3GPP TSG RAN meeting #66
Maui, Hawaii, U.S.A. 08 - 11 Dec. 2014

RP-142217
(Rev. of RP-141989)

EVS over UTRAN CS - Motivations

QUALCOMM®

Background/Motivations, and Proposal

EVS = "Enhanced Voice Service"

3GPP has introduced EVS over MMTel (VoIP/VoLTE) in Rel-12
http://www.3gpp.org/news-events/3gpp-news/1639-evs_news
"The Enhanced Voice Services coder consists of the multi-rate audio coder optimized for operation with voice and music/mixed content signals…" [5]

3GPP recent history

- SA#65 have approved/started a Rel-13 Work Item (SA4, [1, 2]) to support EVS over UMTS CS
  - For better voice quality & NW capacity in 3G NWs, and seamless/consistent user experience
- RAN (and CT) WGs need to do their work, i.e. update UTRAN (and CN/NAS) specs ([3])
- An initial RAN Work Plan was provided to WGs for information ([4])
  - There is some preference for formalizing the RAN work via a Work Item

➢ Proposal

- Open a Work Item in RAN to handle the work via proper WGs agenda/time allocation
- *WID submitted in RP-142218 – RAN2 led*

EVS over UMTS CS - Main Benefits

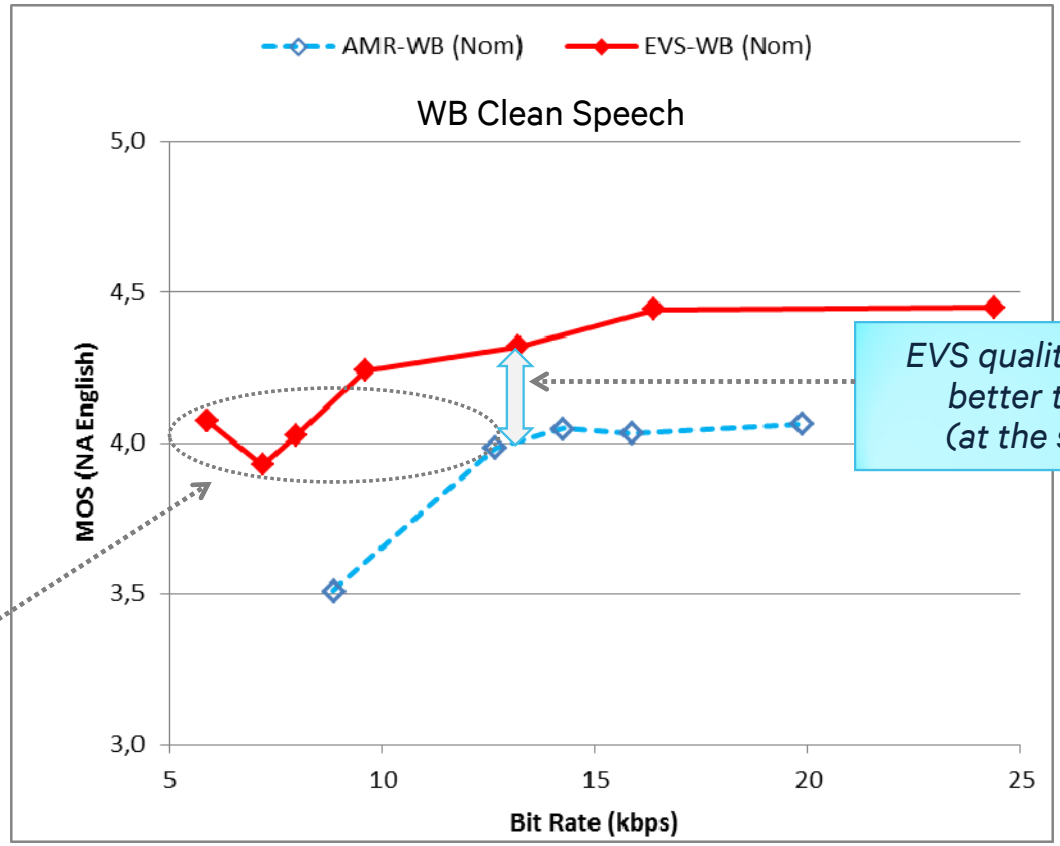
Deliver Superior Voice Quality

Improve CS Voice Capacity and/or Data Throughput

Enable Consistent Voice Quality Across LTE and UMTS

Support interoperability with legacy terminals/codecs

EVS Significantly Improves Voice Quality



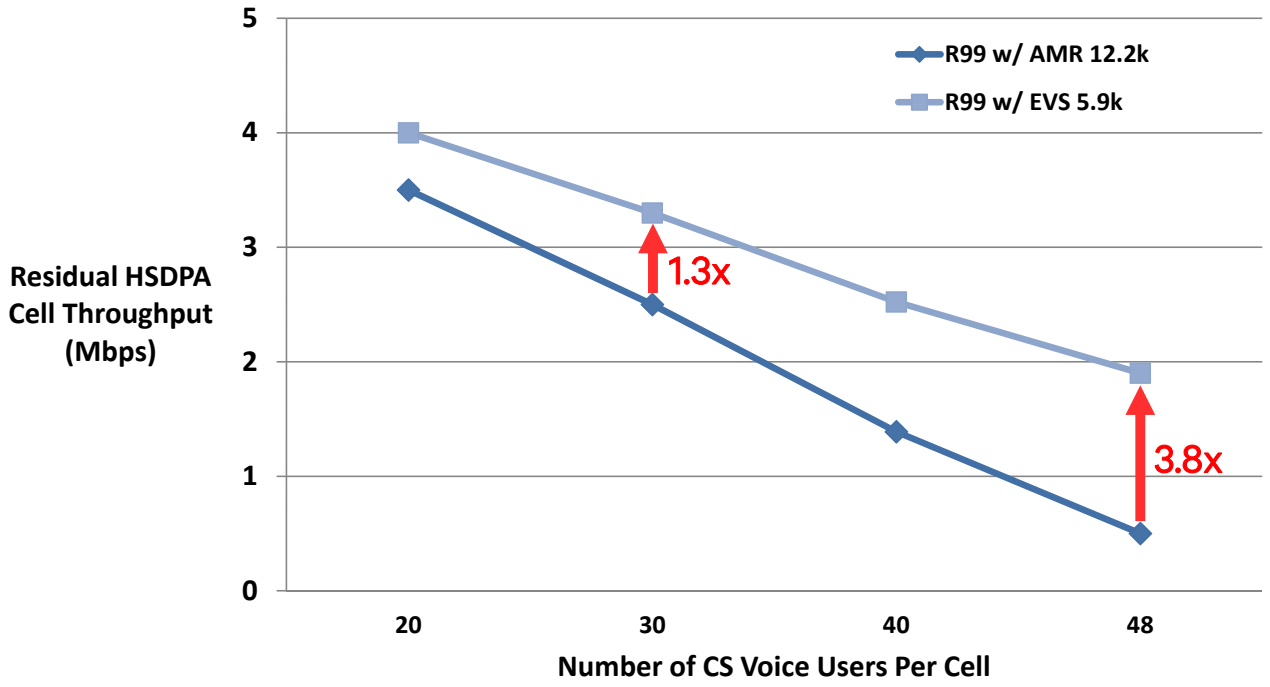
EVS provides similar voice quality at much lower bit rates

EVS quality is consistently better than AMR-WB (at the same bit rate)

Source: 3GPP EVS Selection Test, Experiment W1 (Doc S4-141065)

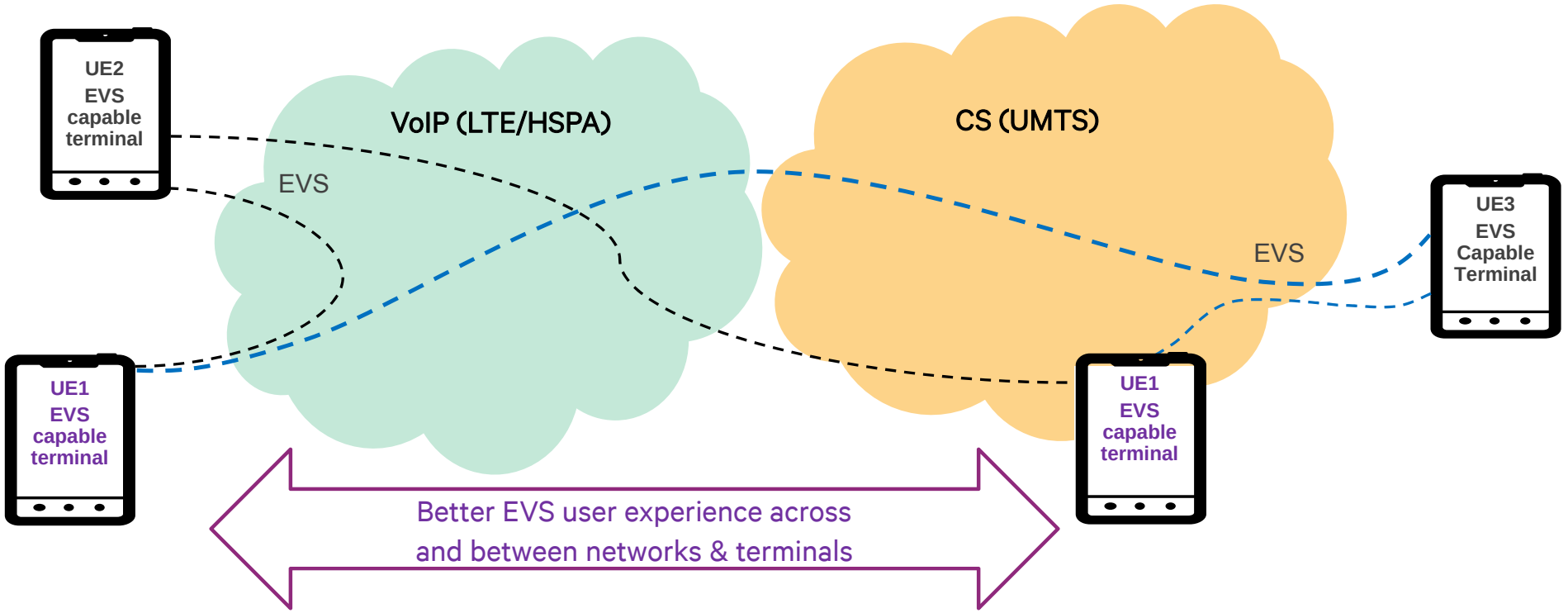
EVS over CS Increases Radio Capacity

Data Tput in Mixed Carriers - up to 3.8x increase in residual HSDPA throughput



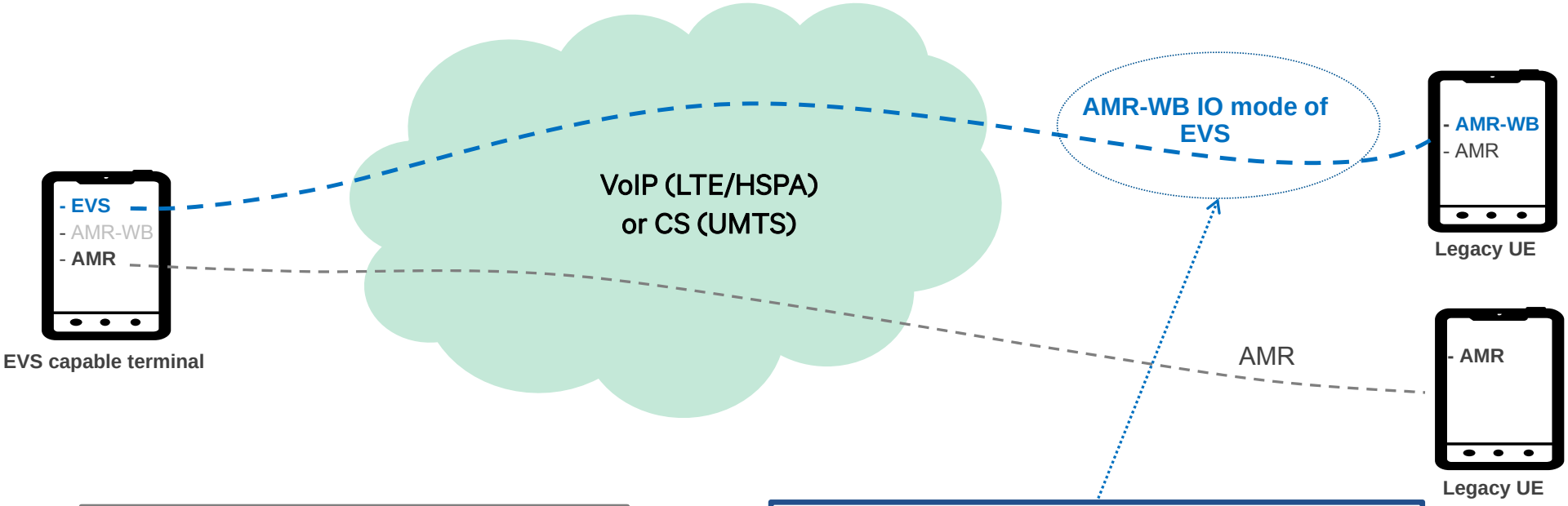
* Comparing residual HSDPA throughput gain of R99 over EVS 5.9kbps vs. R99 over AMR 12.2kbps in a 5MHz UMTS carrier at 20, 30, and 48 CS voice calls. Based on modified ITU channel mode, rake receiver with single UE receive antenna.

Consistent User Experience Across Networks



EVS support over VoIP and CS networks/terminals will provide a consistent better user experience & seamless quality during mobility between LTE and UMTS

Interoperability with Legacy Terminals



EVS Codec Family

EVS-NB	EVS-WB (AMR-WB)
EVS-FB	EVS-SWB

AMR-WB Interoperable (IO) Modes

- To support legacy service interoperability, the EVS codec family includes all AMR-WB codec formats
- This reduces the need for transcoding, thus better audio quality and less network costs

Expected RAN impacts to support EVS over UTRAN CS

Overall, few RAN specs need to be extended to support new EVS codec bit rates and RAB(s)

[3] "SA4 discussed the introduction of a new codec type UMTS_EVS and a new code point for UMTS_EVS. EVS bit rates up to a certain limit, e.g. **32 kb/s**, could be included. The set of configuration(s) is to be decided based on the feedback from RAN groups (e.g. on RAB aspects)"

EVS Source codec mode/bit-rate (kbit/s)	Signal bandwidths
5.9 (SC-VBR)	**NB, WB**
7.2	**NB, WB**
9.6	**NB, WB, SWB**
13.2 (*)	**NB, WB, SWB**
16.4	**WB, SWB, FB**
24.4	**WB, SWB, FB**
32	**WB, SWB, FB**
48	WB, SWB, FB
64	WB, SWB, FB
96	WB, SWB, FB
128	WB, SWB, FB

⇦ EVS Codec bit-rates ([5])
(+ AMR-WB Interoperable Modes)

(*) there is also a 13,2 (channel aware) codec mode

High level RAN WGs and specs impacts

- RAN1: No spec impacts; some input/consultancy on specific RAB L1/L2 parameters is expected
- RAN2: New RABs and AS parameters (in coord. with SA4/RAN1), plus minor RRC updates ([6,7])
- RAN3: small/minor updates in Iu spec ([8])

  RAN5 is expected to update, later on, UE conf. test specs (new RABs, [9]) and signalling test cases ([10])

References

3GPP refs on EVS

- [1] SP-140485: New WID on Support of EVS in 3G Circuit-Switched Networks, Qualcomm Incorporated
- [2] S4-141194: On EVS Parameters in CS; Qualcomm Incorporated
- [3] S4-141410: LS on Support of EVS in 3G UTRAN (to CT and RAN WGs); SA4
- [4] R2-145149: EVS over CS in UTRAN – Work plan and RAN impacts (R2#88), Qualcomm Incorporated

TS/Specs

- [5] TS 26.441: Codec for Enhanced Voice Services (EVS) - General Overview
- [6] TS 25.331: Radio Resource Control (RRC); Protocol specification
- [7] TR 25.993: Typical examples of Radio Access Bearers (RABs) and Radio Bearers (RBs) in UTRA
- [8] TS 25.413: UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling
- [9] TS 34.108: Common test environments for User Equipment (UE); Conformance testing
- [10] TS 34.123: User Equipment (UE) conformance specification; Part 1: Protocol conformance specification