MoCA technology is the fastest and most reliable in-home backbone for Wi-Fi™.
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MoCA Annual Report 2015

MoCA continues to supplement the home network experience. The completion of the MoCA 2.0 field tests in the U.S and the number of 2.0 certifications is an excellent reflection of the dedication of our member companies and their innovation with MoCA technology. Expert work already begun on the next iteration of the specification will only solidify our leadership in the market.

But none of our success would be possible if it weren’t for the countless hours of participation in the work groups and committees that our members provide. While the makeup of the board has changed somewhat due to mergers and acquisitions and people changing responsibilities, the board has conducted business without ever losing focus.

For instance, last winter the board and committee chairs held a three-day, face to face strategy meeting mapping the future course for MoCA in Orlando, FL. And while we did literally spend some time chasing alligators during a dinner outing at a lake, many of the issues discussed and directions to committees are already well on their way toward implementation and ultimately improving the standard.

International membership and acceptance has grown, another indicator of the reliability MoCA offers the service provider. As the number of wireless devices grow in the home, the need for more access points will grow and we believe that using existing coax as a backbone is the best way to support this need.

I can say that the future of MoCA looks bright. Membership is positive and the technology is on a road map toward faster performance. We have a lot of announcements planned for 2016 and I’m confident that the dedication of the board and the supporting members will not only meet but exceed expectations.

Charles Cerino
President, MoCA

“International membership and acceptance has grown, another indicator of the reliability MoCA offers the service provider.”

Charles Cerino
President, MoCA
MoCA 2.0 Field Trials Results

U.S. Field Trials:
The Alliance has completed MoCA 2.0 field tests in the U.S. Trials demonstrated better than 400 Mbps net data rates in 90 percent of all coaxial outlets, or paths. Net throughputs were greater than 350 Mbps for 95 percent of paths.

RESULTS ARE BASED ON 205 HOMES TESTED THROUGHOUT THE U.S.

All homeowners were volunteers and lived in several states throughout the U.S. No homes were screened or chosen based on construction materials, age or condition of coaxial wiring, or type of pay TV service.

Field trials are also currently being conducted in China, Israel, Europe and South Africa.
The intersection of home networking and pay TV is as dynamic and challenging as ever. There are continuously new companies, business models, applications and use cases, all of which generate almost insatiable demands for reliable bandwidth.

Operators and end users no longer want uninterrupted connectivity. They demand it.

But challenge represents opportunity, and MoCA has capitalized on the need for reliable and fast home network backbones.

Our position as the fastest and most reliable backbone for Wi-Fi® resonates worldwide. We have grown the market in terms of units shipped and inclusion in operators RFQs (see Deployments and Trials map on page. 12).

The worldwide home networking device market is expected to grow to $18.5 billion by 2019, a CAGR of 8% from 2014–2019, with 370 million unit shipments, a CAGR of 5% according to IHS.

Our membership has grown despite industry wide consolidation and M&A. We have added 12 new members against a loss of 8 in the past year.

The inexorable march of MoCA technology in the home continues. We will continue to engage operators worldwide to grow the market and membership.

Thanks to all members for your tireless efforts in making MoCA a worldwide leader in home networking. Couldn’t do it without you.

Rob Gelphman
VP of Marketing and Member Relations
MoCA
Adoption of MoCA® 2.0 Drive
Increase in Product Certifications

The Alliance has essentially completed its transition to MoCA 2.0 product certifications. During 2015, the MoCA Certification Board had approved 28 MoCA 2.0 submissions leading to 45 total MoCA 2.0 certifications. This represents a record for the number of certifications granted in a single year.

This compares to 17 certifications in 2014 when the MoCA 2.0 certification program was inaugurated. That year, approximately one third of the certifications granted were for MoCA 1.1. In 2015, in contrast, there was only one MoCA 1.1 certification.

One of the features of the MoCA specification is a set of requirements for Operator-Service Providers (OSPs). This year continued in the trend as all but two of the certified devices carried the OSP designation. This is further demonstration of the demand for products integrating MoCA 2.0 in the service provider environment. Approximately half of the certifications were for set top boxes (Profile A) and the other half were bridging devices (Profile B) such as gateways.

“This has been a prolific year for certification of devices incorporating MoCA 2.0”

Dr. Stephen Palm
Chair
Certification Board
Senior Technical Director
Broadcom Corporation

At the end of the year, the Certification Board opened certification for two bonded channels formally known as Profile C. This demonstrates the Alliance’s continued dedication to meeting service providers’ increasing demand for reliable throughput throughout the home.

Dr. Stephen Palm
Chair
Certification Board
Senior Technical Director
Broadcom Corporation
Managing Director Report

I’ve had the privilege of watching the Multimedia over Coax Alliance blossom from its 2004 startup days to the global technology standard for wired home networking it is today. I may be biased, yet from my director view at MoCA we don’t sit back and relax, we have too much to accomplish. A significant part of my job is ensuring the foundational aspects of MoCA are seamless so that our members, who spend countless hours in work group, committee and task force meetings creating real solutions to real problems, can do their ‘volunteer’ jobs at MoCA effectively and efficiently.

These ‘volunteer jobs’ include liaison work with CableLabs and SCTE to create a comprehensive DOCSIS 3.1/MoCA co-existence report, domestic and international MoCA 2.0 Field Trials and MoCA 2.0 certifications. MoCA administration keeps the Alliance compliant with state, national and international requirements. Along with myself and MoCA finance, our MoCA Treasurer and MoCA Board of Directors continuously review budgets and revenue to ensure responsible fiduciary practices. We don’t relax because we believe the underlying value MoCA provides the industry and the end user - creating technology standards that make the home network better, faster, more secure, highly adaptable and ultimately smarter- is well worth our efforts.

“...we don’t sit back and relax, we have too much to accomplish.”

Roberta Silverstein
Managing Director
MoCA
Consumers Demonstrate Interest in Wired Solutions to Wireless Home Networking Problems

Parks Associates Report Synopsis

MoCA
The Multimedia over Coax Alliance (MoCA) contracted Parks Associates to conduct a consumer survey to gain an in-depth understanding of home network owners’ current home network types, usage, issues, frustrations, and preferences.

As part of this assessment, Parks Associates designed and fielded an online survey in February 2015 to 1,000 home network owners living in U.S. households having broadband Internet access. All respondents are heads-of-household ages 18 and older.

Parks Associates estimates that there are 79 million home network households in the United States, which represents 82% of all households with broadband Internet access. 61 million, or 64% of all broadband households, have a wireless home network.

Report available on mocalliance.org

4 IN 5 U.S. HOUSEHOLDS WITH BROADBAND INTERNET ACCESS HAVE A HOME NETWORK

82% of all broadband households in the U.S., or 79 million households, have a home network (wired or wireless). 64% of all broadband households, or 61 million households, have a wireless home network.

SLIGHTLY LESS THAN

of all households with a wireless router have experienced problems with their wireless network, and have experienced a slow wireless connection and poor wireless coverage throughout the home.

of all network households continue to experience these problems, despite efforts to resolve the issue. This translates into 15 million HHs.

Parks Associates estimates that households currently experience deadzones or slow wireless network performance at home.
Consumers Demonstrate Interest in Wired Solutions to Wireless Home Networking Problems

Consumers commonly experience issues with their home networks.

- Prominent home network issues include slow Internet performance and deadzones.
- Consumers are most likely to blame their Internet service for network issues, but see device congestion and wireless network range as key problems as well.
- Device congestion is likely to worsen as the average number of connected devices per household increases annually.

Consumers are receptive to wired solutions that can improve their home network performance.

- The majority of consumers experiencing home network issues have considered using a wired solution to address the problem.
- The majority of all consumers report being comfortable using a wired solution to improve their home network performance.
- Men, owners of large homes, and those with children in the home are key market segments for wired home network solutions.

CONSUMER COMFORT USING WIRED HOME NETWORKING SOLUTIONS CORRELATES WITH ENJOYMENT OF TECHNOLOGY.

The majority of consumers who are very comfortable with the idea of using a wired solution to improve their home network also highly agree that they enjoy staying on top of new technology.

CONCLUSIONS

58% of respondents report being “Comfortable” using the existing cable (coax) wiring in their homes.

WIRELESS NETWORKING PROBLEMS CORRELATE WITH THE NUMBER OF DEVICES CONNECTED TO THE WIRELESS NETWORK.

Those with a large number of devices connected to their wireless network are more likely to have experienced problems with their home network, and also are more likely to continue experiencing problems despite efforts to resolve the issue. The most likely explanation for this correlation is that the expanding number of connected devices in the home is taxing the home network’s bandwidth.

COMFORT WITH USING EXISTING WIRING TO IMPROVE HOME NETWORK PERFORMANCE

<table>
<thead>
<tr>
<th>Comfort with Using Existing Wiring</th>
<th>% of Respondents Expressing Level of Comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet/Cat-5 wiring</td>
<td>58%</td>
</tr>
<tr>
<td>The existing electrical wiring in your home</td>
<td>56%</td>
</tr>
<tr>
<td>The existing cable-TV (coax) wiring in your home</td>
<td>52%</td>
</tr>
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Over 50% of respondents would be comfortable using wired solutions to resolve networking problems.
We have been spending a lot of time in China the last few years and it is starting to pay off. The following data and analysis demonstrates why.

**The Market**

There are approximately 240 million cable subscribers in China. Many subs are digital but it varies by region. Forecasts are for 280 cable subs by 2018. Some specific operator statistics include Guangdong Cable (G-Cable) in Gongzhou, with 20 million subs, eight million of which are digital. G-Cable has one million broadband subs but due to government regulation does not offer voice/telephone yet, but that is changing. Topway is all digital. Home networking is nascent but growing and there are trials of MoCA among cable MSOs. Topway in Shenzhen is all digital and is starting to implement MoCA in the home. Chongqing Cable and Cheng Du are also starting to implement MoCA and Wasu in Hangzhou has plans to integrate Wi-Fi and MoCA into a home gateway. ChongQing will use MoCA in a home networking application.

The fixed line telco’s, China Telecom and China Unicom, are using cat5 in the home which is either installed by the operator or the subscriber. Fiber to the basement in MDUs is the common network access method.

As much as 97 percent or more of any operator’s footprint is dominated by MDU living environments.

The challenges of wireless are just starting to hit critical mass as use cases accelerate and bandwidth demands increase. The use of MoCA technology as an in-home backbone resonates among all operators and the performance and reliability advantages of the technology are understood and well regarded.

Currently, c.DOCSIS and HomePlug AV over coax (also referred to EoC) are the only network access technologies in use by cable MSOs. HiNoC has been approved, and though it has received a lot of fanfare, there are no chips or devices available and no operator seems inclined to use this technology.

There is also opportunity for MoCA in network access as expressed by every operator and SARFT.

**Invitations**

MoCA has been invited to participate via membership status in SARFT’s Home Networking Information Alliance. MoCA is the only technology standard consortium invited at this time.

**Government Regulation**

It is difficult to do business with the service providers in China without some governmental agency involved. Regulation of the various operators is determined by the medium in use. For instance, the Academy of Broadcast Planning (ABP), a division of SARFT, is the watchdog for network access and home networking for cable MSOs only. ABP controls the coax not the operator or the end user.

Power line is governed by yet a different agency. Cable MSOs are not permitted to use the power line but end users can and thus purchase power line adapters at retail, but not directly from the operator who can only make recommendations.

The three large telco’s China Unicom, China Telecom and China Mobile are regulated by yet another agency and have no authority to use power line or coax. The fixed line carriers thus use cat5.

It should be noted that ABP/SARFT does not mandate networking technologies but all operators will abide by their recommendations as they all want political cover.

**Summary**

In China, it is all about guanxi (relationships). If they know and trust you, they are more likely to do business with you. It takes time but the return is worth it.

MoCA will continue to market to and develop relations with the cable MSOs and SARFT.

China, here we come.
Performance and Reliability Comparison of Home Networking Technology Standards

MoCA commissioned Peter White of Rethink Research in London, to compare and contrast the performance and reliability claims...

<table>
<thead>
<tr>
<th>Technology</th>
<th>PHY Rate</th>
<th>MAC Rate</th>
<th>Advertised Data Rates</th>
<th>Real Data Rates in 90% of Homes</th>
<th>Ratio Claimed To Be Real</th>
<th>Information Source</th>
</tr>
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<tbody>
<tr>
<td>MoCA 2.0</td>
<td>700</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>100%</td>
<td>From MoCA tests available publicly</td>
</tr>
<tr>
<td>MoCA 2.0 Enhanced Mode</td>
<td>1400</td>
<td>800</td>
<td>800</td>
<td>800</td>
<td>100%</td>
<td>From MoCA web site</td>
</tr>
<tr>
<td>G.hn Over Coax</td>
<td>1000</td>
<td>850</td>
<td>500</td>
<td>*</td>
<td>*</td>
<td>Estimates and claims by Alliance; no real world tests available.</td>
</tr>
<tr>
<td>HomePlug AV2</td>
<td>750</td>
<td>500</td>
<td>500</td>
<td>100</td>
<td>20%</td>
<td>HomePlug whitepaper, one stream</td>
</tr>
<tr>
<td>HomePlug AV2 MIMO</td>
<td>1500</td>
<td>1000</td>
<td>1000</td>
<td>200</td>
<td>20%</td>
<td>HomePlug whitepaper, three stream</td>
</tr>
<tr>
<td>G.hn Over Power Line</td>
<td>950</td>
<td>500</td>
<td>475</td>
<td>100</td>
<td>21%</td>
<td>IC vendor claims</td>
</tr>
<tr>
<td>G.hn Over Power Line MIMO</td>
<td>1700</td>
<td>850</td>
<td>807</td>
<td>170</td>
<td>21%</td>
<td>IC vendor claims</td>
</tr>
<tr>
<td>Wi-Fi 802.11ac 4x4 5 GHz</td>
<td>1733</td>
<td>850</td>
<td>910</td>
<td>90</td>
<td>10%</td>
<td>Various publications and vendor marketing materials, Wikipedia</td>
</tr>
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Data Rates in Mbps

The results identified for MoCA 2.0 in the above chart are based on recent tests conducted by MoCA in 108 homes around the U.S. Tests were conducted as randomly as possible and all homeowners were volunteers. There were no stipulations for condition or age of the in-home, coaxial wiring, or type of pay TV service (i.e., cable, satellite or telco/IPTV). The Alliance also announced results publicly.

No other standard body has tested for performance and reliability in this many homes.

*There are unconfirmed reports of G.hn over Coax reaching anything from 400 Mbps to 850 Mbps, but these are all point to point figures, and none are measured across multiple outlets in a single home or across 90% of outlets in multiple homes.

The full white paper is available on the MoCA web site:
http://www.mocalliance.org/marketing/performance-and-reliability.htm
# Deployments and Trials

## Trials/Deployments in Canada
- Cogeco
- Rogers
- Shaw, Videotron
- Eastlink

## U.S.
- Comcast
- Cox
- TWC
- AT&T/DIRECTV
- DISH
- Verizon
- Google
- Charter
- BrightHouse
- Cincinnati Bell
- Frontier
- ViaSat
- Suddenlink
- and many others

## Trials in Latin America
- DIRECTV
- Mexico: TeleCable
- Brazil: Net
- Argentina: CableVision

## DEPLOYMENT/TRIALS in Europe
- Liberty Global/UPC
- Telenor
- Zon
- KPN
- Stofa
- FineComm
- Multimedia Polska
- Toya

## Trials in South Africa
- MultiChoice

## Trials in China
- Sichuan Cable TV Network
- Tianjin Broadcast
- Chengdu Telecom
- Cheng Du Cable
- Guangdong Cable
- China Broadcast Network Corp.

## Trials in Israel
- Hot, Yes

## Trials in Singapore
- StarHub

## Trials/Deployments in Canada
- Cogeco
- Rogers
- Shaw, Videotron
- Eastlink

## U.S.
- Comcast
- Cox
- TWC
- AT&T/DIRECTV
- DISH
- Verizon
- Google
- Charter
- BrightHouse
- Cincinnati Bell
- Frontier
- ViaSat
- Suddenlink
- and many others