



Belgrade, Serbia, 20th - 24th April 2015

SOURCE: ERICSSON

TITLE: COMPARISON OF 2D CB
ENHANCEMENTS WITH CAT.2 BASELINE

AGENDA ITEM: 7.2.5.2.1

DOCUMENT FOR: DISCUSSION AND
DECISION

INTRODUCTION



- › Cat.2 baseline was agreed as the default baseline for FDD in RAN1#80bis
- › In this contribution, we compare 2D codebook enhancements with Cat.2 baseline
 - 2D codebook has 4x spatial oversampling in both vertical and horizontal dimensions

Antenna	Virtualization	Vertical CSI-RS beam angles (deg)	# of beams	# of TXRUs	CS	Description
8x4	4x1 108°	108, 118	2	16	port 0	Cat.2 Baseline
8x4	2x1 130°	108, 118, 128, 138	4	32	port 0	Cat.2 Baseline

Cat.2 assumptions

8X4 UMI



- Phase 1 offered load as baseline

Baseline resource utilization: 20%, Baseline Offered load : 0.68 bps/Hz/cell				
System	Cell-edge UTP [bps/Hz/user]		Mean UTP [bps/Hz/user]	
	Baseline	Gain [%]	Baseline	Gain [%]
Baseline 8TXRUs, UMi, 8x4	1.21	0%	3.39	0%
Cat.2 Baseline 16TXRUs, 2 beams	1.31	9%	3.55	5%
Cat.2 Baseline 32TXRUs, 4 beams	1.37	14%	3.48	3%
2D CB Enhancement 16 TXRUs	1.52	26%	3.71	10%
2D CB Enhancement 32 TXRUs	1.49	24%	3.60	6%
Baseline resource utilization: 50%, Baseline Offered load : 1.18 bps/Hz/cell				
System	Cell-edge UTP [bps/Hz/user]		Mean UTP [bps/Hz/user]	
	Baseline	Gain [%]	Baseline	Gain [%]
Baseline 8TXRUs, UMi, 8x4	0.44	0%	2.17	0%
Cat.2 Baseline 16TXRUs, 2 beams	0.68	53%	2.63	21%
Cat.2 Baseline 32TXRUs, 4 beams	0.80	81%	2.71	25%
2D CB Enhancement 16 TXRUs	0.85	92%	2.85	31%
2D CB Enhancement 32 TXRUs	0.96	116%	2.95	36%
Baseline resource utilization: 70%, Baseline Offered load : 1.40 bps/Hz/cell				
System	Cell-edge UTP [bps/Hz/user]		Mean UTP [bps/Hz/user]	
	Baseline	Gain [%]	Baseline	Gain [%]
Baseline 8TXRUs, UMi, 8x4	0.22	0%	1.52	0%
Cat.2 Baseline 16TXRUs, 2 beams	0.41	83%	2.10	38%
Cat.2 Baseline 32TXRUs, 4 beams	0.58	158%	2.32	52%
2D CB Enhancement 16 TXRUs	0.61	173%	2.50	64%
2D CB Enhancement 32 TXRUs	0.77	243%	2.61	71%

*Results are compared at the same offered load

OBSERVATION:

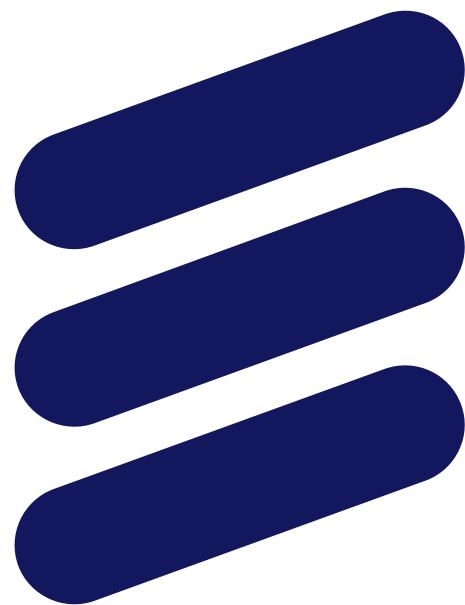


- › For SU-MIMO, 2D codebook enhancements provide significant gain over Cat.2 baseline in 8x4 UMi

APPENDIX: SIMULATION PARAMETERS



Carrier frequency	2 GHz
Bandwidth	10 MHz
Scenarios	3D UMi 200m ISD
Cell layout	19 sites, 3 sectors per site
Wrapping	Radio distance based
UE receiver	MMSE-IRC
CSI periodicity	5 ms
CSI delay	5 ms
CSI mode	Aperiodic mode 3-2
Outer loop LA	Yes, 10% BLER target
eNB Tx power	41 dBm UMi, 46dBm UMa
Traffic model	Non-full buffer, 500 kB packet size
UE speed	3 km/h
UE noise figure	9dB
Scheduling	Proportional fair in time and frequency
CRS interference	Not modeled. Overhead accounted for 2 CRS ports.
DMRS overhead	2 antenna ports
CSI-RS	Overhead accounted for ; channel estimation error modeled
Codebook	Rel.10 8Tx
HARQ	Max 5 retransmissions
Antenna spacing	0.8 lambda in vertical, 0.5 lambda in horizontal
Handover margin	3 dB
CSI-RS beam selection margin	3 dB



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