

VDSL2 Vectoring

Capital Market Day, 15 January 2013



Cautionary Statement

“This presentation contains certain forward-looking statements. Actual results may differ materially from those projected or implied in such forward-looking statements. Forward-looking information involves risks and uncertainties that could significantly affect expected results.”



Overview

- What is vectoring?
- Board Level Vectoring versus System Level Vectoring
- Compatibility issues
- Next steps



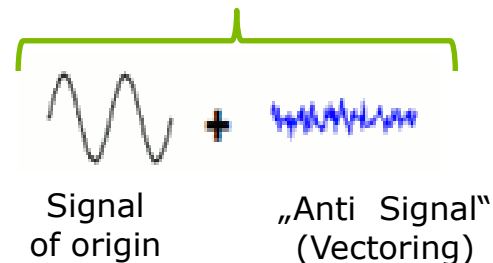
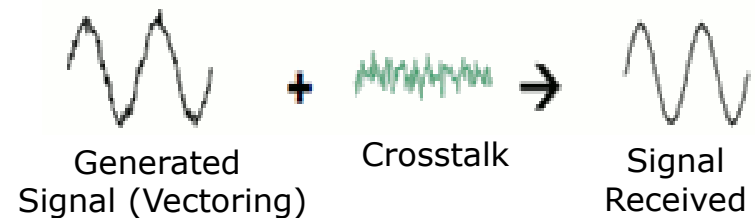
What is Vectoring?

- Each customer suffers from other customers using the same binder (Crosstalk, FEXT, Noise)
- This reduces bitrates by 45 – 50% (compared to the situation of having only one customer on the binder)
- Vectoring gains back up to 90% of lost bandwidth
- Standardized technology according to ITU-T Standard: G.993.5 (May 2010)

Without Vectoring:

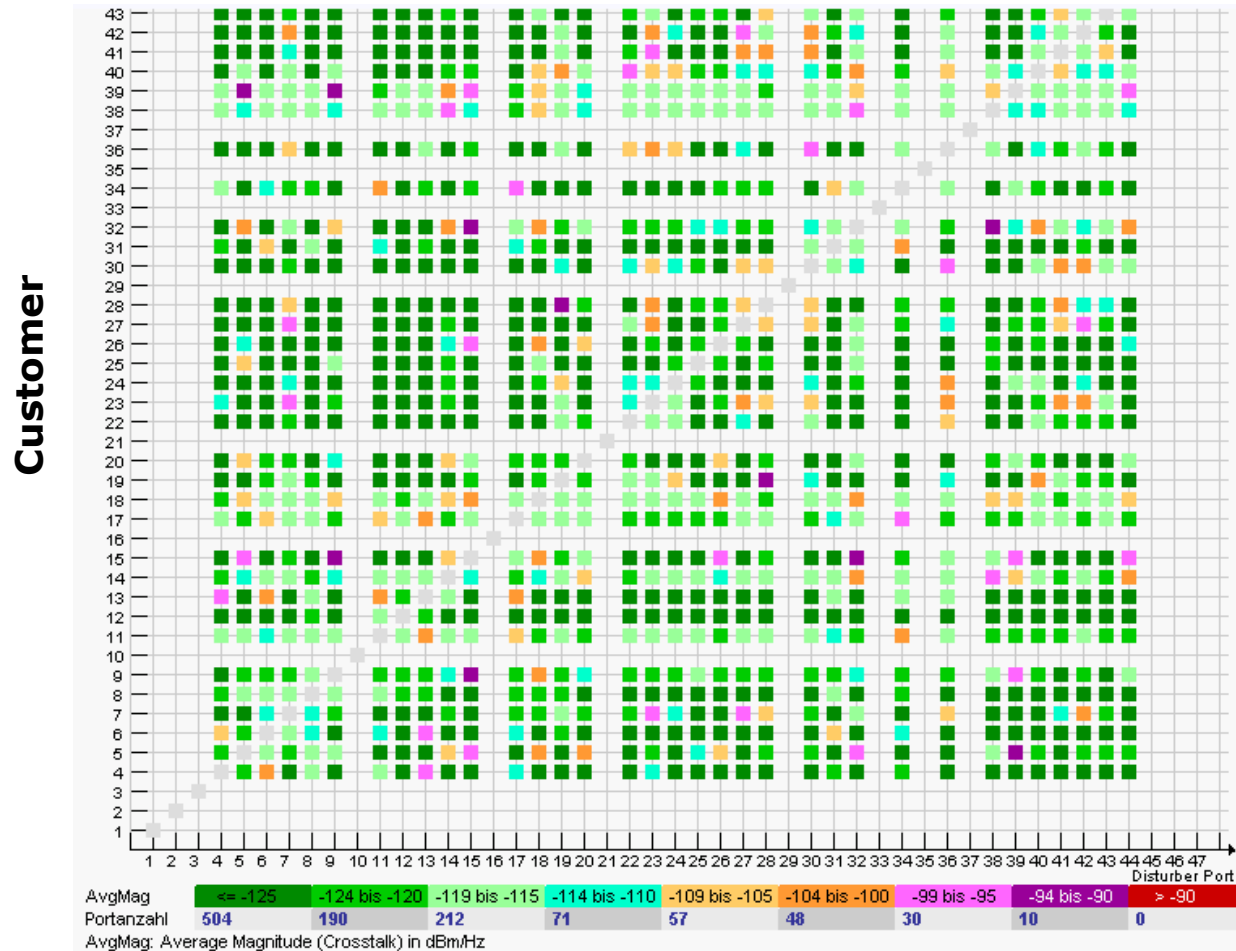


With Vectoring:



DSLAM is Reporting Crosstalk Between Copper Lines = Disturber Matrix

Crosstalk before Vectoring

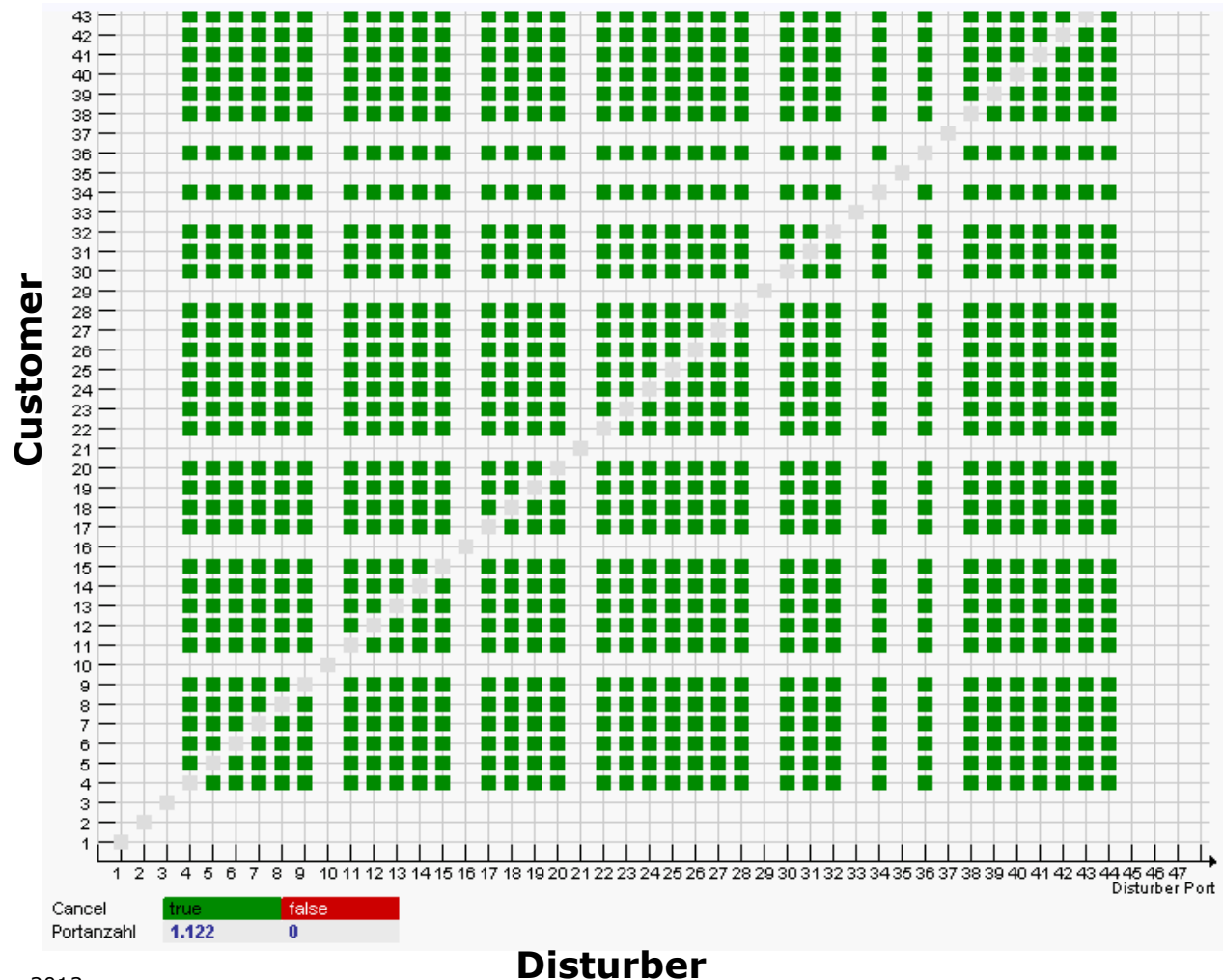


Disturber



Vectoring Eliminates Crosstalk

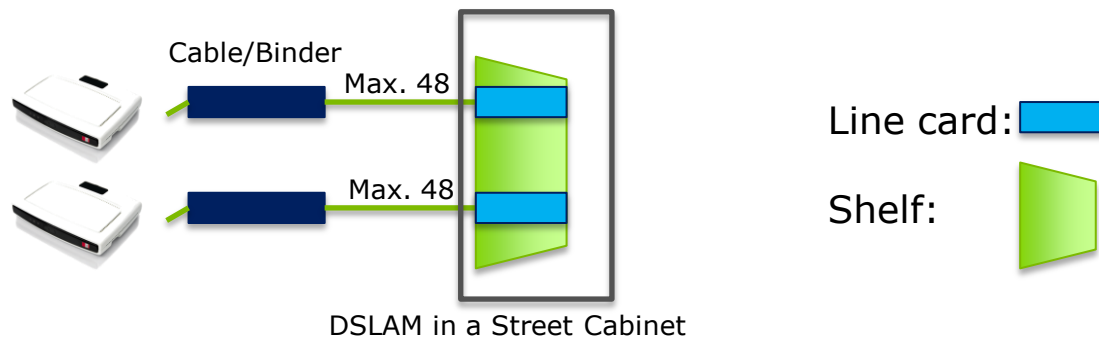
Crosstalk after Vectoring



Field Trial in the City of Korneuburg with Board Level Vectoring

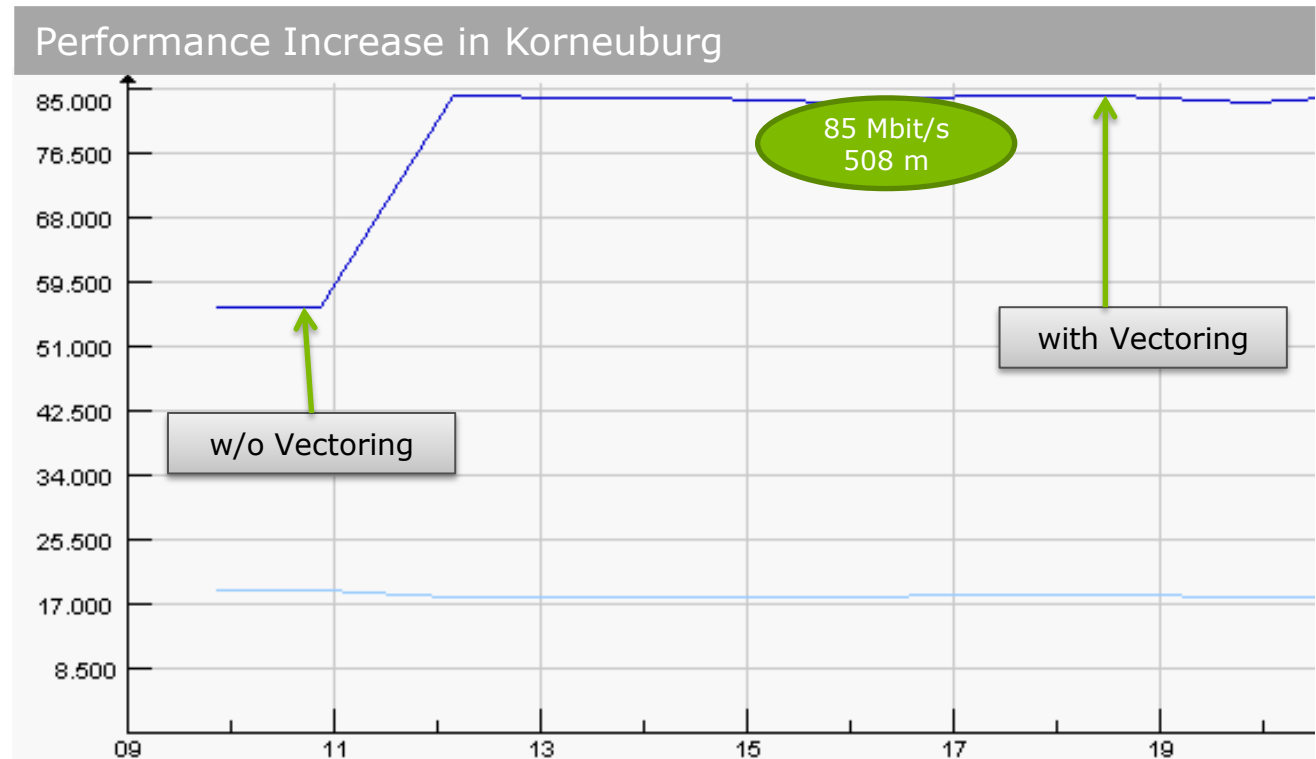
Board Level Vectoring (BLV)

- = Vectoring per line card
- Max. 1 line card or 48 customers per cable or cable binder
- For more than 48 customers
 - Cable topology must be taken into account
 - Low usage and complex OSS implementation
- **Solution fitting well to FTTB and FTTC with few customers**



Field Trial in the City of Korneuburg with Board Level Vectoring

- Trial confirms result of laboratory
- Service Bitrate between 50 and 80 Mbit/s depending on the distance



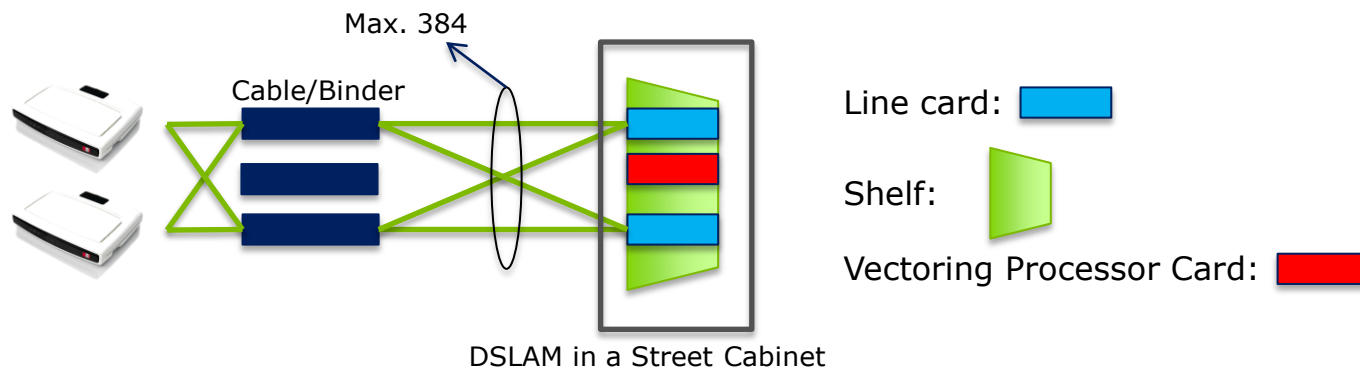
Vectoring Proofs as a Cost Efficient and Stable Way to Offer High Bandwidth Speed

A1 will Mainly Deploy System Level Vectoring

System Level Vectoring (SLV) – 2nd generation of Vectoring technology

= Vectoring at the Shelf-Level

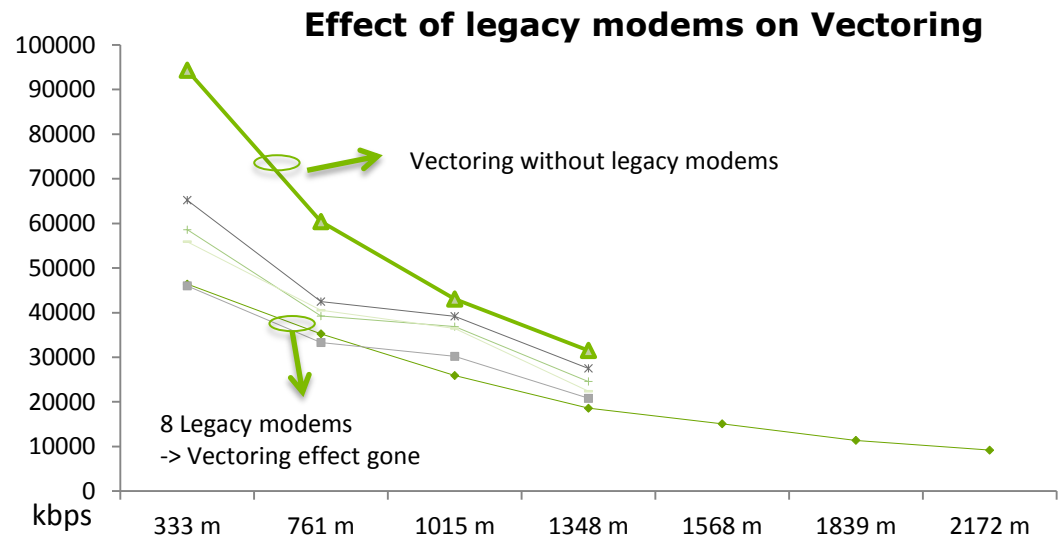
- Max. 384 customers per cable or cable binder
- Simple planning and provisioning processes: cable topology has not to be taken into account
- A Vectoring processor card is additionally required to evaluate and compensates crosstalk
- **Solution fitting well to FTTC with more than 48 customers per site**



98.7% of All VDSL2 Modems in A1 Network are Compatible with Vectoring

Modems

- All VDSL2 Modems of A1 supports vectoring
- Less than 1.3% legacy modems in A1 network
 - Replacement or upgrade required



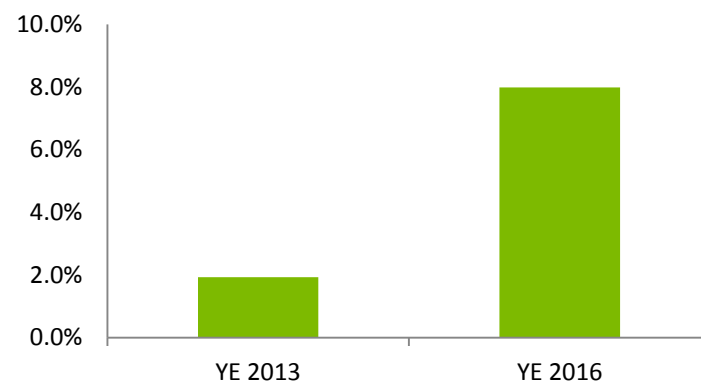
Next Steps

Target 2013: VDSL2 Vectoring Deployment

- Vectoring as standard technology for FTTC
- Focus on System Level Vectoring
- Card seeding until deployment of the ASIC based processor card

Planned Coverage

in % of homes



Commercial and Technological Development

- Acceptance testing and integration of ASIC based processor card (up to 384 customers)
- Preparation of commercial launch

Local Loop Unbundling

- Legal Framework still under discussion



Thank you!

