A Scalable Satellite Broadcasting System in 21GHz Band

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Abstract - This work presents a scalable 21GHz terrestrial broadcasting system architecture and its underlying technologies for efficient channelization and signal encoding. The proposed system is designed to support various types of video services, and it is capable of delivering both broadcast and interactive services. The system architecture includes a scalable video coding scheme, a scalable modulation scheme, and a scalable transmission scheme. The scalable video coding scheme allows for efficient video compression and decompression, while the scalable modulation scheme allows for flexible transmission power adjustment. The scalable transmission scheme allows for efficient channel utilization and adaptive transmission. The proposed system is expected to provide high-quality video services at a low cost.

1. Introduction

The 21GHz band is a promising frequency band for terrestrial broadcasting systems due to its high potential for high-quality video services. However, the limited number of available channels in this frequency band poses a significant challenge for efficient channelization and signal encoding. To address this challenge, this work presents a scalable 21GHz terrestrial broadcasting system architecture and its underlying technologies for efficient channelization and signal encoding. The proposed system is designed to support various types of video services, and it is capable of delivering both broadcast and interactive services.

2. Scalable Video Coding

2.1 Scalable Video Coding

SVC (Scalable Video Coding) is a technique for efficient video compression and decompression. It allows for efficient video transmission by enabling the transmission of only the necessary video layers, which can be decoded at different qualities and resolutions. This technique is particularly useful for terrestrial broadcasting systems, as it allows for efficient channel utilization and adaptive transmission. The proposed system architecture includes a scalable video coding scheme that is designed to support various types of video services, including high-quality video services.

2.2 Layered Video Coding

Layered video coding is a technique for efficient video compression and decompression. It allows for efficient video transmission by enabling the transmission of only the necessary video layers, which can be decoded at different qualities and resolutions. This technique is particularly useful for terrestrial broadcasting systems, as it allows for efficient channel utilization and adaptive transmission. The proposed system architecture includes a layered video coding scheme that is designed to support various types of video services, including high-quality video services.

2.3 Transmission System

The transmission system is designed to support efficient channel utilization and adaptive transmission. It includes a scalable modulation scheme and a scalable transmission scheme. The scalable modulation scheme allows for flexible transmission power adjustment, while the scalable transmission scheme allows for efficient channel utilization and adaptive transmission.

<Figure 1> The proposed scalable terrestrial broadcasting system.
<표 1> Characteristics of the test stream (CITY)

<table>
<thead>
<tr>
<th></th>
<th>Base Layer</th>
<th>Enhance Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit-rate</td>
<td>1Mbps</td>
<td>2Mbps</td>
</tr>
<tr>
<td>Resolution</td>
<td>CIF</td>
<td>4CIF</td>
</tr>
<tr>
<td>Frame rate</td>
<td>30fps</td>
<td>30fps</td>
</tr>
<tr>
<td>Stream format</td>
<td>MPEG-2 TS</td>
<td>MPEG-2 TS</td>
</tr>
<tr>
<td></td>
<td>(Video, Audio)</td>
<td>(Video)</td>
</tr>
</tbody>
</table>

3. 결론
본 논문은 21GHz 대역을 사용하여 다양한 HDTV 품질방송 서비스를 위한 저층적 방송 시스템을 제안하고 이를 구현하였다. 논문에서 제안한 시스템은 SVC 기술을 사용하여 비디오 데이터를 인코딩하고, 싸운 기본 세
출용 쿼적 촉성을 나누어 각각 Ku, Ka 대역의 두 채널을 활용하여 전송
한다. Barlett-Lewis Pulse model을 사용하여 간주 환경을 모델링하여 개
출용 위성방송 시스템의 성능을 검증하였다. 53dB의 SNR margin을 갖도
록 하여 switching 시기를 약 15%정도 감소시켰고 실험적으로 제안한 시스
템이 간주 환경에서도 기본적인 화질 보장을 확인하였다.

[그림 2] The results of the layer switching algorithms.

(a) Decoding with base and enhancement layers.

(b) Upsampling after decoding with only base layer.

[그림 3] Test results of the scalable satellite broadcasting system.

REFERENCES