



Updated NRSC-5 Standard Published

The National Radio Systems Committee (NRSC) has now published the *NRSC-5-B In-band/on-channel Digital Radio Broadcasting Standard* which was adopted by the Digital Radio Broadcast (DRB) Subcommittee at the April 12, 2008 meeting of the group (held in Las Vegas in conjunction with the 2008 NAB Show). This document and the associated reference documents are available for download free of charge at www.nrscstandards.org/SG/NRSC-5-B.asp.

First adopted in April 2005 then revised in September 2005 (as NRSC-5-A), this Standard sets forth the requirements for broadcasting digital audio and ancillary data signals in the AM and FM radio bands. It is structured as a main document (the Standard itself, cover shown in image at right) which provides an overview of the AM and FM IBOC systems designed by iBiquity Digital Corporation (and upon which the Standard is based), and a set of reference documents authored by iBiquity (with input from the NRSC) which provide the detailed information needed for those “skilled in the art” to construct compatible equipment. NRSC-5-A differed from the original document in that it specified a mechanism for transmission of advanced data services.

This latest version includes substantive (but relatively minor) changes as well as editorial revisions designed to make the document easier to understand and more complete. None of these changes are expected to cause any backwards compatibility issues with HD Radio receivers. Some of the more significant changes are highlighted here (section numbers refer to sections in NRSC-5-B):

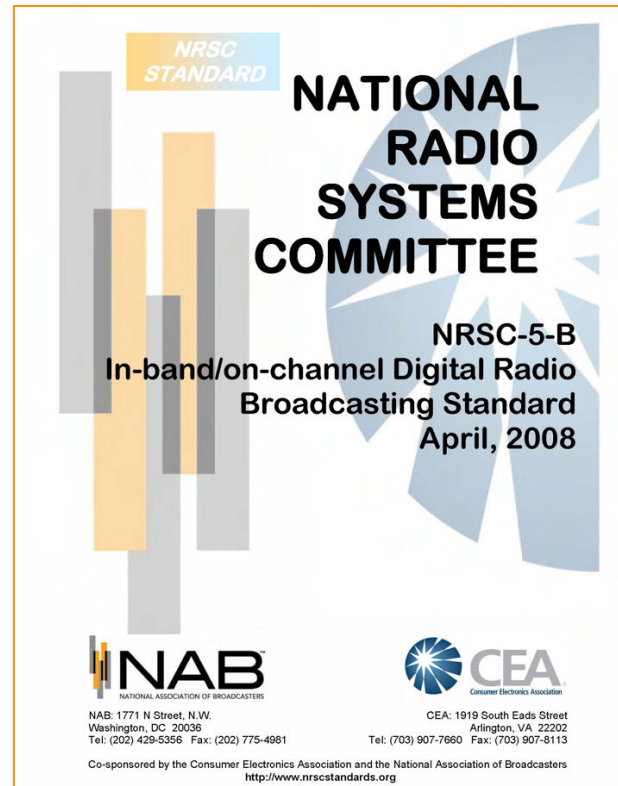


Table of Contents – tables listing all of the Figures and Tables in the Standard are now included; also, Table 5 (description of information transmitted by SIS) has been augmented to include all types of SIS data;

Section 3.3.2 – Data Inputs – this section was edited to make clearer the different types of data supported by the system. While the previous version discussed only two types of data—program service data (PSD) and non-program service data—the updated version makes clear the fact that the system supports three distinct data services:

- *PSD*, which includes descriptive information associated with the transmitted audio programming such as song title and artist;
- *Station Information Service (SIS)* data, which contains information about the station and the signal that is not associated with an individual program stream; and,
- *Advanced Data Services (ADS)* data, which is data that is sent using the ADS portion of the system (examples would include navigation/traffic information, image files of CD covers, etc.).

Section 4.1.8 – Spectrum Emission Limits for AM IBOC – this is a new section which includes and augments information from Section 4.1.7 of the previous version (the AM IBOC mask itself is unchanged). A new sub-section, *4.1.8.1 – Measurement of mask compliance for AM IBOC systems*, references an *NRSC Guideline* which is currently under development by the NRSC’s IBOC Standards Development Working Group

(ISDWG). This Guideline will include detailed mask compliance measurement procedures applicable to different types of measurements (e.g., factory test, in-service out-of-band emissions), as well as recommended locations for making measurements depending upon the specifics of a particular implementation. The ISDWG expects to complete this new Guideline later this year.

Section 4.2.8 – Spectrum Emission Limits for FM IBOC – the FM hybrid IBOC spectrum emission mask has been modified from the previous versions and is included in this section. This is a minor modification (a relaxation of the mask in the region from 200-250 kHz offset from the channel center frequency) which was previously submitted to the FCC by iBiquity Digital Corporation (developers of the HD Radio AM and FM IBOC systems) in July, 2006. The modified mask is shown in *Figure 19 - NRSC-5 FM hybrid waveform noise and emission limits*. Additional changes here are similar to those discussed for Section 4.1.8 above.

Section 5.3 – Advanced Data Services

– new text in this section clarifies the definition and function of the Advanced Applications Services Transport (AAT). AAT is the method chosen by the NRSC for transport of fixed and opportunistic advanced data services (ADS) data in the IBOC system (AAT was first included in the NRSC-5-A version of the Standard).

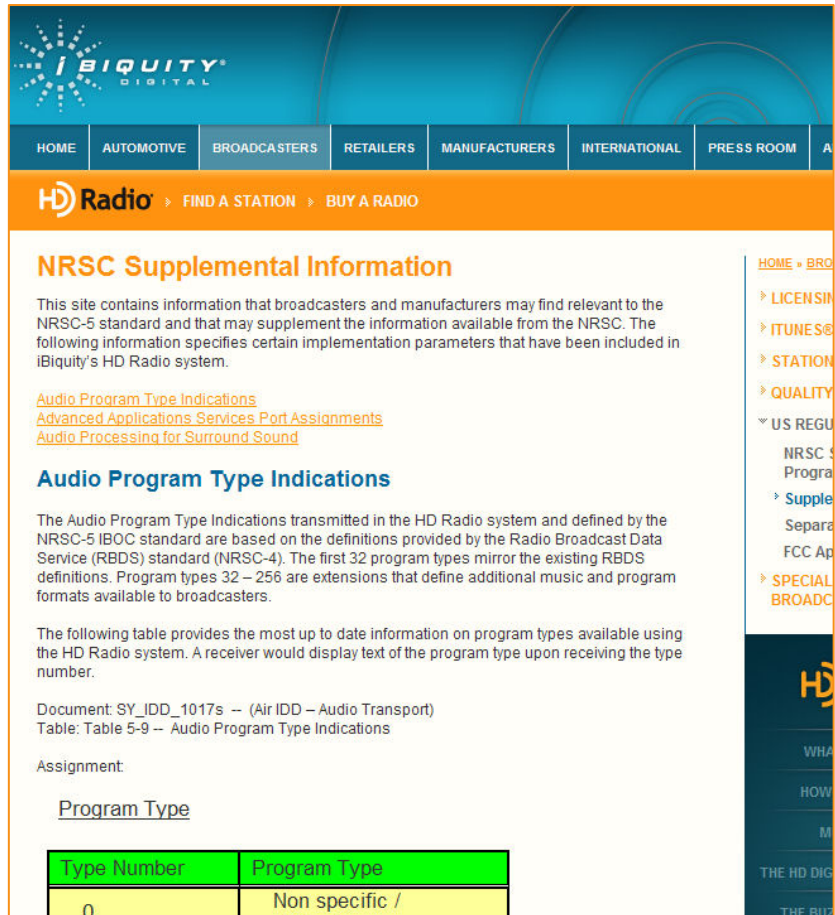
Reference document 1011s rev. F – the most important change here is the substitution of extended hybrid service mode MP4 with a new mode, MP11. The new service mode has the same approximate information rate as did the old (148 kbps) but the bits are allocated differently among the various logical channels, and a potential backwards compatibility issue (identified by iBiquity since adoption of NRSC-5-A) is resolved. In addition, this revision of 1011s removes an interleaver definition which was found to cause delay in audio and data, leaving a single interleaver definition instead of two.

Coincident with the adoption of this most recent version of the Standard, iBiquity has launched an “NRSC Supplemental Information” Web page (see image at right) which will allow iBiquity to provide HD Radio system information to broadcasters and manufacturers that has not yet been incorporated in the Standard. Included here at present is information about:

- *Audio Program Type* – lists the codes for program formats (e.g., sports, talk, etc.) which have been added since adoption of the Standard (type numbers 32-54 shown here are new);
- *AAT port assignments* – provides new information about the “port identifiers” required for each advanced data service;
- *Surround sound codes* – iBiquity has assigned a unique code to various surround sound formats which can be used with the HD Radio system.

This Web page can be accessed directly at

www.ibiquity.com/broadcasters/us_regulatory/nrsc_supplemental_information or through links provided on the NRSC-5-B Web page.





**NAB AM Antenna
Computer Modeling Seminar
November 20-21, 2008
NAB Headquarters
Washington, DC**

Don't miss this opportunity for broadcast engineers to learn the basics needed to utilize modeling software such as MININEC and nodal analysis for designing performance-optimized AM directional antenna phasing and coupling systems and proving the performance of directional antenna patterns.

You will learn about:

- Moment Method Modeling Basics
- DA Proofing Using Moment Method Modeling
- Overcoming Limitations of Using Field Strength Measurements for DA Proofs
- State of the Art in Phasing System Design Nodal Analysis of AM DA Phasing and Coupling Systems
- Pattern Design Considerations for Optimum Performance

AM antenna experts Ron Rackley and Ben Dawson, along with antenna modeling software specialist Jerry Westberg, will lead the seminar demonstrating how moment method modeling makes analysis of actual tower current distributions possible and how a model can be used to proof an array provided the proper criteria are considered. All instructors are well known in the radio industry as experts in the field of directional antenna design and maintenance. Their decades of experience offer station engineers an opportunity to learn techniques, tips and tricks that can be immediately useful.

Seminar fee: \$395.00 (NAB members) and \$495.00 (non-members). For more information on the curriculum, how to register or housing go to [AM DA Seminar](#) on the NAB Web site or call Sharon Devine at (202)-429-5338. Register now for the NAB AM Antenna Computer Modeling Seminar!

