

## SK Broadband and Harmonic Achieve the World's First Major Commercial Launch of Cable IPTV

### BACKGROUND

Korea is one of the world's leaders in broadband connectivity, with a household broadband penetration rate of 93<sup>1</sup> percent in 2007 according to Gartner. Not only has SK Broadband (previously Hanaro Telecom) played a critical role in building Korea's advanced communications infrastructure, the company has a long-standing history as a market-mover. They were Korea's first telco to launch video-on-demand with their innovative Broad&TV service, and they were one of the world's first operators to deploy a wideband DOCSIS® 3.0 data service, more than tripling bandwidth delivered to subscribers.

SK broadband continues to push the technology envelope to retain and grow market share in a highly competitive marketplace with savvy consumers that have high expectations. SK Broadband's cable IPTV deployment reflects the company's ability to overcome technological challenges to provide their customers the most advanced service portfolio possible.

Harmonic's advanced Direct-2-Edge™ (D2E) Cable IPTV technologies, which include Harmonic's industry-leading NSG™ 9000 universal edgeQAM and D2E session and resource manager, have enabled SK Broadband to address the architectural and technical impediments hindering cable IPTV deployments to date. Harmonic's solutions form the technical foundation for this landmark deployment and give SK Broadband a very powerful platform to achieve the full potential of IP-based video delivery over their varied access networks.

### CHALLENGE

While service providers worldwide have successfully deployed IPTV services over existing telecom networks for several years, regulatory issues and content sourcing disputes have delayed IPTV rollouts in Korea. With the legal and regulatory framework issues recently resolved by Korean lawmakers, operators are quickly rolling out their highly anticipated IPTV offerings.

SK broadband is a hybrid service provider that operates cable, xDSL, and FTTx networks, serving approximately 6 million subscribers throughout Korea. SK Broadband's toughest challenge was to deliver a uniform broadcast service over its multiple networks, at a commercially viable cost-point. SK broadband needed to deliver simultaneous subscriber access to both its existing ultra high-speed Internet service and the new cable IPTV service, leveraging SK Broadband's existing modular cable modem termination system (M-CMTS) network and the installed base of cable modems used to deliver its wideband DOCSIS 3.0 data service, also powered by Harmonic.

1. Gartner, 2007

### Challenges

- Deliver uniform broadcast IPTV service over telco and cable networks
- Successfully compete with telcos and other operators that can provide true IPTV services

### Solution

- Harmonic Direct-2-Edge solution works along CMTS to increase efficiency, and enables quick adjustment of QAM frequencies

### Benefits

- Estimated 70% cost savings
- Seamless integration with existing M-CMTS equipment
- Increased customer satisfaction and retention





SKBB used Harmonic's CMTS bypass solution to cost-effectively deploy IPTV over cable in over 50 locations across the country.

Time-to-market was also critical in this deployment, as SK Broadband competes with telcos and other providers operating more homogenous networks and facing fewer technical challenges in their own respective IPTV rollouts.

## SOLUTION

For the past twenty years, Harmonic has introduced game-changing technologies that have revolutionized IP video delivery over cable networks. Harmonic introduced the edgeQAM category of products and continues to innovate with the unique NSG 9000 edgeQAM, today powering more than 135,000 DOCSIS downstream QAMs. In 2007, Harmonic was awarded CableLabs' technology innovation award for its Direct-2-Edge technology. The M-CMTS and Direct-to-Edge Cable IPTV solutions deployed by SK Broadband come out of this long-standing tradition of peerless innovation.

Harmonic's Direct-2-Edge solution includes the following key components:

- Harmonic's NSG™ 9000 universal edgeQAMs
- The Direct-2-Edge IP delivery product family, including of the Direct-2-Edge Manager and the Direct-2-Edge Encapsulator

## THE DIRECT-2-EDGE APPROACH

Harmonic's Direct-2-Edge technologies determine the optimal flow of video and data content over an operator's HFC network, providing two distinct data pipelines. Standard Internet data, such as VOIP, HTTP, and email, passes through the CMTS, which is optimally suited for Internet data flow.

However, in contrast to M-CMTS architectures which can funnel both video and data content through the CMTS, Harmonic also offers a different approach, providing a second pipe to more efficiently and cost-effectively transport video streams across an operator's network.

Harmonic's video CMTS bypass approach overcomes the significant cost and operational inefficiencies that occur when sustained video bit-rates (instead of bursty data flows) are passed through the CMTS. The Direct-2-Edge system further offloads the CMTS by introducing a number of new innovations, including adding certain DOCSIS MAC functions to Harmonic's industry-leading NSG 9000. Content such as walled garden video-on-demand (VOD) streams targeted for IP set-top-boxes, linear TV multicast flows targeted for personal computers, and over-the-top Internet streaming video, is sent directly to a DOCSIS 3.0 cable modem.



Figure 1 illustrates the video and data delivery chain using Harmonic's Direct-2-Edge Cable IPTV architecture and technologies. As shown, video content is separated from the existing CMTS platform and sent directly to the subscriber. Harmonic's Direct-2-Edge system works alongside the CMTS, enabling both systems to work much more efficiently.

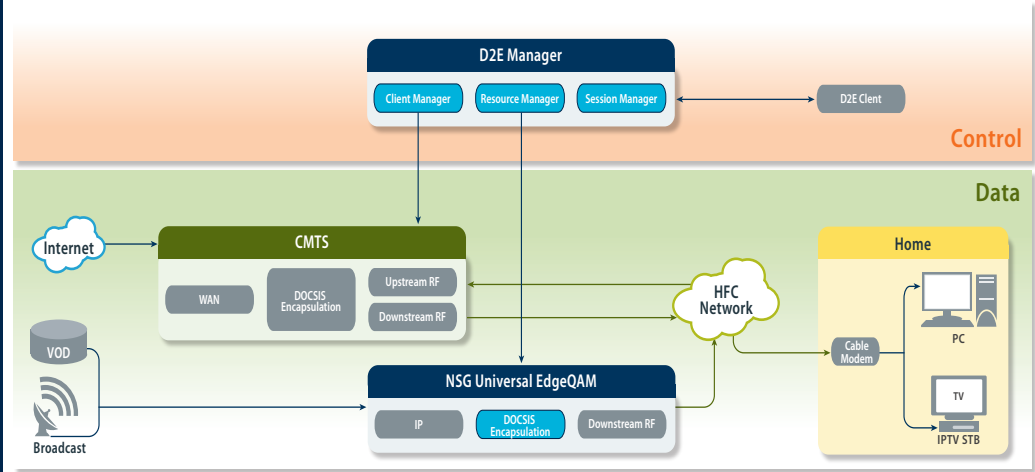


Figure 1. Harmonic's Direct-to-Edge Cable IPTV Approach

Harmonic's Direct-2-Edge cable IPTV solution also addresses another critical challenge that occurs when an operator's complete video/DOCSIS offering exceeds the number of QAMs a given cable modem can tune to at a given time. Harmonic's highly advanced server-based control plane solution allows the system to send commands to cable modems to adjust QAM frequencies according to service requests or any other logic.

## BENEFITS

Harmonic's Direct-2-Edge technologies deliver a commercially viable solution to delivering Cable IPTV over existing HFC networks. By eliminating the expensive routing of video streams through the CMTS, Harmonic's "bypass" approach delivers an estimated 70-percent infrastructure cost savings.

As demonstrated with the SK Broadband rollout, Harmonic's highly flexible solutions integrate seamlessly with existing CMTS or M-CMTS architectures, network equipment, and IP set-top-boxes, providing additional and substantial cost and time to market advantages.

The advantages of IPTV video delivery include great flexibility in the choice of target devices and a highly customized and personalized user experience. Targeting IP set-top boxes and personal computers helps operators to retain and grow their subscriber base, preventing churn to over-the-top viewership. The network is also capable of supporting new sources of revenues such as affordable targeted advertising.

“Harmonic has a longstanding track record of technology excellence, and they were the optimal choice for this project. The support Harmonic provided SK Broadband was outstanding, and their solutions are seamlessly integrated with third-party modems and set-top-boxes. Harmonic's solutions provide SK Broadband with numerous technical advantages and tremendous flexibility while enabling the rapid rollout of our cable IPTV service.”

—Chan Woong Park, Senior Vice President, Network Technology Division at SK Broadband



Harmonic's NSG 9000 universal edgeQAM is an integral part of the Direct-2-Edge Cable IPTV solution.

- The only proven platform to support VOD, nPVR, cable IPTV, broadcast, M-CMTS, SDV and edge encryption
- Cable operators use Harmonic's NSG systems to deliver more than 600,000 QAM VOD streams
- Operators worldwide are rolling out M-CMTS services with Harmonic, totaling over 135,000 DOCSIS® downstream channels

Harmonic's Direct-2-Edge technology is part of the company's much wider offering in the video delivery value chain. The complete solution set provides a cost-effective, video-enabled pipe over a DOCSIS cable network and includes Harmonic's DiviCom® Electra® encoders and Mentor™ re-encoding; Armada® intelligent asset manager and StreamLiner video servers for on-demand and time-shifted video; and the MediaPrism converged video delivery solution.

Harmonic's cable IPTV solutions deliver substantial cost benefits, provide an end-to-end video delivery solution encompassing the entire video delivery pipeline, and are ideally suited for hybrid operators such as SK Broadband that are deploying a uniform IPTV service across multiple access networks. The solution set is also an outstanding choice for greenfield operators implementing an all-IP network. For more information on Harmonic's ground-breaking solutions, visit [harmonicinc.com](http://harmonicinc.com).

## ABOUT HARMONIC INC.

Harmonic Inc. is a leading provider of versatile and high performance video solutions that enable service providers to efficiently deliver the next generation of broadcast and on-demand services including high definition, video-on-demand, network personal video recording and time-shifted TV. Cable, satellite, broadcast and telecom service providers can increase revenues and lower operational expenditures by using Harmonic's digital video, broadband optical access and software solutions to offer consumers the compelling and personalized viewing experience that is driving the business models of the future.

Harmonic (NASDAQ: HLIT) is headquartered in Sunnyvale, California with R&D, sales and system integration centers worldwide. The Company's customers, including many of the world's largest communications providers, deliver services in virtually every country. Visit [www.harmonicinc.com](http://www.harmonicinc.com) for more information.