Fibre Access Extension – Reusing The In-Building Coaxial Cabling for Multi-Gigabit Performance

Helge Tiainen, Business Development, InCoax Networks
Chair, MoCA Access Work Group

MoCA ACCESS™

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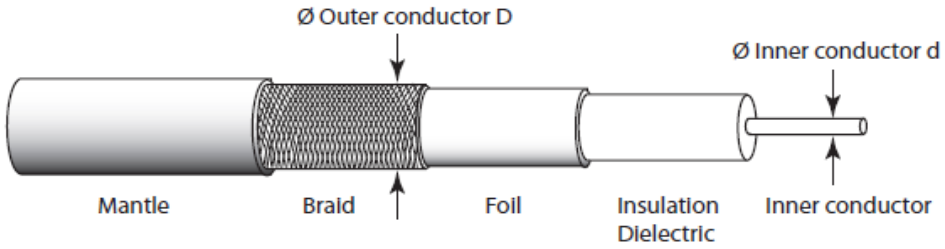
Challenges In MDU GPON Deployments

Potential Barrier	Potential Delay	Cause
New cabling	Several months	Approval from all condo owners
Cable construction work in apartments	Several months	Condo owner don't see any benefit of new wiring
Apartment installation	Several weeks	Key handling and access to apartments
Reluctant to convert to fibre services	Length of existing subscription contracts	Understand the benefits with fiber based services
In-building wiring cost (paid by building owner)	Depending of annual condo meeting	Need to be approved by a majority

Reduce Deployment Barriers  **Use existing infrastructure**

Existing MDU Infrastructure – Coax or Copper



Cable Attribute	Coax Cable Network	Twisted Pair Network
Age of in-building wires	☺	☹
Cable availability at entry point	☺	☺
Cabling reach home location of TV-set	☺	☹
Low cable attenuation @ high frequency	☺	☹
Support for multi-gigabit	☺	☹
Roadmap for 10 gigabit	☺	☹

Coax Access Technologies

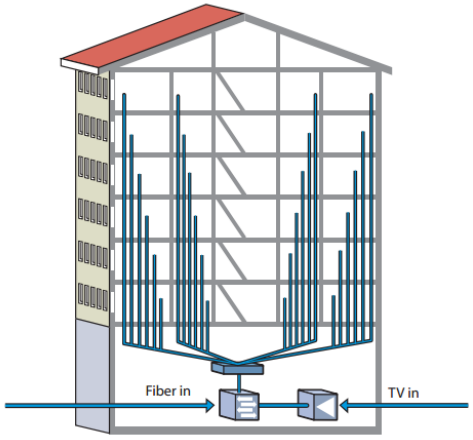
Technology	☺	☹
G.fast over coax (106 MHz profile)	DL 900 Mbps / UL 100 Mbps	Supports only point-to-point topologies
G.fast over coax (212 MHz profile)	DL 1800 Mbps / UL 100 Mbps	Supports only point-to-point topologies
G.hn (200 MHz profile)	DL 1200 Mbps / UL 200 Mbps	Supports only 15 modems in point-to-multipoint
MoCA Access 2.5	DL 2500 Mbps / UL 2000 Mbps	Not a baseband technology

Best technology match to GPON fibre access extension

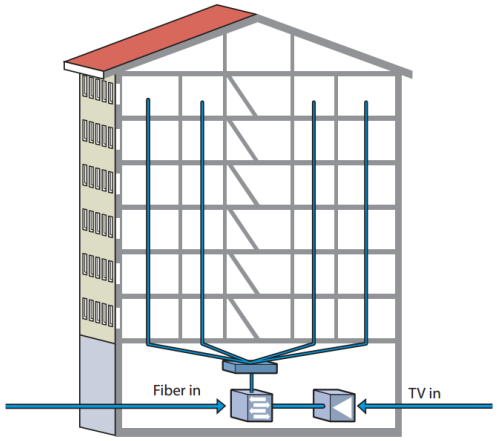
MoCA Access 2.5

Coax Network Topologies

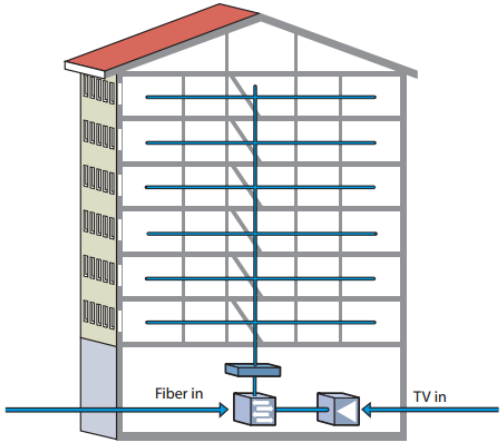
- Star, cascade, tap and tap/splitter
- Point-to-point and point-to-multipoint



Star



Cascade



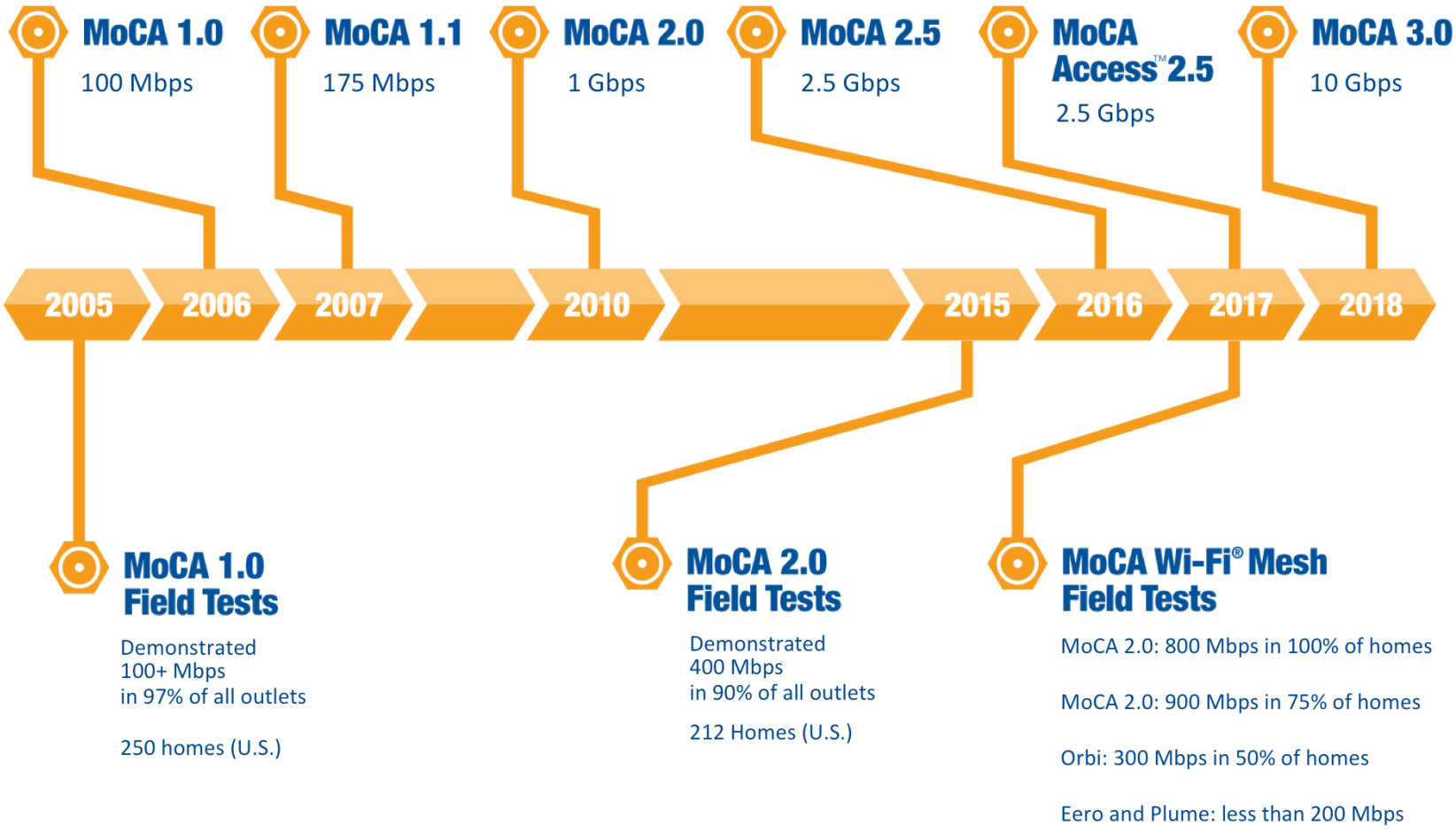
Tap

MoCA Overview

- Alliance established in 2004.
- Fastest and most reliable home networking technology standard available.
- Actual data rates (MAC):
  - 1 Gbps (MoCA 2.0)
  - 2.5 Gbps (MoCA 2.5)
  - 10 Gbps (MoCA 3.0)
- Uses existing coaxial cabling. Not dependent on type or age of wiring.
- MoCA in deployment by cable, telco and satellite operators worldwide.
- More than 270 million chipsets in the field.
- 228 certified products.
- MoCA Access 2.5 in trials at operators in Europe and China.

MoCA Technology Roadmap

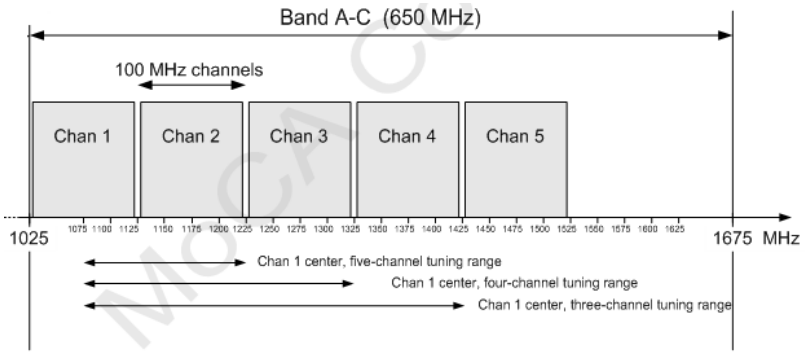
Numbers shown indicate actual data rates.

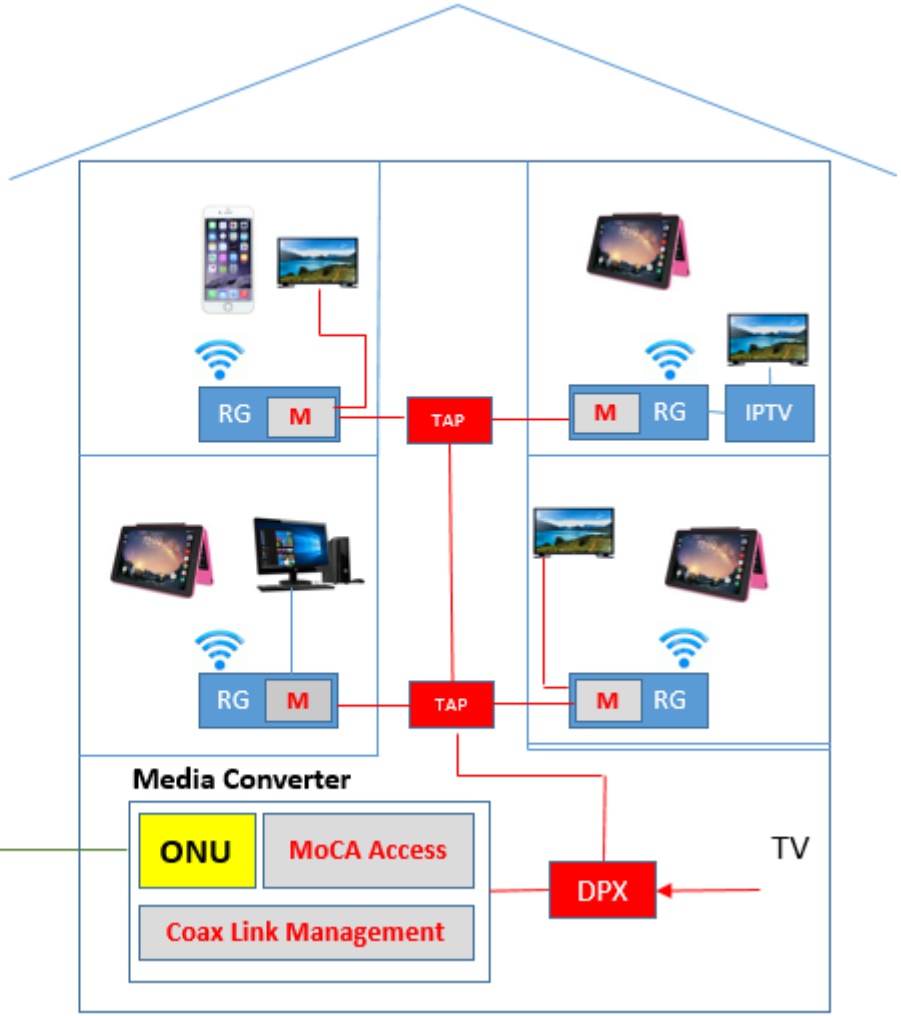


MoCA Access 2.5 Features

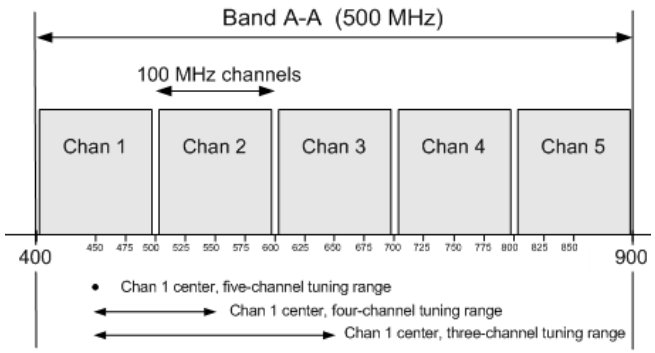
- Transparent IEEE802.3 bridge
- MAC speed up to 2.5Gbps (DL:2.5/UL:2.0)
- Configurable DL/UL ratio
- Profiles for 1.0 /1.5/2.0 or 2.5Gbps MAC rates
- MAC using time division multiple access (TDMA)
- Supports up to 512 multicast addresses and full VLAN range
- Shaping and QoS up to eight classes
- Average latency < 3ms
- Max MTU size 2k
- Client node with three power states
- Frequency range 400-1675MHz
- Profile C 225MHz/profile D 300,400 or 500MHz bands with channel bonding
- P2PM up 63 modems
- PHY using time division duplexing (TDD) and OFDM modulation
- Up to 1024QAM
- Packet error rates < 10^{-6} or 10^{-8}
- Supports multicast over a coax link
- 5 pre-defined bands for AL-IP or co-exist TV services
- AES cryptographic algorithm with 128-bits key with AATEK refreshment within six hours
- Three power contours with 45dB, 55dB or 65 dB link budget

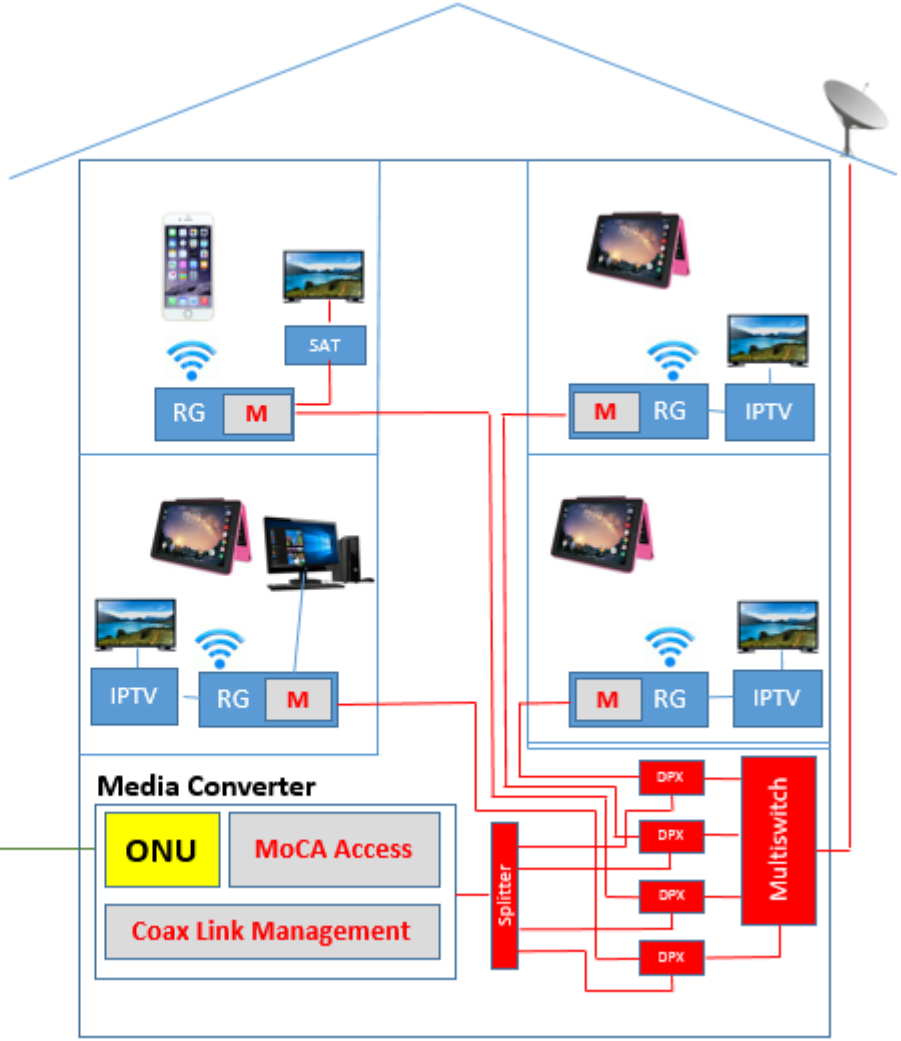
GPON Co-existence With TV



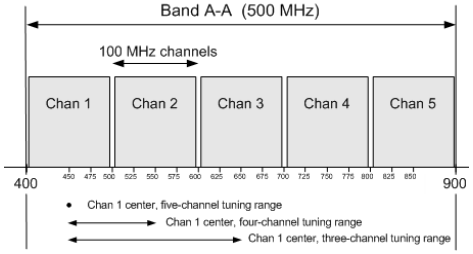


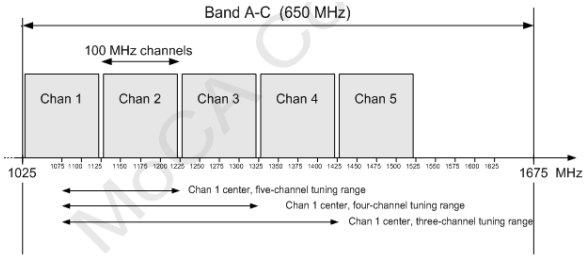
GPON Co-existence With Satellite

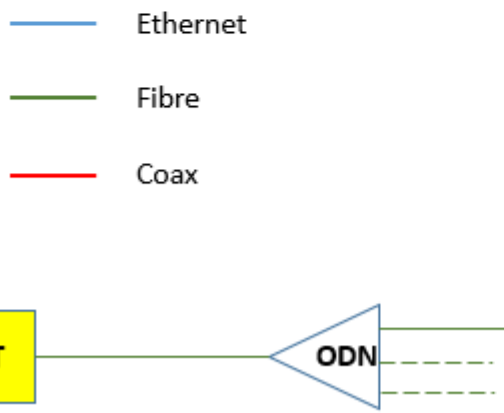




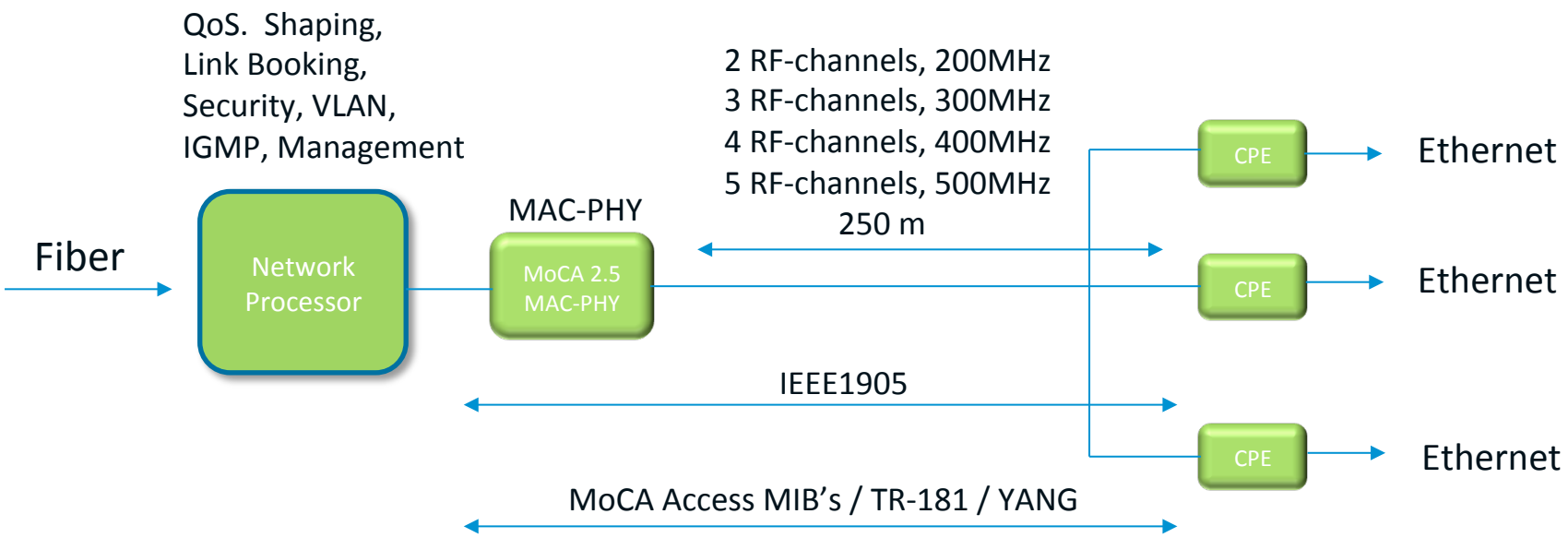
GPON Using Full Coax Spectrum







MoCA Access Principals



InCoax Fibre Access Extension Node

CLC2524

Key features:

- **Accumulated 10 Gbps over four RF-ports**
- **Each RF-port delivers 2.5 Gbps**
- **Delivers IPTV, VoIP and high-speed Internet**
- **Operational bands between 400-1675 MHz**
- **Co-exist with terrestrial and cable-TV services**
- **Uses existing in-building coaxial cables**
- **Delivers broadband through existing antenna outlet**
- **Fast and cost-efficient in-building deployment**

Questions?

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