



TELESTE

Extended Spectrum DOCSIS: A Pragmatic Approach

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Decade after decade



Decade after decade - **From changes to solutions**

Changes

- More bits/symbol requiring better MER
- Higher frequencies and loads, requiring better amplifiers
- Lower margins due to higher Total Composite Power (TCP)

Solutions

- More robust modulation methods and FECs
- Better amplifiers
- Digital fibre instead of analog (shift to DAA)
- Careful network planning and intelligent amplifiers

Decade after decade – A challenge of continuity

What has **NOT** changed

- Engineers complaining that the next change is "different"
- Distances between existing street cabinets

Solutions

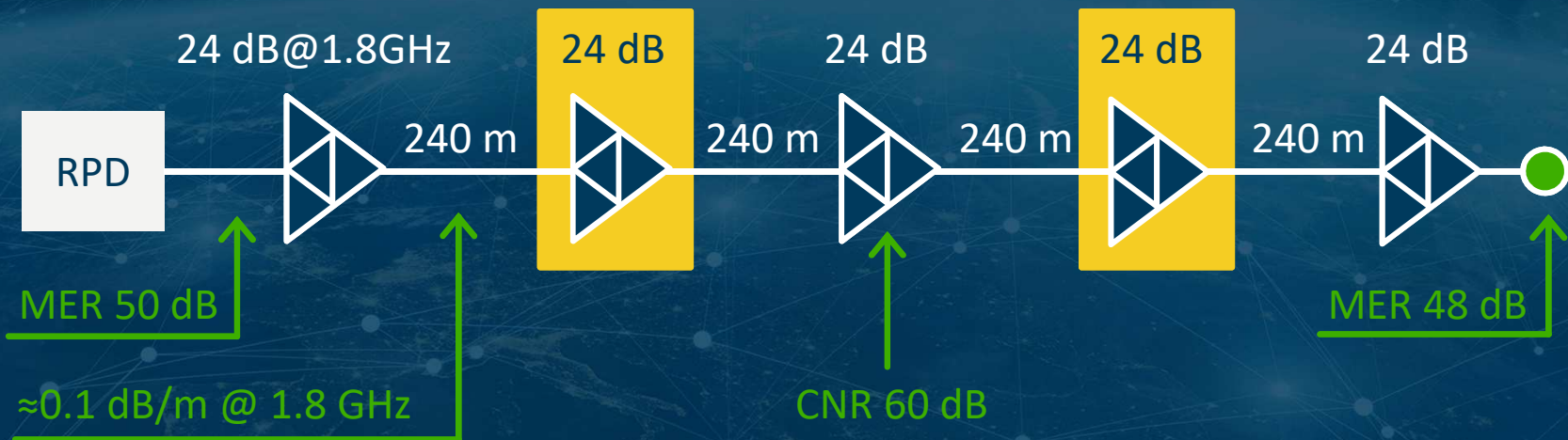
- Time
- Better amplifiers and careful network planning

Questions

- How good are these better amplifiers going to be?
- Are booster amplifiers needed between street cabinets?

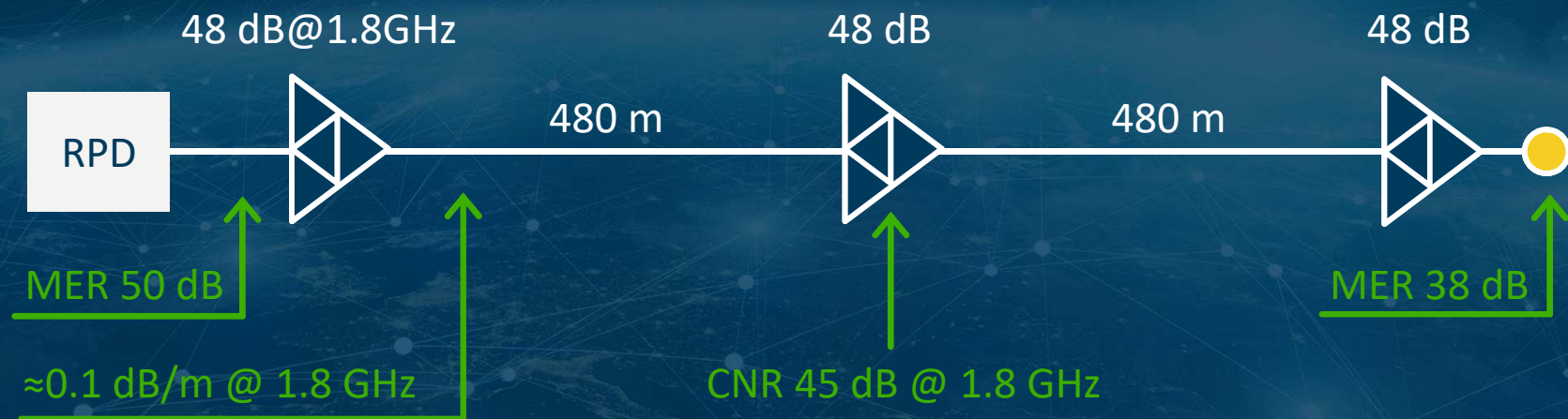
If distance between amplifiers is chosen **without restraints**

- ✓ Cascading 1.8 GHz amplifiers and reaching 4K QAM can be "trivial"
- ✓ Theoretically calculated and measured results follow the 10log equation
- ✓ In practice some of these amplifiers would be **trunk extenders in new locations**

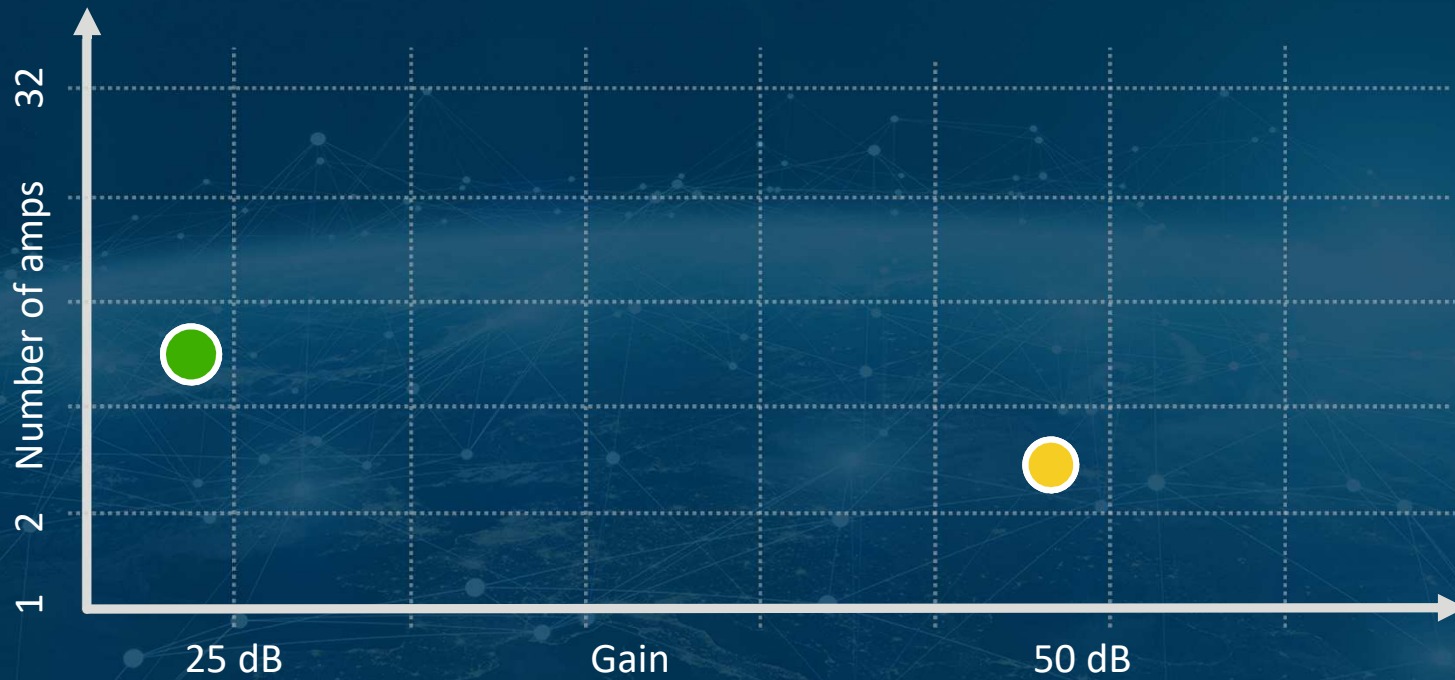


If distance between street cabinets is more challenging

- ✓ Cascading 1.8 GHz amplifiers and reaching 4K QAM can be difficult
- ✓ Theoretically calculated and measured results do not follow 10log (closer to 13log)

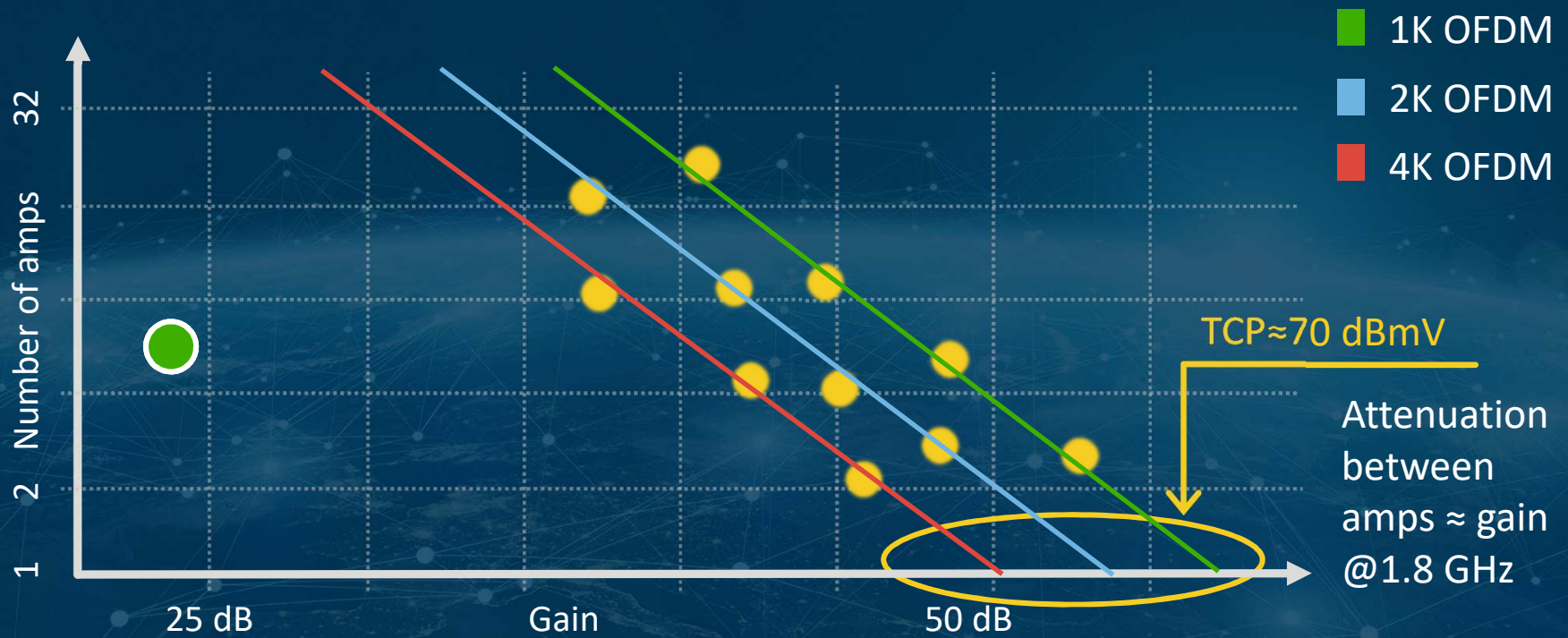


Cascades & MER



Attenuation
between
amps \approx gain
@1.8 GHz

Cascades & MER



Summary

1. Coax has served us well, all challenges have been solved wave by wave

2. Attenuation between amplifiers guides 1.8 GHz network upgrades

3. Today, 1.8 GHz amplifiers can manage 70 dBmV TCP

4. Careful network planning and precise adjustments reduce number of new locations

- The accuracy of signal levels becomes paramount
 - > Intelligent and automatic adjustments secure proper network operation

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