

FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Digital Audio Broadcasting Systems) MM Docket No. 99-325
And Their Impact On the Terrestrial Radio)
Broadcast Service)

To: The Commission

Comments of National Public Radio, Inc.

Introduction

Pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. § 1.415, National Public Radio, Inc. ("NPR") hereby submits its Comments in response to the Commission's Public Notice regarding a joint request for voluntary FM asymmetric sideband operation.¹

NPR is a non-profit membership corporation which produces and distributes noncommercial educational programming through more than 900 public radio stations nationwide. In addition to broadcasting award winning NPR programming, including *All Things Considered*[®], *Morning Edition*[®], and *Talk Of The Nation*[®], NPR's Member stations are, themselves, significant producers of news, information and cultural programming. NPR also operates the Public Radio Satellite Interconnection System and provides representation and other services to its Member stations.

¹ Public Notice: Comment Sought on Request for FM Asymmetric Sideband Operation And Associated Technical Studies, MM Docket 99-325, rel. Nov. 1, 2011 [hereinafter "Public Notice"].

I. Asymmetrical Sideband Operation Would Enable FM Stations To Improve Digital Coverage Without Causing Harmful Interference to Adjacent Analog Reception

Representing a further step in the evolution and implementation of in-band, on-channel ("IBOC") digital audio broadcasting ("DAB" or "HD Radio"), asymmetrical sideband operation promises to enable many FM stations to improve their digital service coverage without causing interference to adjacent analog service. Although slightly less effective in coverage for the same amount of total digital power as compared to two equal (symmetric) digital sidebands, asymmetrical operation permits an FM digital station to protect a neighboring station operating on a first-adjacent channel by limiting digital sideband power on that channel, while increasing digital sideband power on the other first-adjacent channel.² Accordingly, authorizing such operations on a voluntary basis would facilitate the HD Radio transition and serve the public interest.

As set out in the test report NPR submitted in the above-captioned proceeding and referenced in the Public Notice, NPR tested a Nautel HD Radio Exciter featuring an enhanced Peak to Average Power Ratio Reduction ("PAPR") algorithm for HD Radio transmissions.³ The purpose of the testing was to assess the digital performance and analog compatibility of the enhanced PAPR under both laboratory conditions and in the field in connection with the HD Radio operations of WAMU(FM), Washington, DC. Although one benefit of the Nautel PAPR algorithm is to permit greater hybrid transmitter output power and improved operating

² This example assumes that the first-adjacent channel on which digital sideband power is increased requires no protection to a nearby FM station on the same channel.

³ See PAPR and Asymmetrical Sidebands Field Results: HD Radio™ Coverage Technologies, MM Docket No. 99-315, filed Oct. 24, 2011 ["PAPR and Asymmetrical Sideband Test Report"]; Public Notice at 1.

efficiency, an additional benefit is the capability of asymmetrical sideband transmission.⁴

The lab and field testing documented the compatibility of a station's HD Radio and analog transmissions operating with symmetrical and asymmetrical sideband power on typical analog FM radios.⁵ Laboratory testing demonstrated analog FM receiver compatibility and determined specific digital performance improvements for mobile reception.⁶ Controlled field testing with WAMU verified the lab's performance improvements with both symmetrical and asymmetrical sidebands.⁷ Extended over-the-air broadcasting by WAMU confirmed the lab and field results.⁸

II. Authorizing Asymmetrical Operation Requires Only Modest Modifications To The Currently Authorized HD Radio Transmission Parameters

The January 2010 Media Bureau Order established the current maximum permissible DAB operating power for FM stations.⁹ That Order generally authorized FM stations to increase

⁴ PAPR and Asymmetrical Sideband Test Report at 1.

⁵ Id. at 4 (no multipath), 5 (RBDS and FM-SCA reception), and 5-7 (multipath).

⁶ Id. at 6-8.

⁷ Id. at 8-10.

⁸ Station personnel noticed that the HD Radio signal extended several miles farther out than it had, and there were some spots where dropouts were filled in. . . . WAMU did not notice any deleterious effects to its analog signal . . . at any of the sideband levels tested with asymmetrical operation, nor was there any apparent affect at -14 dBc with HD PowerBoost on or off.

Id. at 10.

⁹ In the Matter of Digital Audio Broadcasting systems and Their Impact on the Terrestrial Radio Broadcast Service, Order, 25 FCC Rcd 1182, 1189-90 (Media Bureau 2010) ["2010 Order"].

power by 6 dB to a level of -14 dBc.¹⁰ Depending on a station's proximity to any first adjacent FM stations, the station could apply to increase operating power beyond the general 6 dB increase, up to a maximum increase of 10 dB, or -10 dBc.¹¹

Authorizing FM stations to operate with asymmetrical sidebands requires only a modest modification of the current technical parameters summarized above.¹² One general change would be to replace all single symmetric power level references with a pair of asymmetric sideband power figures, including in application forms and the engineering database. Thus, the generally permissible operating power limit of -14 dBc would be revised to -17 dBc per sideband for each sideband. The minimum digital operating power an FM station could formally request and obtain would be revised from -20 dBc to -23 dBc for the lower sideband and to -23 dBc for the upper sideband.

While asymmetrical sideband operation provides greater flexibility for FM digital station upgrades, it would be subject to the same protection to first-adjacent channel FM stations that was set forth in the 2010 Order. Thus, to obtain Commission authorization to operate above -17 dBc on either sideband, the licensee would have to calculate the station's analog F(50,10) field strength at all points on the protected 60 dBu F(50,50) contour of a potentially affected upper or lower first-adjacent channel analog FM station, using the station's licensed analog facilities and the standard Commission contour prediction methodology. To accommodate the specification of separate digital sidebands, whether operated symmetrically or asymmetrically,

¹⁰ Id., 25 FCC Rcd at 1189.

¹¹ Id.

¹² Id., 25 FCC Rcd at 1189-90.

the chart set forth in the 2010 Order would be modified as indicated below:¹³

Proponent Analog F(50,10) Field Strength at Protected Analog 60 dBu F(50,50) Contour	Maximum Permissible FM Digital ERP <u>For the Pertinent Sideband</u>
51.2 dB μ and above	-14 <u>-17</u> dBc
50.7 dB μ - 51.1 dB μ	-13 <u>-16</u> dBc
50.3 dB μ - 50.6 dB μ	-12 <u>-15</u> dBc
49.6 dB μ - 50.2 dB μ	-11 <u>-14</u> dBc
49.5 dB μ or less	-10 <u>-13</u> dBc

For increases of either sideband beyond -17 dBc, an FM licensee would need to submit an application "with a detailed showing containing a complete explanation of the prediction methodology use as well as data, maps and sample calculations," for Commission evaluation on a case-by-case basis.¹⁴

Otherwise, the Form 335-FM used to notify the Commission that a station has commenced digital operations would need to be modified to accommodate those stations desiring to operate asymmetric sidebands. The Form currently requires the licensee to specify single values for the analog and digital Effective Radiated Powers ("ERPs").¹⁵ The Form should be modified so that all licensees specify the actual ERP for digital transmission separately for each sideband as follows:

Digital LSB _____ kilowatts

Digital USB _____ kilowatts

¹³ Id., 25 FCC Rcd at 1190.

¹⁴ Id.

¹⁵ Form FM-335, Section I, Question 6.

There is no need to sum the digital power, as it has minimal regulatory significance and can be easily calculated. For Transmitter Output Power, a combined power would be supplied as follows:

Digital LSB (...) _____ kilowatts

Digital USB (...) _____ kilowatts

Digital Total (...) _____ kilowatts

Given the minimal modifications required, the voluntary nature of any power increase, and the ability to increase digital power without causing new interference to the host analog service or that of any adjacent FM stations, we see no reason for the Commission not to authorize asymmetric sideband operation as proposed. Because digital coverage is so important to the long-term success of HD Radio, we urge the Commission to act on this matter expeditiously.

Conclusion

For the foregoing reasons and in the manner described above, the Commission should promptly authorize FM stations to implement asymmetric sideband operation on a voluntary basis.

Respectfully submitted,

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