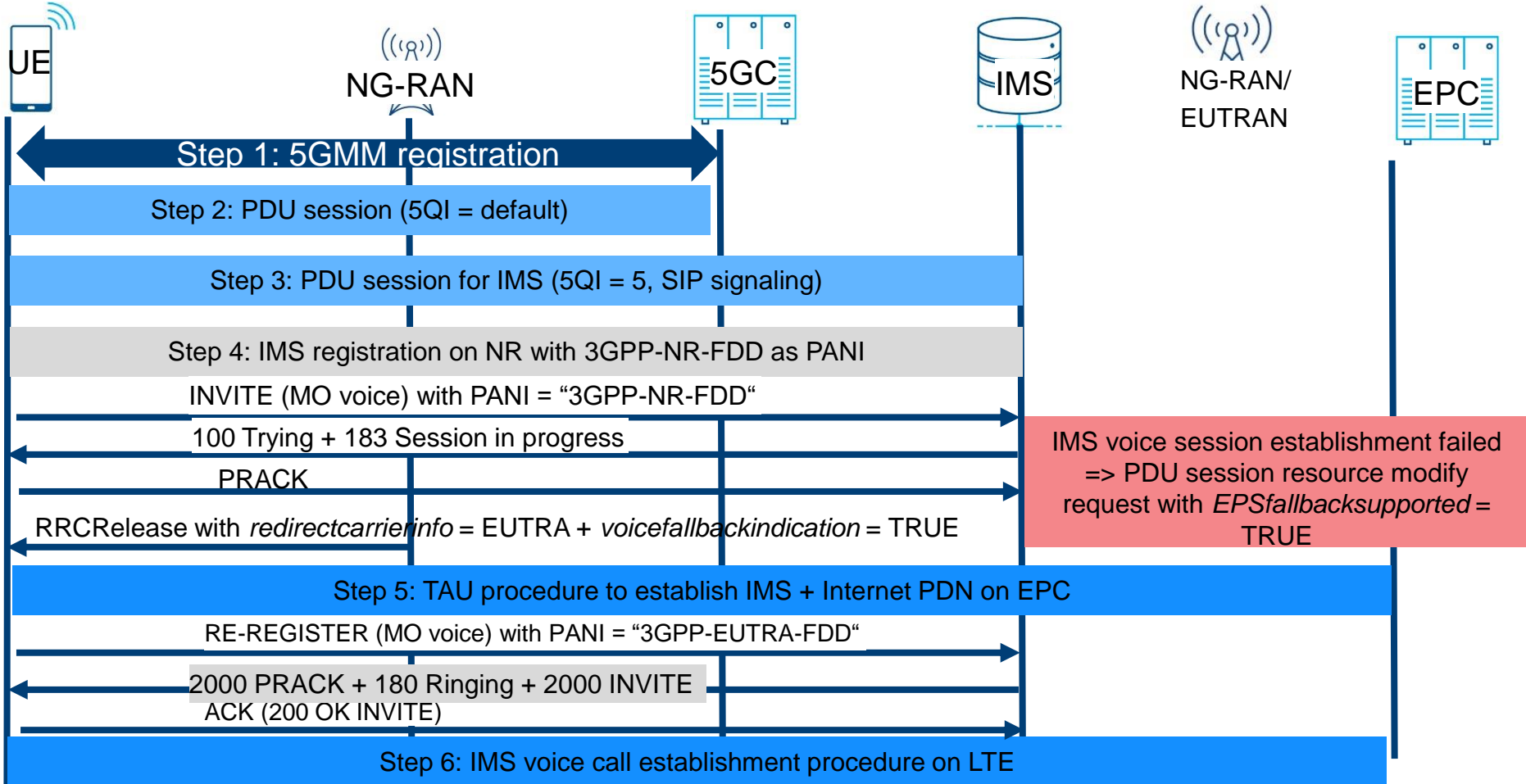


- Voice is using VoLTE principle.
- IMS connected to EPC
- IMS does not know about 5G NR
- VoLTE uses IMS SIP QoS profiles as known from VoLTE
- Depending on UE capability, 5G link is suspended during voice call or kept for simultaneous data
- Challenge: battery consumption + UE needs to support split bearer when simultaneous data

# EPS FALLBACK SCENARIO



# EPS FALLBACK SIGNALING PROCEDURE



# RAT FALLBACK FOR VOICE SUPPORT

