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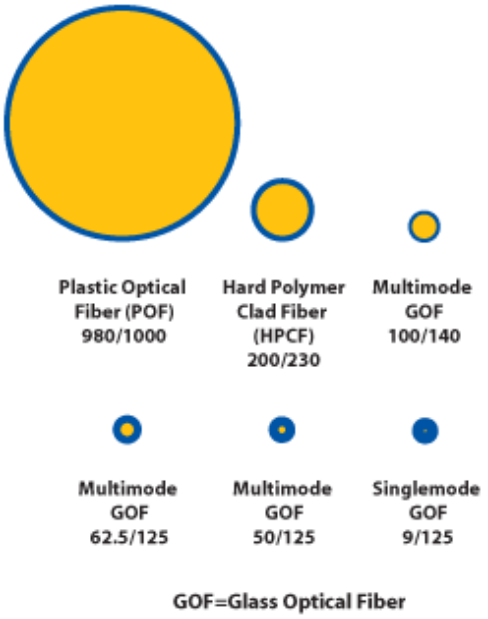
OFC 2009 POF Symposium

Speaker: John D. Lambkin

‘POF – Crossing the Chasm of Market Adoption”

Step Index-POF Basics



- Core diameter: 1 mm
- NA: 0.5
- Attenuation: 180 dB/km at 650 nm (Visible)
- Dispersion: 40 Mhz.50 m
- NRZ Transceivers 125 Mbps-100m
- Minimum Bend Radius ~10 mm
- Terminated with a simple cutter: bare fibre interfaces
- Standard: IEC 60793240 A4a.2

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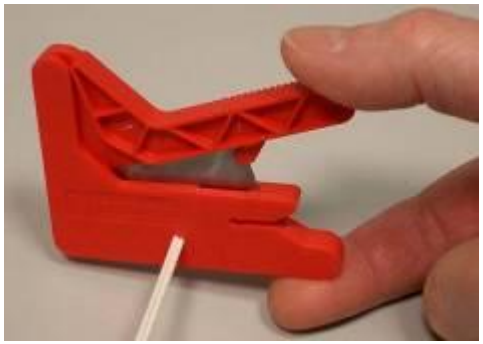
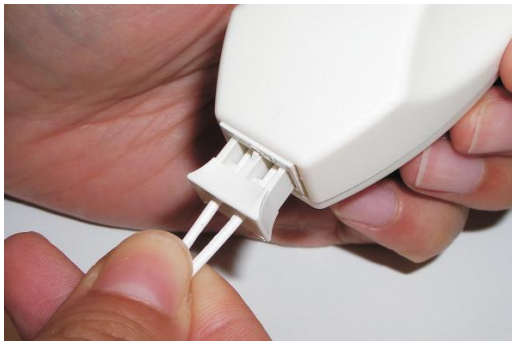




POF Technology from Car to Home

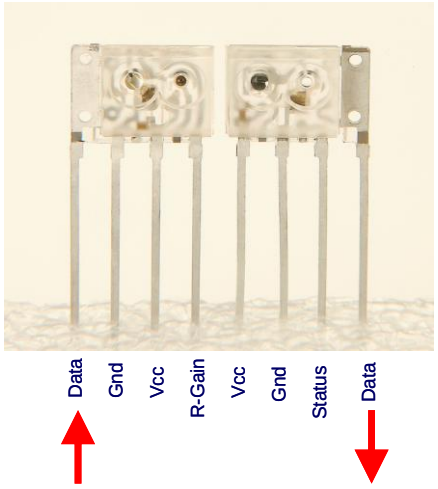
- Automotive
  - Entertainment POF network
  - 15 million nodes annually
  - 55 Car models
  - 25 – 150 Mbps
  - Excellent EMI Immunity
  - High Reliability
  - Low Cost

Technology Migration

- Consumer
  - Entertainment home-networks
  - IPTV Services delivered by Operators
  - Early Adoption by Innovators

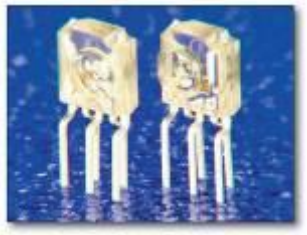
Consumer Leverage of Auto

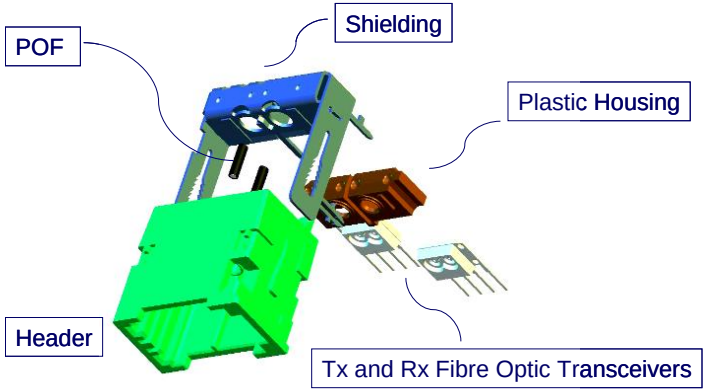
Auto

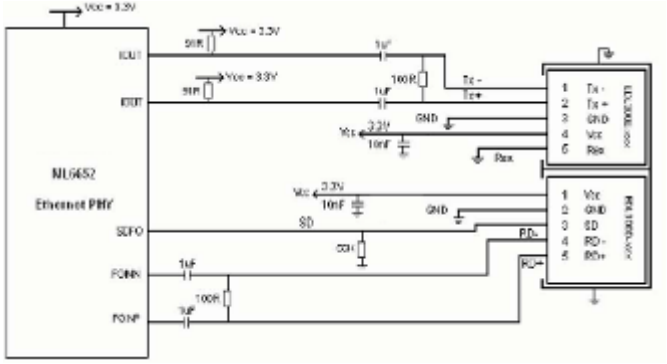


- Performance
- Quality
- Reliability
- Manufacturing
- Standards
- Confidence

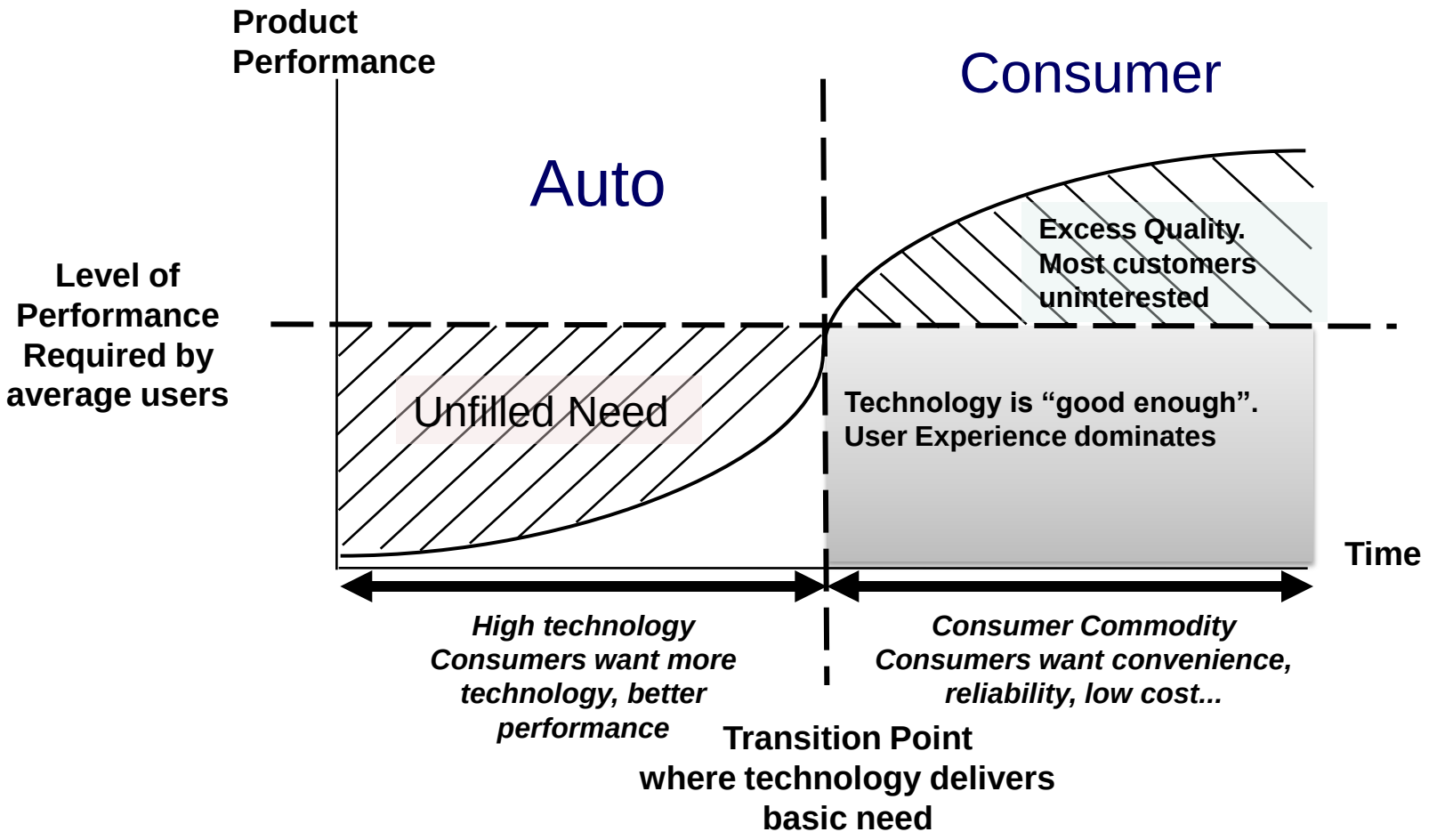
Consumer







Technology Maturity Curve



[Source : Christensen]

IPTV In-Home Connection Requirements

Access Gateway (Modem)

?

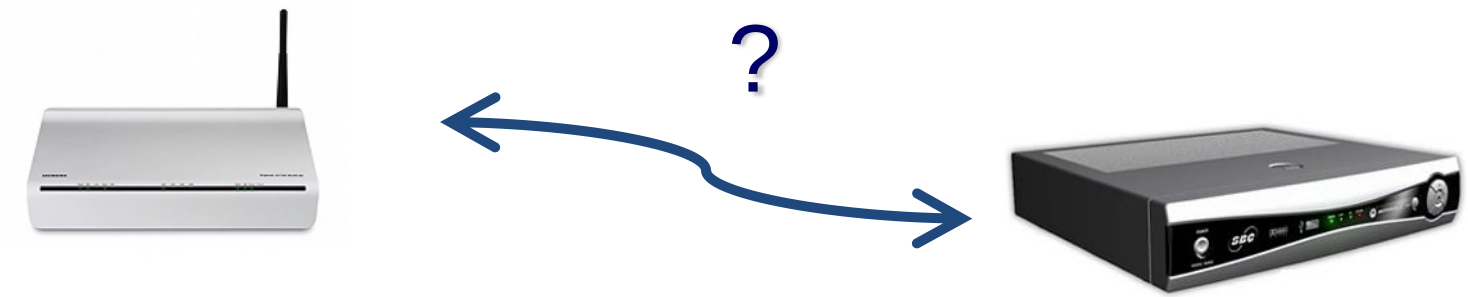
Set-Top-Box

- Criteria
  - Quality of Service
  - Future Proof
    - Multiple HDTV channels
    - Multi-room scenario
  - Ease of Use
  - Self Installation Option
    - Increases adoption rate
    - Reduces operator costs
    - Reduces customer cost
  - Low Cost

Single B-frame IP packet loss

Single I-frame IP packet loss

In-Home Connection Options

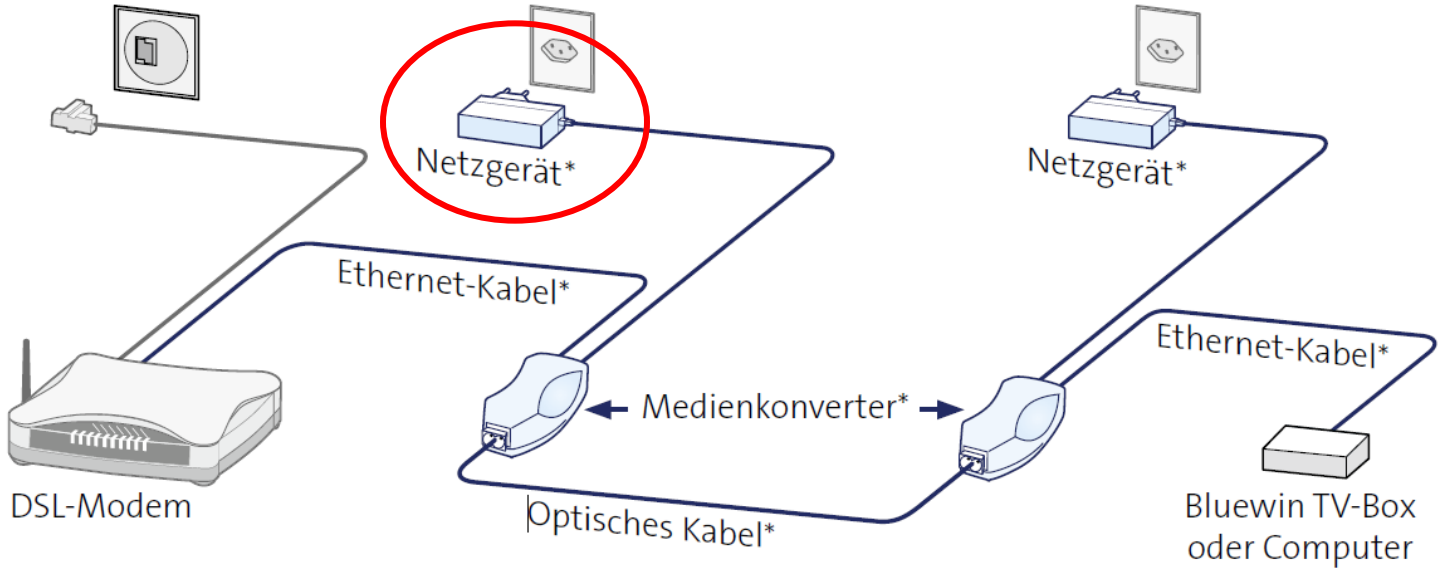


- **No Wires / No New Wires**
  - MOCA, HPNA
    - Variable install times
  - 802.11b/g/n, MIMO
  - HomePlug/AV,PLC, HDPLC
    - Ideal for low speed SDTV
    - Construction dependent
    - Net throughput & Interference
    - Uncontrollable install time
    - Self-Install Options: (PLC, Wireless)
    - Not a home backbone technology
- **Clean Wire**
  - Cat5/5e/6
    - Ideal if already wired
    - Long installs for retro-fits
  - PLASTIC OPTICAL FIBRE (POF)
    - Guaranteed bandwidth (125 Mbps)
    - Future Gbps capability
    - Dedicated medium
    - Fast & Controlled installation time for retro-fits
    - Self-Install Option

Early Adopter Solution

Aufbau und Gerätebezeichnungen

* Im Lieferumfang enthalten



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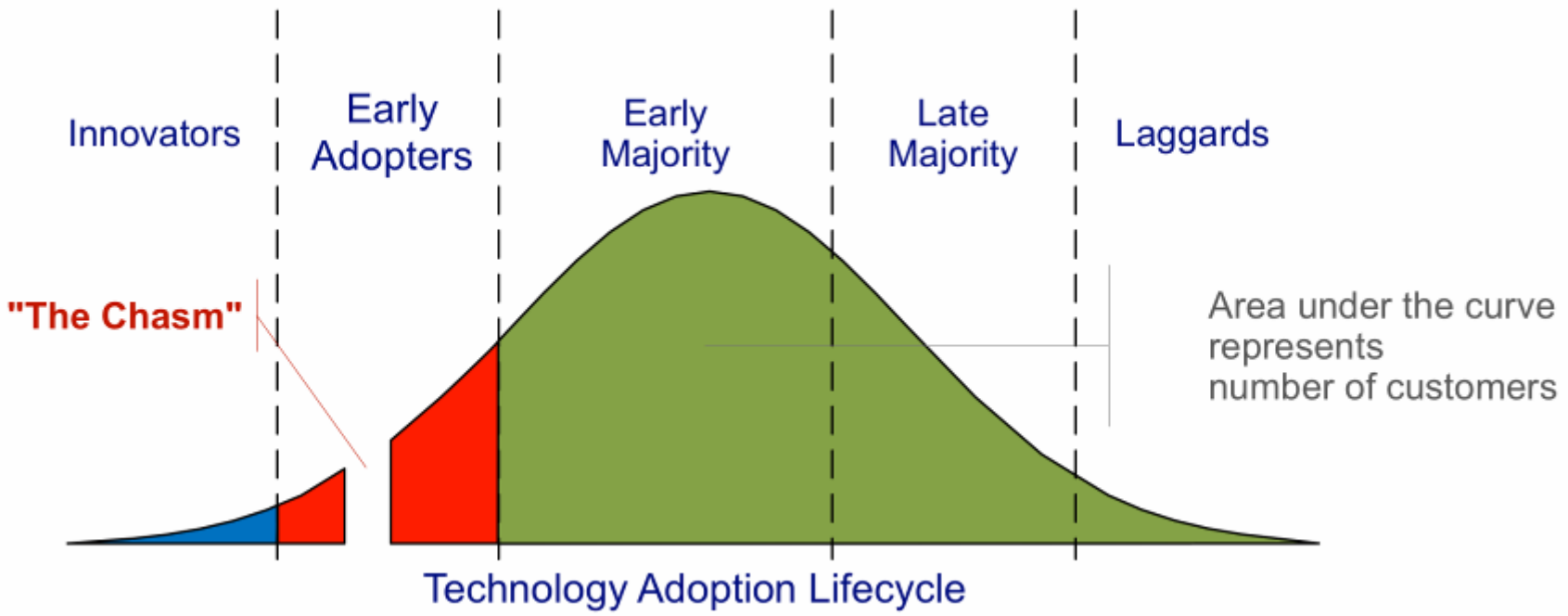
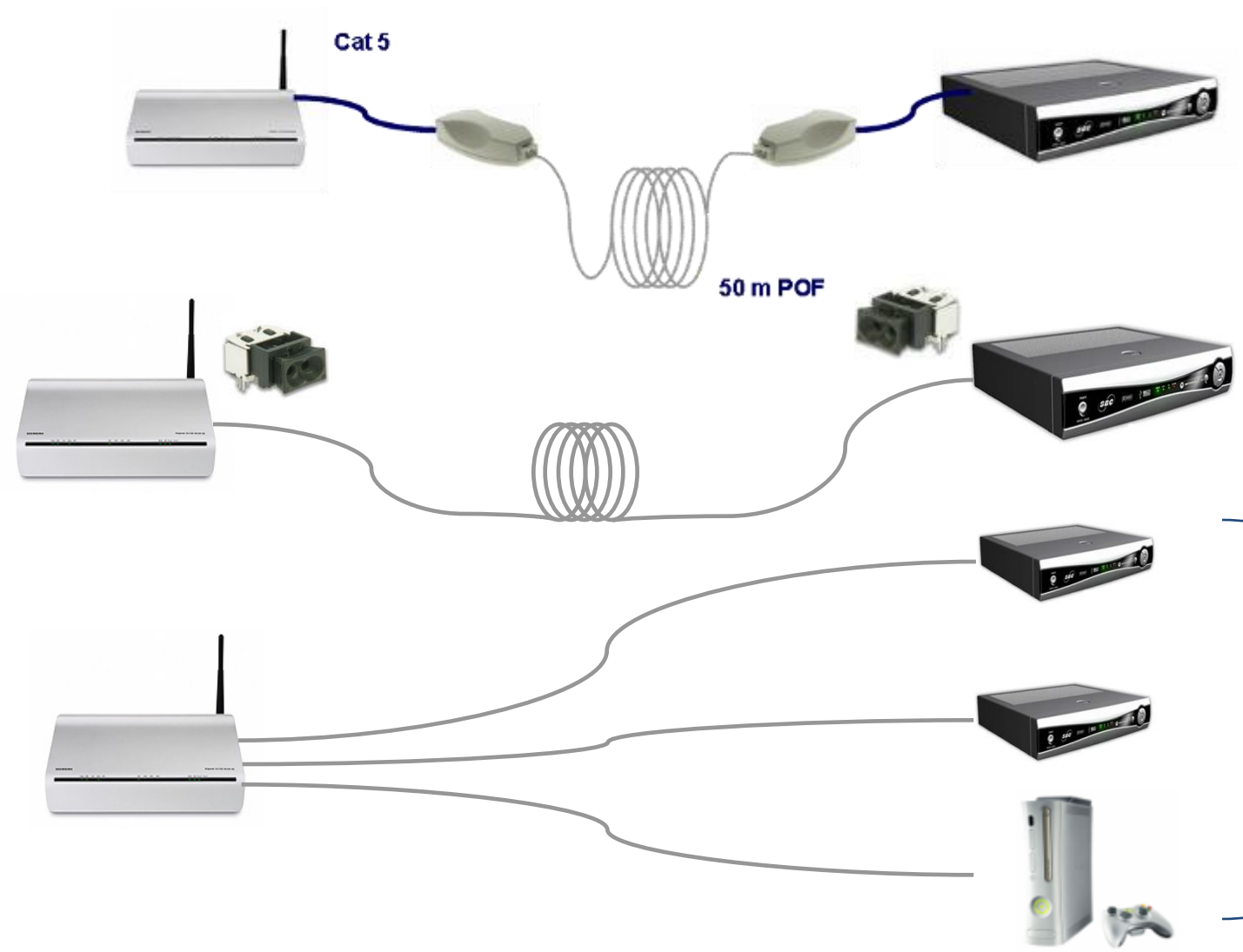
Crossing the Adoption Chasm



[Source : Geoffrey Moore]

Path to Adoption Growth



Early Adoption
Phase - Kits
Costs Telco
Approx $40

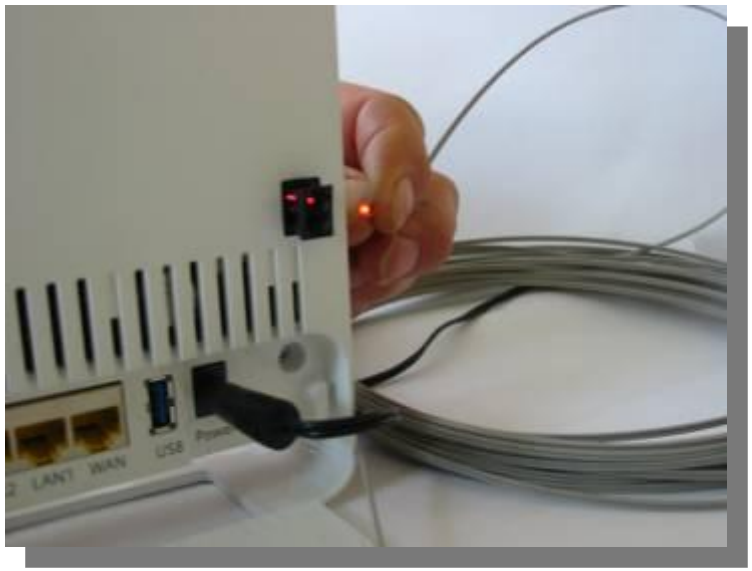
Integration Phase
Optical Port 'In-The-Box'
Costs Telco
Approx $2.50/per port

Multi-Room Scenario
Widespread adoption
Multiple Networking Options

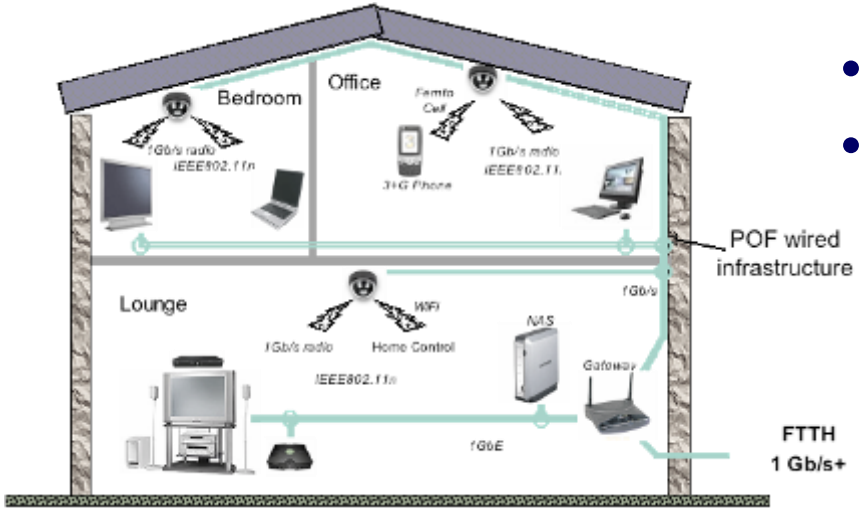
STB with Embedded POF Port

STB with Embedded POF Converter

Home Gateway with Embedded POF Port



Tomorrow's Bandwidth Requirements ?

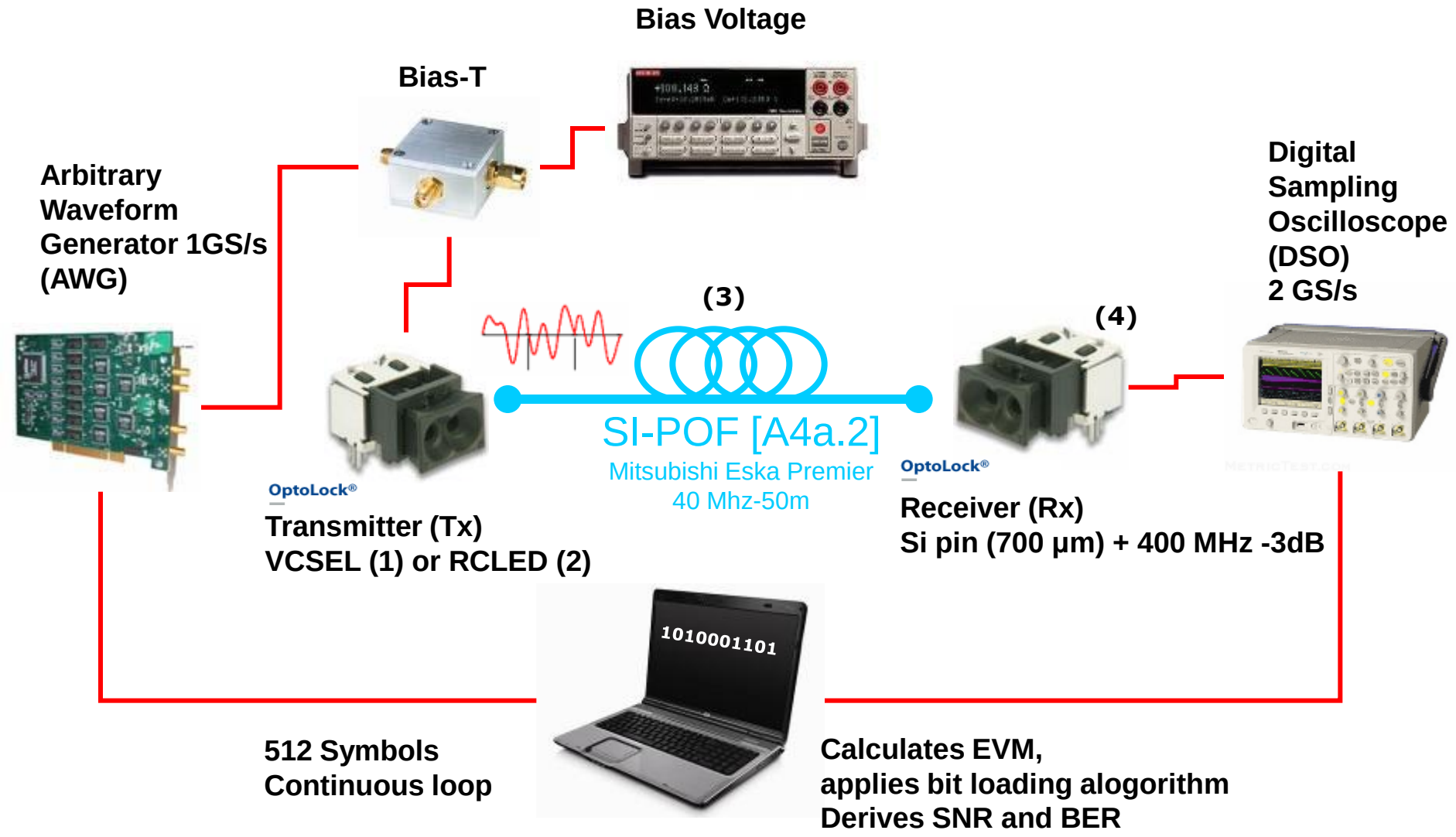


Home network with integrated POF and wireless infrastructures

3D TV (Philips)

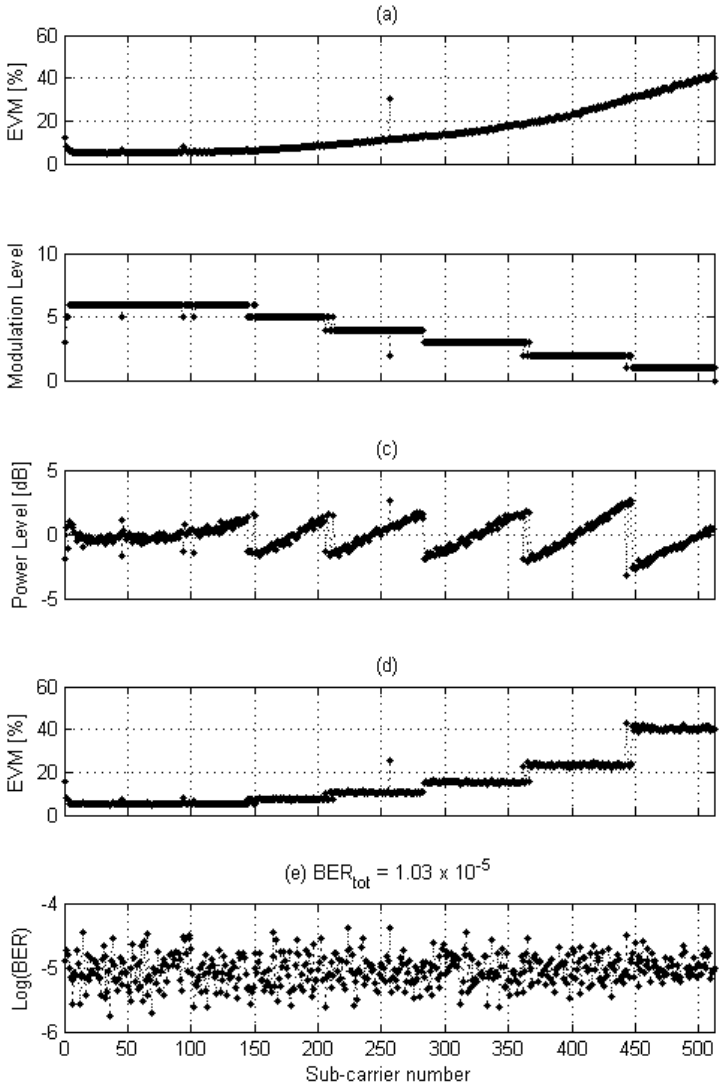
- FTTH Gbps services
- High Speed Wireless
- Super Hi-Vision (SHV) video system developed by NHK
  - Screen definition of 7680 x 4320 (aspect ratio of 16:9) and carries 24 audio channels for full spatial sound effects.
  - 180 – 600 Mbps depending upon coding
  - Expected to be broadcasted in Japan by 2025.
- 3D TV already broadcasted in Japan as of April 2008
  - 3D TV are commercially available
  - 62.5 to 300 Mbps depending on coding

Optical OFDM: The Experimental Setup



RCLED Results

- 50m SI-POF
- Symbol Duration 2.05 µs
- 950 Mbps acheived for a target bit error rate of 10^{-5}
- Modulations from 64QAM to BPSK
- Channels used up to 512 (250MHz)



Conclusions

- POF has proved to be a robust low-cost solution for automotive applications
- POF is now being used by early adopters for consumer IPTV applications
- Embedded POF port solutions are now appearing from a number of STB and Gateway manufacturers
- POF has the potential to become a robust, low-cost optical back-bone with Gbps capacity