

3GPP TSG RAN Meeting #70  
Sitges, Spain, 7 -10 December 2015

RP-151898

Source: Huawei, HiSilicon  
Document for: Approval  
Agenda Item: 14.1.2

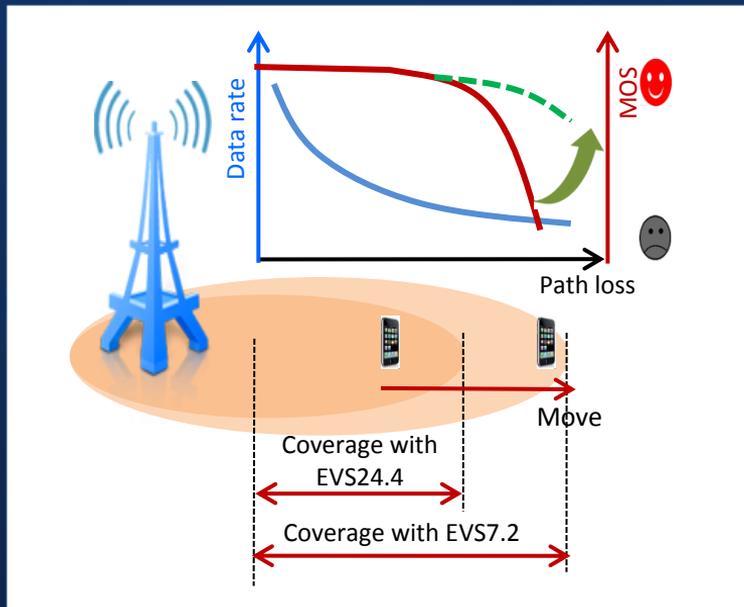


## Motivation for a New SI: RAN optimization for EVS full HD voice in LTE

# Motivation

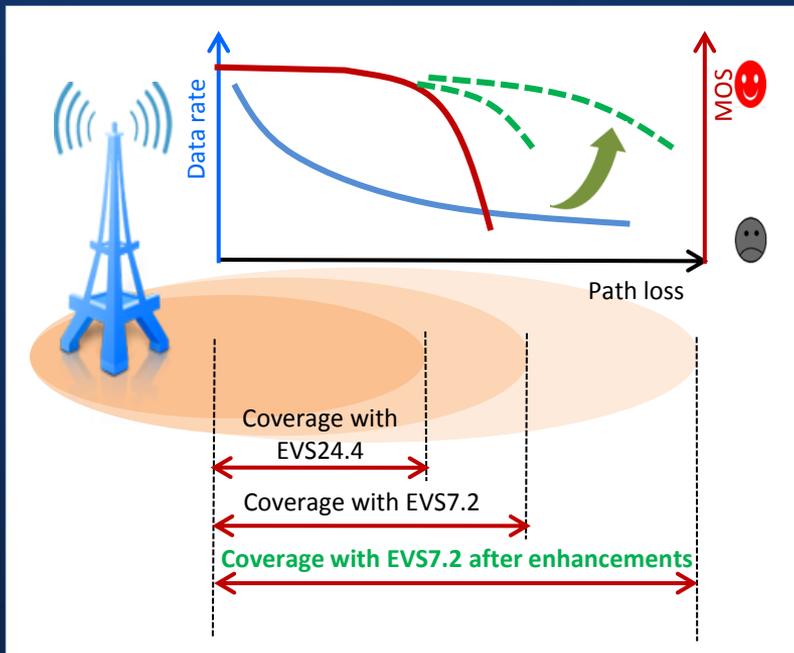
- RAN flexibility for codec rates is essential to enable the high rate usage in VoLTE networks and ensure the quality at cell edge. Especially for EVS codec, which can deliver good enough quality with low rates.
- In poor coverage areas (e.g. indoor environment) VoLTE suffers low MOS. To improve the HD voice quality with further coverage enhancement mechanisms is useful to improve the end user experience.
- In mobility, poor coverage or congestion environments, further improvement on VoLTE signaling are needed to guarantee a good user experience.

# EVS Codec Adaptation Enhancement



- It is beneficial to adapt the codec rate based on cell load, channel quality (shadow fading, UE moving, etc.) in a quick and robust manner, to ensure a continue high quality voice experience.
- It is also useful for RAN to trigger the adaptation of other codec parameters, e.g. audio bandwidth, codec type, EVS mode etc. during the call session.

# Further Coverage Enhancement



- Lower EVS rate with smaller packets (e.g. TBS 224bits for 7.2kbps) extends voice coverage compared to RAN1 previous baseline AMR12.2kbps.
- Further coverage enhancements could be considered based on new EVS rates:
  - Study the normal UE VoLTE coverage enhancements with technologies for MTC UEs in Rel-13 eMTC.
  - Further enhanced HARQ for TTI bundling beyond Rel-12 enhancements.
  - Existing header compression techniques for voice packets.

# VoLTE Signaling Enhancements

## Prioritization of VoLTE signaling:

- Although voice bearer QCI=1 can be differentiated from other bearers, the voice access procedure and the SIP signaling before and during the session cannot be treated with higher priority, and this might impact the session quality (e.g. increased call setup delay) and user experience.

## Call drop probability during mobility

- Call drop during mobility could happen, e.g. when using redirection, and this will impact user experience.

# Objectives of Study Item

This study item will study the following enhancements for VoLTE:

1. Enhancement of voice codec adaptation function in order to, in any network deployment, use the highest codec rate possible according to radio conditions and ensures continuation of the call with lower EVS rates at cell edge [RAN2]
2. Enhancements that improve the voice quality perceived by the user by reducing packet loss rate or allowing the use of higher codec rate focusing on:
  - The coverage enhancement technologies developed for MTC UEs in Rel-13 eMTC [RAN1]
  - Further enhanced HARQ for TTI bundling beyond Rel-12 enhancements [RAN1]
  - Existing header compression techniques for voice packets [RAN2]
3. Enhancements to prioritize voice access and/or voice related signaling and reduce call drop probability (e.g. potential call drop during mobility) by VoLTE signaling enhancement [RAN2, RAN3]

# THANK YOU

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