

Preparation for V-Low Multimedia Broadcasting



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1. Introduction

V-Low multimedia Broadcasting is a new type of digital broadcasting being introduced in Japan in the VHF frequency band previously used for analog television. It is anticipated for developing a great variety of new services through a flexible system, utilizing the advantages of digital broadcasting. Preparation of the system was completed last year, and preparation to begin offering services is currently ongoing. Below, we give an overview of V-Low multimedia broadcasting and introduce some of the services being planned for the future.

2. The V-Low Multimedia Broadcasting System

According to the Radio Law, V-Low multimedia broadcasting is regulated as a core terrestrial broadcasting service for mobile receivers, using the 99 MHz to 108 MHz band. This definition indicates that it is a core broadcasting service intended to be installed and used in automobiles

and other terrestrial vehicles, as well as portable receivers, it excludes satellite core broadcasting services. It does not indicate what will be broadcast, as did conventional television (video and audio) and radio (audio), so the system is able to broadcast various other types of content in addition to real-time broadcast of video and audio, such as stored broadcasts, which store data on the receiver and use it later, and IP datacasts (IPDC), which transmit IP packets used on the Internet as-is over the broadcast signal.

Another major feature of V-Low multimedia broadcasting is that broadcasting is done over broadcast regions called regional blocks, which span multiple prefecture-level areas.

3. V-Low Multimedia Broadcasting Technology

V-Low multimedia broadcasting uses the ISDB-Tsb system, which is based on ISDB-T, the system used for digital terrestrial television broadcasting. While digital terrestrial television broadcasting uses 6

MHz bands divided into 13 segments, V-Low multimedia broadcasting uses 4.5 MHz bands divided into nine segments. Receivers receive these nine segments in either three-segment or one-segment units. It implements broadcasting that can be received easily by smartphones or in vehicles by selecting a transmission mode that facilitates such reception, similar to One-Seg among the many broadcast modes

of the ISDB-T system.

The base band is in the MPEG-TS format, so in addition to broadcasting audio and video in real time, it can use technology that embeds IP packets in MPEG-TS to deliver a diversity of digital content and services from the Internet over broadcast channels. Thus it can provide an information infrastructure able to distribute to many receivers at once.

V-Low multimedia broadcasting also has the following original technologies.

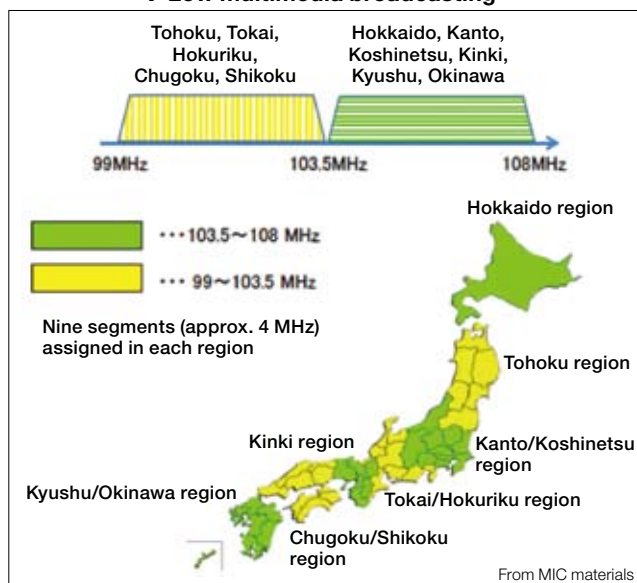
(1) High-quality audio broadcasting

Since V-Low multimedia broadcasting is oriented to mobile and vehicle reception, one of its focuses is audio services, which do not require viewing the screen. Recently, “high-resolution audio” (“Hi-Res”), with quality exceeding that of CD, has been attracting attention. To meet high sound quality needs of this sort, V-Low multimedia broadcasting eliminates the 48 kHz upper-bound on audio sampling rates and enables broadcast of sound sources at higher sampling rates such as 96 kHz. CD audio can only reproduce frequencies up to 22.05 kHz, but V-Low multimedia broadcasting can reproduce tones as high as 44 kHz at a bit rate of 256 kbps when using HE-AAC audio compression.

(2) Disaster-prevention and security information

Another focus of V-Low multimedia broadcasting is to continue the role that radio has had, as a means of delivering information in times of emergency or disaster. Radio is a familiar medium that is portable and can run on batteries, so it has an important role when disaster strikes. Using digital broadcasting technology, V-Low multimedia broadcasting promises to expand that role. One way it does so is with an automatic receiver wake-up function. An emergency earthquake warning can be sent on part of the digital broadcast signal called the auxiliary channel (AC). The AC signal is on the

Figure 1: Frequencies and broadcast regions for V-Low multimedia broadcasting



OFDM pilot carrier, so it can be received without demodulating all of the OFDM carriers. Thus, the automatic receiver wakeup can operate by demodulating only the AC signal, even when the receiver is turned off (or in standby).

In addition to warnings about earthquakes, tsunami, and flooding, V-Low multimedia broadcasting can be used to distribute regional disaster-prevention and security information such as instructions for finding shelter or refuge. The combination of this automatic wakeup signal and transmission of information will enable reliable transmission of information to more people.

4. V-Low Multimedia Broadcasting Services

V-Low multimedia broadcasting focuses on providing services in the following three categories.

(1) Smartphone and tablet Services

In addition to high-quality audio broadcasting, as an advanced form of radio, data broadcasts linked to programs can be provided using HTML5. If the terminal has a communication function, more-detailed content can be viewed by using links on the data broadcast screen to go to sites provided through communications. Video can also be transmitted according to the size of the terminal screen.

Stored-content services could also include distribution of a variety of content such as e-newspapers, e-books, e-pamphlets, coupons and game items.

(2) Vehicle information services

In addition to radio channels for drivers, traffic, tourism, event and other information can be distributed in real time. Update information for maps, location data, navigation system firmware and other components can also be provided as a vehicle engineering service.

(3) Disaster-prevention and security information distribution

Disaster information in text and image form can be provided in addition to the audio on the radio. Information is also marked with an area code, so it can be apportioned in even smaller regions within the same broadcast area. The V-Low multimedia broadcasting station is able to add voice or text information from local authorities directly to the broadcast, which

Figure 2: High-quality audio with HE-AAC

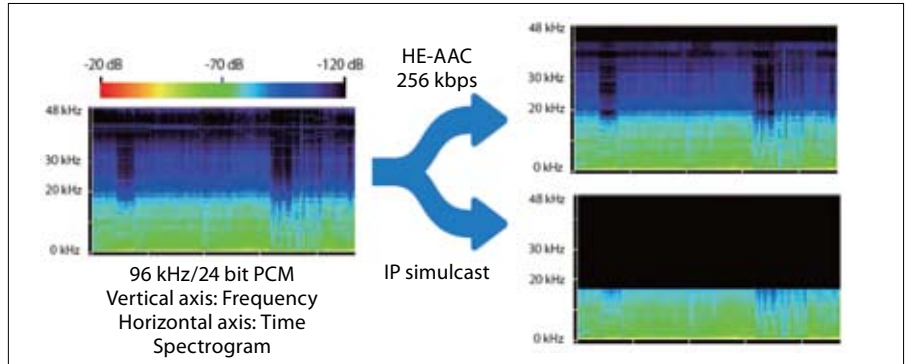


Figure 3: V-Low multimedia broadcasting service examples



Figure 4: V-Low multimedia broadcast receivers



also contributes to delivering information rapidly during emergency or disaster.

5. V-Low Multimedia Broadcasting Receivers

Smartphones and tablets with the ability to receive V-Low multimedia broadcasts have already been developed. Devices able to receive V-Low multimedia broadcasts and send them to smartphones and tablets via Wi-Fi have also been developed.

Smartphones and tablets receive programs using an application provided by the broadcaster. Broadcasters can broadcast using new data formats by updating the application. V-Low multimedia broadcasting has an architecture that allows broadcasts to evolve as digital content technology advances.

V-Low multimedia broadcasting

also anticipates use in public spaces, such as in digital signage and public wireless LAN. V-Low multimedia broadcasting also has potential to provide disaster information to many people during emergency and disaster, when other forms of communication are interrupted.

6. Conclusion

V-Low multimedia broadcasting has been conceived and designed to be flexible, surpassing the bounds of conventional broadcasting and covering domains of communication typified by the Internet. This new broadcast medium must become a part of the information infrastructure, unifying broadcasting and telecommunications in Japan. We will continue our initiatives developing these services.