

MIMO off-air repeaters

COBHAM

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Introduction

To provide throughput in LTE networks it is essential to reduce the link loss between the eNodeB and the Mobile. For Hot spots and smaller areas this can be achieved in an easy way by using off air repeaters. The advantage compared to a small cell or eNodeB is that the high speed connection to the core network is eliminated. Thus a fast roll out and low OPEX is achievable.



Due to the deployment of a MIMO network in almost all LTE rollouts the question arises how a SISO off air repeater affects the performances compared to a MIMO off air repeater.

LTE Repeaters in MIMO environments

As a principle of a 2x2 MIMO system the traffic information is transmitted over two physically separated channels over two antennas.

While the signalling information (RSRP) is transmitted alternating on one MIMO channel at a time, the traffic information is transmitted simultaneously over both MIMO channels.

To balance the additional signal strength received for the traffic information, the signalling information is transmitted 3dB higher than the traffic information.

- RSRP is transmitted to a single MIMO channel at a time alternating
- Traffic information is transmitted simultaneously between all MIMO channels
- To balance, RSRP is transmitted at higher levels (i.e. +3dB for 2x2 MIMO)

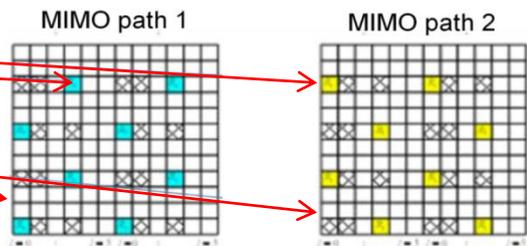


Figure 1: Alternating RSRP transmission in LTE MIMO

LTE Downlink Radio Frame for 2x2 MIMO. Colours indicate RSRP carrying resource elements

If a SISO repeater is connected to a MIMO donor cell, only one path will be transmitted. As a consequence, the receiver will measure a 3dB higher RSRP compared to the traffic information. As LTE MIMO is optimized for receiving the traffic information on two paths (2x2), the system is no longer optimized. The result is that the throughput drops to approximately 1/3 of the expected throughput under MIMO conditions.

When connecting a high quality MIMO off air repeater to a MIMO donor cell, the throughput over the repeater can be expected to be almost the same or equal to the speed experienced when directly connected to the eNodeB.

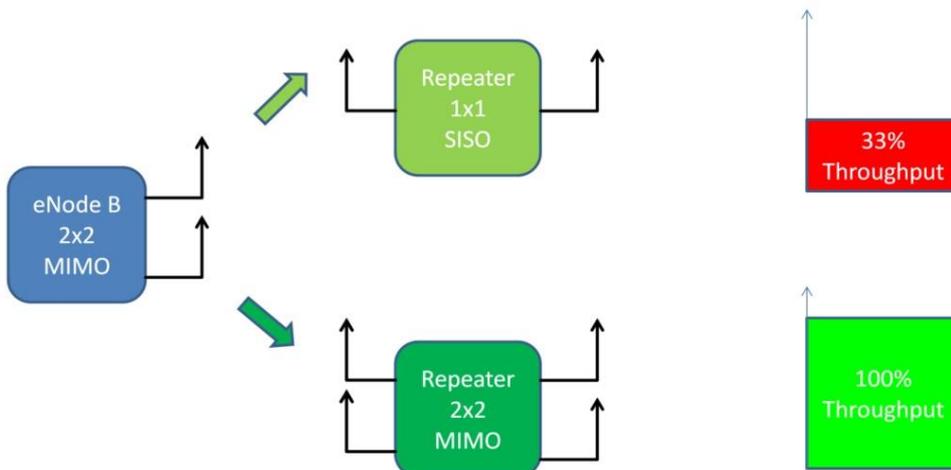


Figure 2: SISO and MIMO off air repeater scenarios



Cobham Wireless MIMO Solutions

Cobham Wireless is using a high quality, latest technology approach for LTE repeaters. The digital filter technology allows a precise adaption of the filter roll off and a sharp selectivity to all defined LTE channel bandwidths. In combination with highly linear amplifiers an excellent EVM can be achieved.

In all power classes Cobham Wireless is offering MIMO versions, providing a systematic, integrated solution delivering an unrestricted data throughput to coverage holes and hot spots.

All Cobham Wireless digital off air repeaters allow a mixed usage of 2G, 3G and 4G in the same band. Separated by each other due to digital filters, individual power control and gain adaption is maintained.

Multi-operator use is fully supported due to the high number of digital sub bands.

Future spectrum refarming is no concern as all products can be adjusted remotely to a new frequency plan. Cobham Wireless supports MIMO for the DIGImini, D-SBR, D-MBR and D-OBR off air repeater products.



Figure 3: DIGImini dual band digital MIMO repeater

All Cobham Wireless digital off-air repeaters allow a mixed usage of 2G, 3G and 4G in the same band.

Further Cobham Wireless MIMO Products

For all optical DAS products Cobham Wireless is offering integrated MIMO solutions in a multiband configuration. The MBF40 family provides up to 8 bands with an output power of up to 43dBm.

As a compact, low power approach the MBF20 offers an excellent form factor for dual band, InBuilding environments.

All units are optimized for multi-operator, multi-band, environments, supporting GSM, GPRS, EDGE, UMTS, W-CDMA, LTE and more.

