R1-111129

VoIP Results for FDD UL with SPS

Renesas Electronics Europe

© 2011 Renesas Mobile Corporation. All rights reserved.

Introduction

- In R1-110789 an raised the issue of the impact of MCS restriction for SPS VoIP capacity since it is not possible to schedule 1 PRB 16QAM
- In this contribution we present system simulation results for case 1 and 3 to show the impact of the MCS restriction

© 2011 Renesas Mobile Corporation. All rights reserved.

Simulation parameters

Parameter	Value
Scenario	3GPP Case1 (isd=0.5km); 3GPP Case3 (isd=1.732km)
Cell Layout	7 Cells, 3sectors with wraparound
Antenna pattern	Antenna pattern 70 deg (-3 dB) with 20 dB front-to-back ratio
Max UE Tx Power	24dBm
Bandwidth	5MHz; 2 PRBs reserved for UL control; 23 PRBs for data
Channel model	SCM-C
HARQ process number	8
HARQ mode	Synchronized HARQ; non-adaptive HARQ is used as much as possible
Scheduling	SPS
Control channel assumption	Realistic PDCCH modeling
PDCCH Resource	10 CCEs, 360 REs reserved for PDCCH
Antenna	1 for tx; 2 for rx
Receiver	MRC
eNodeB/UE antenna gain	14 dBi / 0 dBi
Packet Delay Limitation	50 ms
Traffic	AMR 12.2kbps; Voice active factor=0.5; mean talk spurt length=2s; 40bytes/15bytes

© 2011 Renesas Mobile Corporation. All rights reserved.

Case1 Results

- The proportion of users using different PRB number is optimized for each case;
- 12.2kbps-1PRB: 16QAM 2/3;
- 12.2kbps-2PRBs: QPSK 2/3;

Scenarios	Supported VoIP user number per Cell	User proportion
16QAM is used	**246**	10% using 1PRB; 90% using 2PRBs
16QAM is not used	**243**	100% using 2PRBs
Performance Degradation	**1.2%**	

© 2011 Renesas Mobile Corporation. All rights reserved.

Case3 Results

- Note: the proportion of users using different PRB number is optimized for each case;
- Packet segmentation is enabled for Case3;
- Users with segmentation use 2 PRBs;

Scenarios	Supported VoIP user number per Cell	User proportion
16QAM is used	**120**	10% using 1PRB; 80% using 2PRBs; 10% using Segmentation
16QAM is not used	**120**	90% using 2PRBs; 10% using Segmentation
Performance Degradation	**0%**	

- 35% of the UEs encounter power limitation and packet segmentation is needed in this case since TTI bundling and SPS cannot be enabled simultaneously.
- Using 16QAM (1PRB) is not so important in this case since the proportion of UEs near the eNB is less than in case 1 and more UEs have larger pathloss.

© 2011 Renesas Mobile Corporation. All rights reserved.

Conclusion

- We compared the VoIP performance for FDD UL with SPS scheduling, when 16QAM is allowed or not allowed.
- In the optimized cases the proportion of users with 16QAM is very low for both case1 and case3 since for SPS scheduling the MCS and frequency resources cannot be dynamically adopted to the channel conditions causing minimal degradation in the VoIP performance
  - For Case1, the performance degradation is 1.2%
  - For Case3, the usage of 16QAM has practically no impact on the VoIP performance
- No need for any specification change

© 2011 Renesas Mobile Corporation. All rights reserved.

Renesas Mobile Corporation

© 2011 Renesas Mobile Corporation. All rights reserved.