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Experimental HD Radio (Hybrid and Extended Hybrid) in the FM Broadcasting Band

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Preface

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1. Foreword

HD Radio[1] in the FM band is a digital extension of the existing analog FM broadcasting system and is based on In-Band On-Channel (IBOC) emissions. The standards for FM HD Radio are reflected in the National Radio Systems Committee (NRSC) document, *IBOC Digital Radio Broadcasting Standard* (NRSC-5B, April 2008).

2. Purpose

The purpose of this circular is to inform the applicants wishing to experiment with either HYBRID or EXTENDED HYBRID HD Radio in the FM band on how to file applications to the Department and to the CRTC, and what technical criteria will apply in those circumstances.

3. System Characteristics

3.1 Primary HD Radio Spectrum

The Primary HD Radio sideband spectrum is located at ± 100 kHz to 200 kHz from the centre frequency of the FM channel. This spectrum is further subdivided equally in 14 sub-bands or partitions. The service mode selected will determine how this spectrum is used.

3.2 Service Modes

3.2.1 Hybrid Mode MP1

In this service mode, only that part of the Primary HD Radio spectrum (also identified as Primary Main sidebands) located between ± 129 kHz and 200 kHz from the centre frequency of the FM channel is used for the digital signal, which means that 10 of the 14 partitions are used. The four remaining partitions are identified as Primary Extended sidebands.

3.2.2 Extended Hybrid Mode

This service mode is created by adding partitions to the Primary Main sidebands and comprises three different service modes:

Mode 2 (MP2): uses the Primary HD Radio sidebands plus a single extended frequency partition;

Mode 3 (MP3): uses the Primary HD Radio sidebands plus two extended frequency partitions; and

Mode 4 (MP4): uses the Primary HD Radio sidebands plus the four extended frequency partitions; in this mode, the total sideband spectrum between ± 100 kHz and 200 kHz from the centre frequency of the FM channel is used.

A graphical representation of these modes is provided in Figure 1 of Appendix 1.

[1] HD Radio is a commercial trademark owned by iBiquity Digital Corporation in the United States.

3.3 Power Relationship with FM Carrier

In Hybrid Mode MP1, the total power of each HD Radio sideband is 23 dB below the unmodulated FM carrier level; in mode MP4, the total power of each HD Radio sideband is 21.6 dB below the unmodulated FM carrier level.

4. Application to the Department

4.1 General

Applicants wishing to experiment with either HYBRID or EXTENDED HYBRID HD Radio need an experimental authorization from the Department and must file an application.

4.2 Application Information Required

The application must contain the following:

(a) the call sign, channel, class, city, antenna coordinates, transmitter model, hybrid mode type (main or extended), absolute and relative power of the digital component and complete specifications of the antenna systems used for both the analog and digital signals. Where both signals are combined into a single antenna, a complete description of the combining system shall be provided;

(b) description of the proposed digital coverage; and

(c) requested starting date and duration of the experimental authorization.

4.3 Notification to Short-spaced Canadian Stations Operating on the First Adjacent Channel

The applicant must notify all Canadian stations operating on the first adjacent channel that is short spaced relative to the FM station intending to carry the HD signals (refer to section 3.5 of BPR-3).[2]

4.4 Information on Authorized Experimentations

All experimental authorizations will be published on the Department's website at http://sms-sgs.ic.gc.ca/eic/site/sms-sgs-prod.nsf/eng/h_00015.html#Database.

5. Technical Requirements for Experimental Authorization

5.1 Experimental authorizations for HD Radio in Canada will be based on using systems that implement the NRSC-5 standard referenced in section 1 above.

5.2 As a norm, the digital signals and the analog FM will be combined and then fed into the same antenna. Broadcasters may opt to use a separate antenna and/or a different tower for their

[2] The Broadcast Procedures and Rules (BPR) are available on the Department's website at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf06134.html.

digital signals. In such cases, the tower for the digital antenna must be within 3 seconds of latitude and longitude of the analog antenna. Moreover, the EHAAT of the digital antenna must be within 70-100% of the authorized EHAAT of the analog antenna.

If a separate antenna is proposed, the applicant must comply with the requirements on antenna siting outlined in Section 2 of BPR-1.

The Department will evaluate the proposed system design on a case-by-case basis.

5.3 For HD Radio on channel 300, where the digital sideband spectrum may interfere with the NAVCOM services, the applicant will need to address the potential for such interference and notify NAV CANADA of the intended operation.

5.4 An on-air testing period shall be coordinated with the appropriate Industry Canada district office (refer to Section 1.4 of BPR-1).

5.5 Should the HD Radio broadcasting operation cause harmful interference, the broadcaster is to cooperate with the Department to take immediate remedial action. This action could include reducing power, altering the radiation pattern of the antenna, as well as cessation of the digital emissions if necessary.

6. Application to the CRTC

An application to the CRTC is required to obtain the authorization to operate a programming undertaking.

Appendix 1 – Relative Power to HD Radio Sidebands

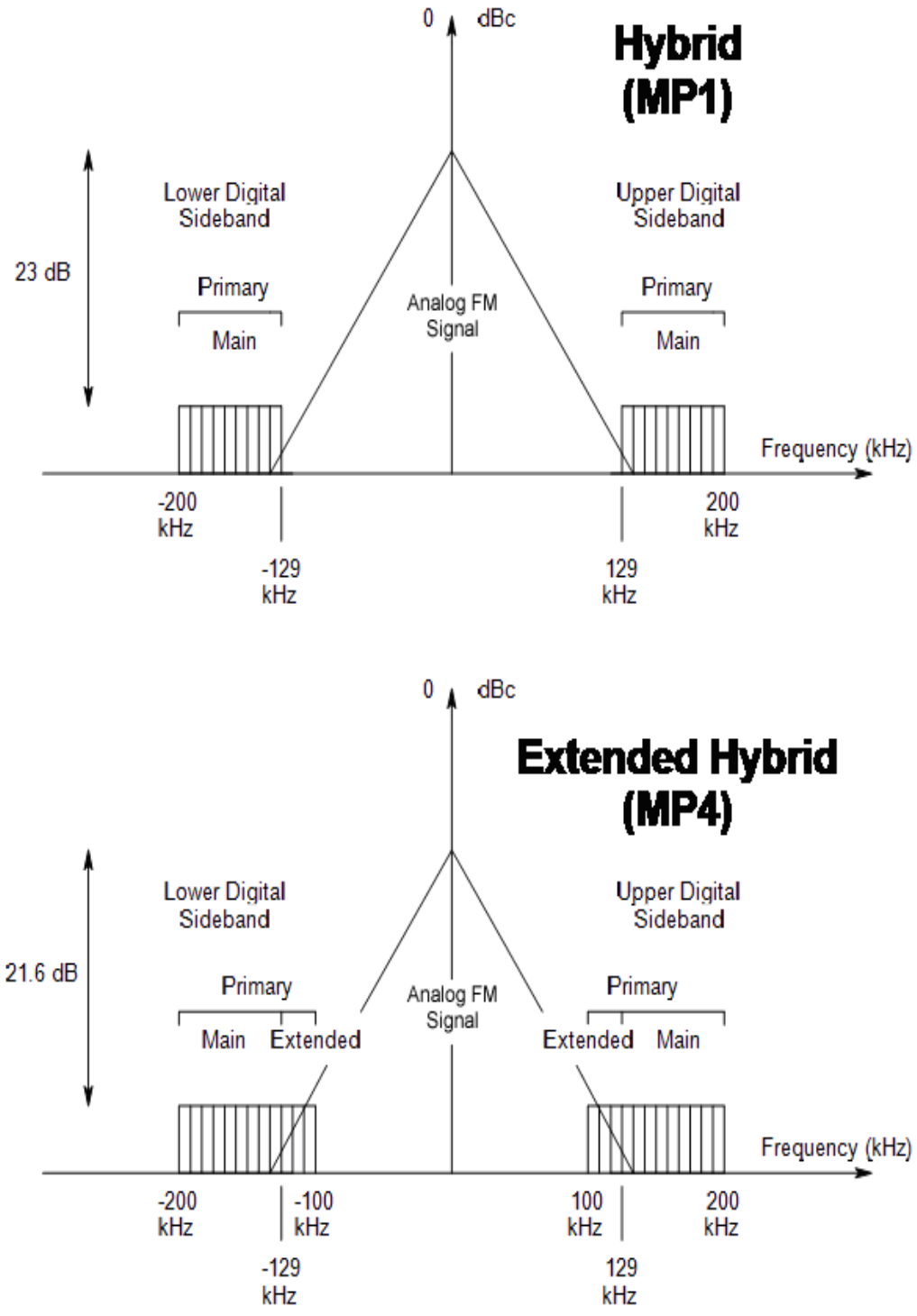

Fig. 1: Relative Power of HD Radio Sidebands