

HD Radio Consistent/High-quality Multicasting Engineering

Definition of Multicasting

Multicasting is the ability for an HD Radio technology enabled FM station to broadcast additional programming simultaneously with the main program service using the station's current frequency assignment. The configuration of the various multicast channels can be set by the broadcaster to support various program formats and is discussed below. There is currently no multicasting available in the AM mode.

A maximum of 3 multicast channels (SPS or Supplementary Program Service) can be broadcast in addition to the main analog service (MPS or Main Program Service). The MPS channel is often referred to as the HD1 channel and the SPS/multicast channels are known as the HD2, HD3 and HD4 channels. Broadcasters who are part of a HD data services network, such as BTC or TTN, should consult service provider documentation to ensure bandwidth allocations comply with the applicable data providers requirements.

There are 2 FM modes available to use when multicasting:

- The MP1 Mode has a usable bandwidth of 96kbps and is referred to as the Hybrid mode.
- The MP3 Mode (not to be confused with the MP3 codec) has a usable bandwidth of 120kbps and is referred to as the Extended Hybrid mode.

Below is a chart showing how these channels can be divided depending on the station's audio programming needs.

HD1-MPS	HD2	HD3	HD4	Mode
48kbps	48kbps			Hybrid-96kbps
64kbps	32kbps			Hybrid-96kbps
48kbps	24kbps	24kbps		Hybrid-96kbps
48kbps	48kbps	24kbps		Extended Hybrid-120kbps
64kbps	32kbps	24kbps		Extended Hybrid-120kbps
48kbps	24kbps	24kbps	24kbps	Extended Hybrid-120kbps
32kbps	32kbps	32kbps	24kbps	Extended Hybrid-120kbps

The audio bit-rates can be scaled back to include the data bandwidth requirements for features such as Artist Experience, Real-time traffic, etc.

However, Importer v4.x or higher is required to split audio and data on the extended sidebands in MP3 mode.

Things to remember when using the MP3 Extended Hybrid Mode:

- The 96kbps bandwidth in the primary subcarrier must be divided into channels separately from the 24kbps bandwidth in the extended sidebands.
- An additional 20% of digital power must be available from the transmitter
- Analog FM modulation should be kept within the FCC allowed limits; excessive audio processing and/or over-modulation will decrease the performance of the IBOC extended sub-carriers.

Audio Processing and Programming

- A station should employ all the tools including the TX Gain parameter specific to each program and audio processing to establish consistent audio levels across all programs.
- Programming sources should be delivered via an audio compression algorithm with a bitrate sufficient so as not to introduce additional coding artifacts.
- EAS Alerts/tests and legal station ID's must be incorporated on each audio channel
- Title and Artist text, Album Experience or static promotional text should be used as much as possible.
- Silence alarms and periodic monitoring should be incorporated to insure consistent and high quality operation of each channel.
- Programming and engineering staff should be equipped with receivers to monitor all HD channels.