

MoCA Subsystem

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Overview

The use of Multimedia over Coax Alliance (MoCA) networking technology is a large part of our everyday configuration in homes subscribing to our X1 Platform. As we continue progressing down the path of advanced MoCA and Wi-Fi configurations in the home, it is essential that everyone understands the fundamental workings around MoCA technology.

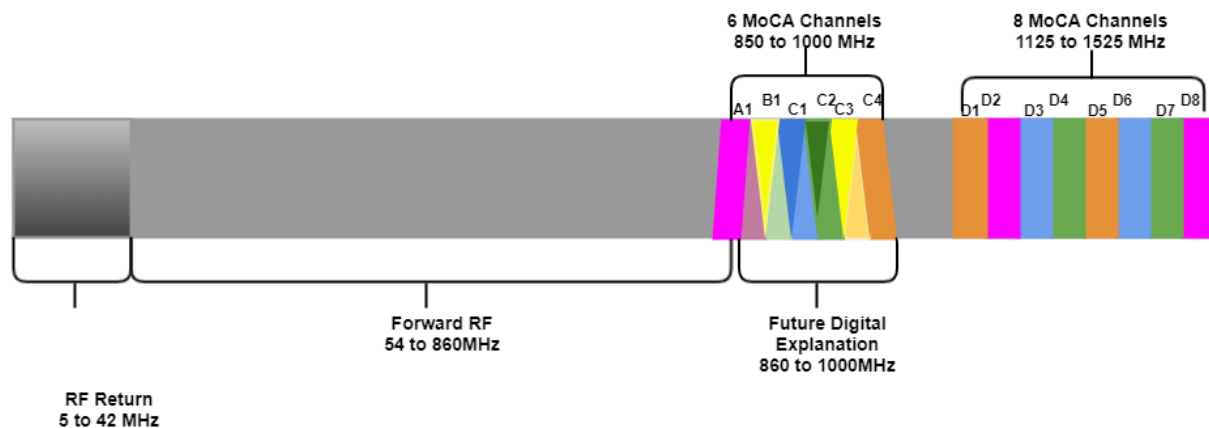
Background

MoCA technology is the worldwide standard for high performance and high reliability in the connected home adopted by Cable, Telco/IPTV, and Satellite Operators. MoCA technology transmits IP-based packets of video and XRE content within a home's network and also used to extend Wi-Fi® connectivity. Comcast standard use of MoCA allows us to convert our QAM video streams into deliverable IP packets to our MoCA capable devices. In the future our video will not be delivered via QAM; it will be delivered by IP multicast through the XB6 via Wi-Fi and MoCA.

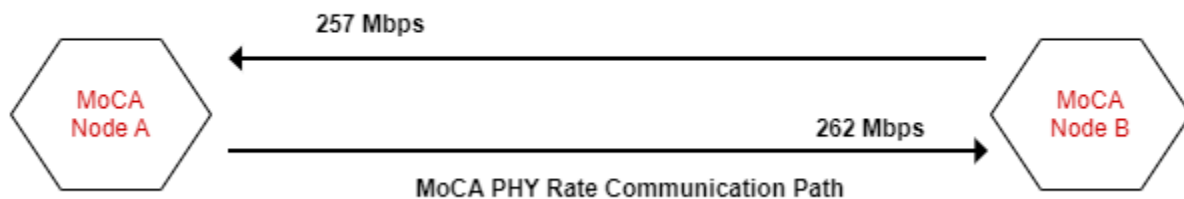
MoCA technology uses resonant frequencies that can easily transfer energy between two or more MoCA devices; in our network, we refer to these as Nodes (Host & Terminal Set-Top, Wi-Fi Extenders). Our X1 network relies heavily on high rates of transmission to reflect the signal from one node to another using MoCA resonant frequencies. This allows for the transfer of video packets and XRE content in a network. What we typically call a *MoCA PoE Filter* is really a PoE RESONATOR that acts as a mirror, reflecting the original MoCA signal from Node-to-Node. A resonator is one of the most crucial parts of a coaxial home-network to maintain a very high level of MoCA transmission between MoCA devices.

MoCA Signal Fundamentals

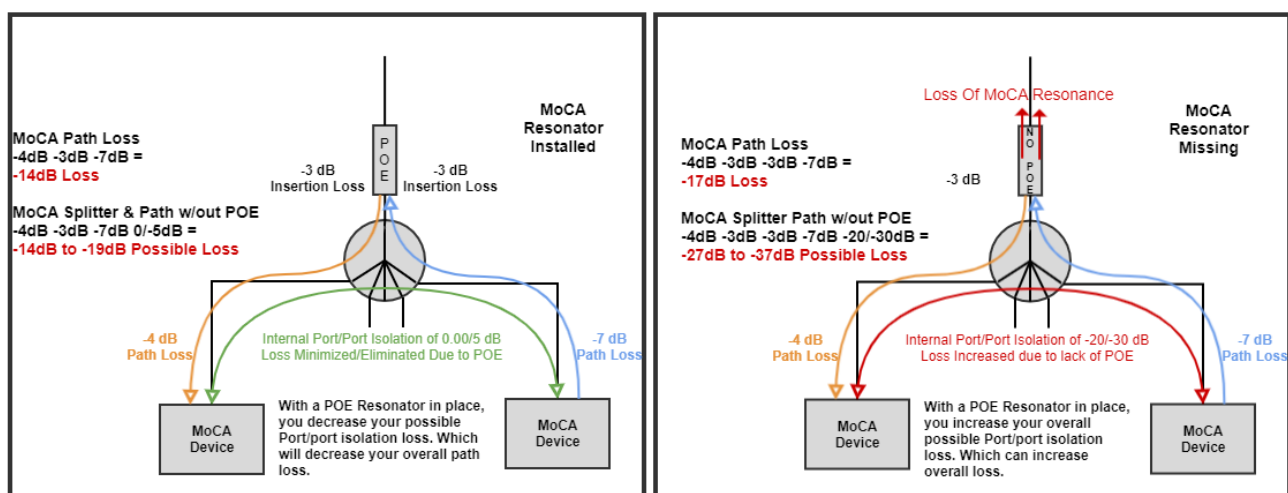
Our current MoCA signaling is transmitted within the Channel D-1 MoCA Band starting at 1125 MHz with a center frequency of 1150 MHz. MoCA signaling is very resilient to impedance changes because of its high rate of transmission. Although an impedance mismatch severe enough will cause a MoCA signal to deviate and vary from one node to another.



The measure of the MoCA signal, captured in Mbps (PHY Rates), is the baseline measure of MoCA integrity within an X1 home network. Every MoCA device has two paths to every other MoCA device on the same network, one for receiving and one for transmitting. Ideal PHY Rate levels range above 200 Mbps; anything less is considered poor.



MoCA signal transmissions are susceptible to traditional internal splitter loss and port-to-port isolation loss (-20 dB thru -30 dB). A PoE Resonator plays an important role in minimizing the port-to-port isolation loss. The figures below depict generalized signal level losses meant to show the difference in overall loss due to not having a PoE.



MoCA Enabled Devices and Material

Coaxial Cable; Coaxial Splitters; Coaxial Connectors; Unity Gain Amplifiers (UGA's); MoCA PoE Resonators, MoCA 2.0 is deployed in most of the RDK Devices.

Equipment Installation and Configuration

The proper installation of a MoCA enabled network is the most important step in ensuring our MoCA capable devices function efficiently in a customer's home. This job aid outlines the different components and steps required to install and maintain an effective MoCA network.

CPE Installation Fundamentals

First: Set-Top Host Controllers, XG1, and XG2 CPE devices have a built-in DOCSIS Modem, QAM Tuner, and Cable Cards to convert Video QAM and Content into deliverable IP Packets. These packets transmit via a MoCA coaxial network.

Second: Set-Top Terminals, IP Client devices such as Xi3, and XiD CPE devices, take the IP Packets via MoCA and convert them into viewable video streams and content menus. While the terminal set-top is playing Live TV, a Tuner is used from an XG Controller.

Deployed CPE devices such as Xi3 and XiD Set-Top Terminals are 100% reliant on MoCA for Video.

Third: Ensure proper configuration of the Host Controllers and Terminal Set-Tops. All MoCA devices should communicate on the same internal coaxial network using a centralized Splitter or UGA configuration. This ensures that the customer experience and service functionality of X1 Platform is at the highest efficiency.

I.	(Current)	Traditional Any-room X1 Installation (1-8 Outlets Needed)
II.	(Custom)	Complex Any-room X1 Installation (8+ Outlets Needed)

III.	(<u>Future</u>)	Xi5 Wi-Fi Any-room X1 (Use of Arris XB3 within active MoCA Network; with optional Wi-Fi extender)
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