

# NATIONAL RADIO SYSTEMS COMMITTEE

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June 2, 2008

Marlene H. Dortch, Secretary  
Federal Communications Commission  
Office of the Secretary  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Dear Ms. Dortch:

In the *First Report and Order* in MM Docket No. 99-325, the Commission sought the assistance of the National Radio Systems Committee (NRSC)<sup>1</sup> in the development of an In-Band/On-Channel (IBOC) digital radio standard.<sup>2</sup> On May 18, 2005, the Consumer Electronics Association (CEA) and the National Association of Broadcasters (NAB), as the co-sponsors of the NRSC, submitted the NRSC In-Band/On-Channel (IBOC) Digital Radio Broadcasting Standard, NRSC-5, to the Commission for consideration.

NRSC-5 was approved by the NRSC's Digital Audio Broadcasting (DAB) Subcommittee on April 16, 2005. It is based on iBiquity Digital Corporation's IBOC digital radio technology. Subsequently, the standard was revised, as NRSC-5-A by the NRSC's Digital Radio Broadcasting (DRB) Subcommittee, adding sections concerning Advanced Application Services and a new reference document.

The latest revision of the IBOC standard, NRSC-5-B, was adopted by the NRSC DRB Subcommittee on April 12, 2008. NRSC-5-B updates the reference documents and makes minor changes to the FM mask<sup>3</sup> and to the description of hybrid IBOC operation.<sup>4</sup> NRSC-5-B also incorporates the revisions of NRSC-5-A.

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<sup>1</sup> NRSC serves as an industry-wide standards-setting body for technical aspects of terrestrial over-the-air radio broadcasting systems in the United States.

<sup>2</sup> *First Report and Order*, MM Docket No. 99-325, released October 11, 2002, at para. 44.

<sup>3</sup> The new FM mask was previously submitted to the Commission by iBiquity Digital in a letter to the FCC, dated July 5, 2006.

<sup>4</sup> For convenience, we are attaching an unofficial summary prepared by NAB engineers of the recent revisions to the IBOC standard.

NRSC-5-B is hereby submitted to the Commission, for its further consideration and approval as the basis for the FCC technical rules on IBOC digital radio.

Respectfully submitted,

CONSUMER ELECTRONICS  
ASSOCIATION

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Michael Petricone  
Senior VP, Government Affairs

Brian Markwalter  
VP, Technology & Standards

NATIONAL ASSOCIATION OF  
BROADCASTERS

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## 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.nrcstandards.org/SG/NRSC-5-B.asp](http://www.nrcstandards.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.

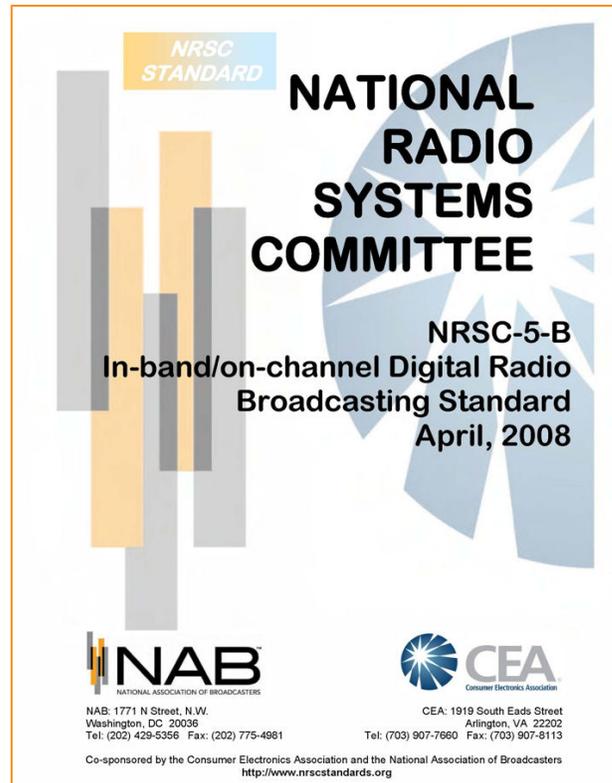
This latest version includes substantive (but relatively minor) changes as well as editorial revisions designed to make the document easier to understand and more complete. None of these changes are expected to cause any backwards compatibility issues with HD Radio receivers. Some of the more significant 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](http://www.ibiquity.com/broadcasters/us_regulatory/nrsc_supplemental_information) or through links provided on the NRSC-5-B Web page.

