3GPP TSG RAN Meeting #68
Malmö, Sweden, 15 - 18 June 2015 RP-150785

Motivation for WI Proposal: Elevation Beamforming/Full-Dimension (FD) MIMO for LTE

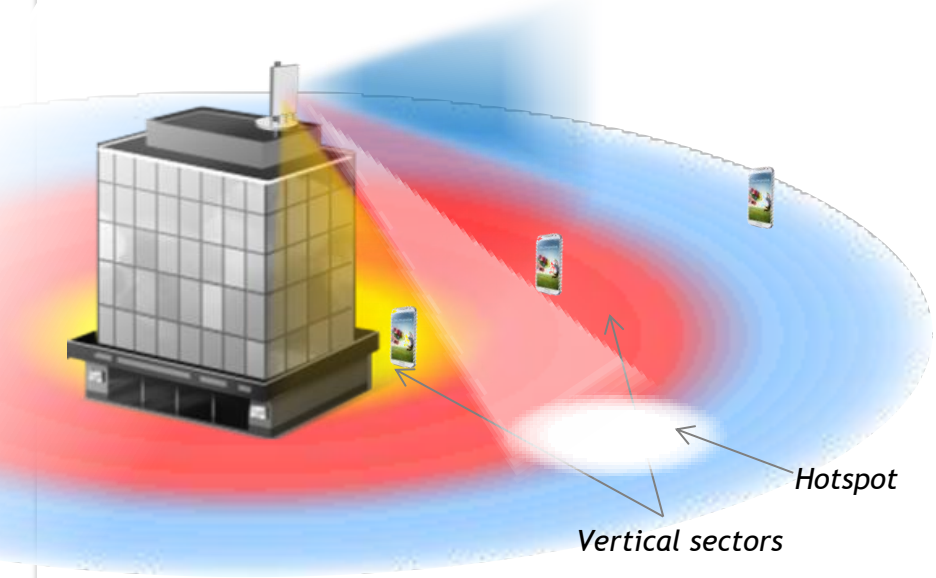
Agenda Item: 13.1.1

Samsung

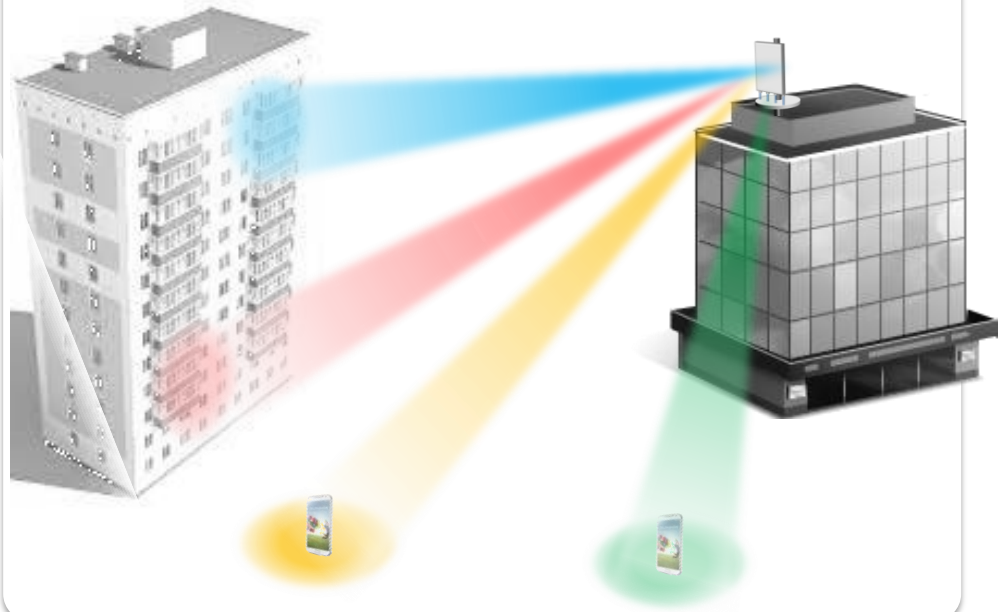
Introduction

- Elevation BF (E-BF) and Full Dimension MIMO (FD-MIMO) utilizes large number of antennas placed on 2-dimensional antenna array panel
- Antennas on the 2-D panel allow an eNB to adaptively and dynamically control the directions of the transmissions in the azimuth and elevation domains

Flexible V/H sectorization



3D beamforming



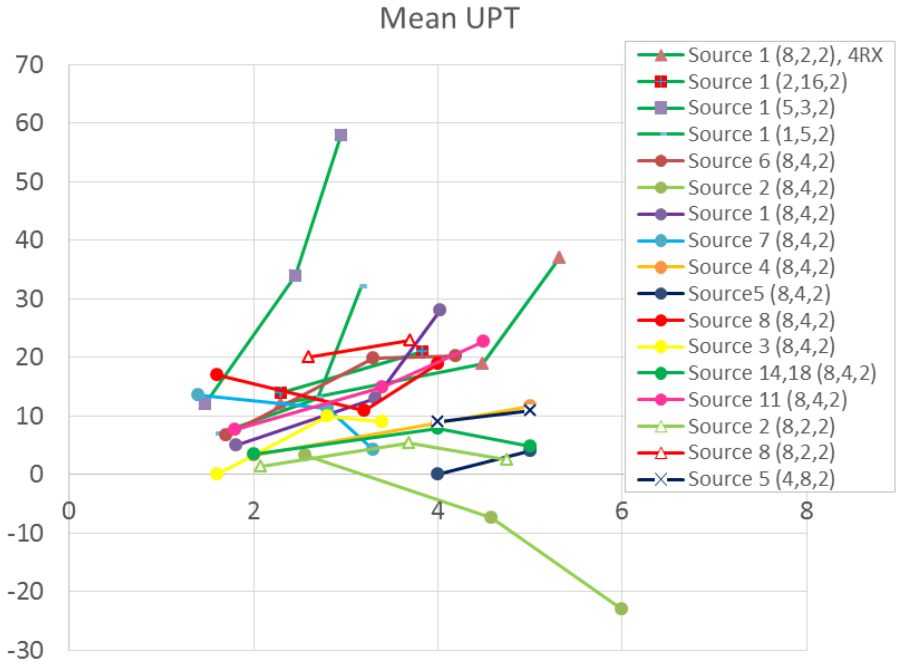
RAN1 Work on E-BF/FD-MIMO

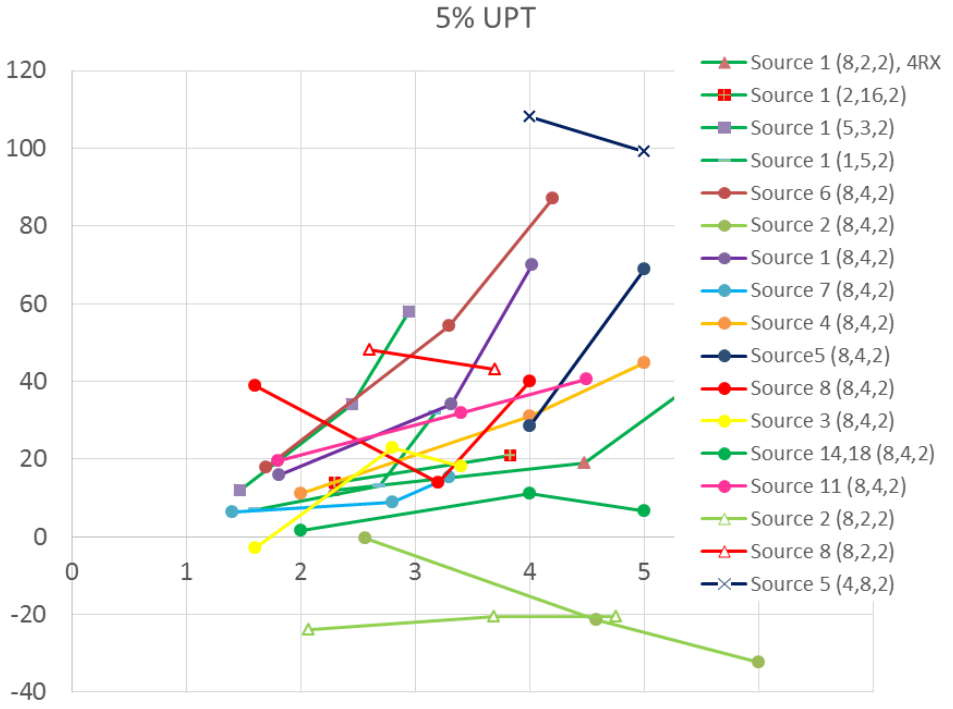
- As a first step in evaluating and studying the potential specification enhancements for E-BF and FD-MIMO, a RAN1 study item on 3-D channel model was undertaken
  - Schedule: December 2012 ~ September 2014
  - Outcome: TR 36.873

- Following the completion of the study item on 3-D channel model, RAN1 conducted a study item on E-BF/FD-MIMO to evaluate and study the potential specification enhancements
  - Schedule: September 2014 ~ June 2015
  - Outcome: TR 36.897
  - RAN1 study showed that significant gain can be achieved from specification enhancements

Example Evaluation Results

- Figure 7.2.2.1.2-1 for the UMi (Urban Micro) channel with carrier frequency of 2GHz, inter-site distance of 200m, and # TXRUs = 16
  - Mean UPT (User Perceived Throughput): Most companies observed significant gains especially when resource utilization (RU) was high
  - Cell edge 5% UPT: Most companies observed significant gains especially when resource utilization (RU) was high





Conclusions from Study Item on E-BF/FD-MIMO

- Non-precoded, beamformed, and hybrid CSI-RS based schemes demonstrate significant throughput gain in realistic non-full buffer traffic models over the best baseline using implementation based enhancements in many scenarios
  - The best choice between these schemes may depend on factors including the number of TXRUs
- Non-codebook based CSI reporting is beneficial for EB/FD-MIMO compared to the best baseline using implementation based enhancements.
- SRS enhancement is beneficial for EB/FD-MIMO compared to the best baseline using implementation based enhancements.
- From the performance perspective, DMRS enhancements are beneficial for EB/FD-MIMO.

Proposal

- Approve a WI on E-BF/FD-MIMO for completion in Rel-13