

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Promoting Diversification of Ownership)	MB Docket Nos. 07-294; 06-121;
In the Broadcasting Services)	02-277; 04-228
)	
)	MB Docket Nos. 01-235; 01-317;
)	00-244; FCC 07-217

REPLY COMMENTS OF H. DONALD MESSER AND BENNETT Z. KOBB

The purpose of these comments is to indicate to the Commission that aside from the VHF frequencies proposed by other commenters for expansion of radio broadcasting,¹ there exists an additional and uniquely valuable spectrum resource which could accommodate an entirely new terrestrial digital audio and information service.

This additional spectrum can benefit unserved and underserved audiences; provide opportunities for new entrants, especially Non-Commercial Educational organizations that could not or did not obtain AM, FM or LPFM licenses; and provide multilingual and multimedia services of high quality and reliability without interfering with incumbent stations.

Specifically, we recommend local use of the 430 kHz-wide spectrum from 25670 to 26100 kHz (the "26 MHz" band). It is allocated in the U.S. and worldwide for High Frequency Broadcasting (HFBC) but essentially is unused for broadcasting to the public. Consequently, local broadcast use of this band is consistent with the International Table of Allocations.

¹ See Comments of the Broadcast Maximization Committee and Diversity and Competition Supporters in MB Docket 07-294.

In this band, and with properly designed transmission facilities, digital modulation techniques and planned frequency assignments, it is possible to provide local, "FM-like" service at low power levels in channels of 10 kHz or 20 kHz width.

Even leaving alternate channels unused in a given locality and leaving the lowest and highest channels vacant for protection of the Radio Astronomy and Maritime Mobile allocations just above and below it, respectively, the 26 MHz band yields approximately 20 usable channels for a local assignment plan. Neighboring locations, for example Baltimore compared to Washington, could use the first adjacent channels unused in Washington.

A RECOGNIZED DIGITAL HFBC STANDARD EXISTS

Digital modulation is the key enabler for local use of the 26 MHz band. The only standardized, nonproprietary and openly published digital modulation system for HFBC is *Digital Radio Mondiale* (DRM).

DRM has been standardized by ETSI² and is the only system for HFBC use recommended by the ITU-R³. Some of its major features are:

- Approximate coverage radii in typical metropolitan areas with low average power requirements would be two miles at 10 watts; six miles at 100 watts and 20 miles at 1000 watts.
- Within the information portion of the full bit rate (normally around 20 Kbits/sec out of a total of around 48 Kbits/sec.) up to four different speech programs can be multiplexed.
- Parametric stereo in a 10 kHz channel; full stereo in a 20 kHz channel, either of which compares favorably with FM in a 200 kHz channel.

² European Telecommunications Standards Institute EN 302 245-2: Transmitting equipment for the Digital Radio Mondiale broadcasting service; and ETSI ES 201 980 V1.2.2 for the latest version of the over the air specification, as standardized.

³ Recommendation ITU-R BS. 1514.

- Data capability ranging from program-associated information to electronic publications incorporating text and image.
- Single-frequency networking (SFN) of multiple low-power transmitters on the *same frequency* to efficiently cover fixed and mobile receivers.
- Successfully field tested during the past five years in several countries including Brazil, Mexico, Spain, UK, France, Germany, Croatia, Rwanda, India and Australia.^{4 5}

Several manufacturers produce DRM-compatible low power transmitters and exciter/modulators. Skywave-suppression antennas can ensure that most of the transmitted energy propagates locally (line-of-sight) as in the FM band, with very little energy transmitted via skywave to distant locations. Accordingly, a specific 10 or 20 kHz frequency assignment may be reused anywhere beyond nearby locations; again as is the case for FM assignment plans.

DRM-capable receivers entered production in 2004 in limited quantities. All receivers that permit DRM decoding are multipurpose receivers in that they also function for FM and AM reception, as well as other digital system reception outside of the HFBC bands.

⁴ See for example, *Analysis of the ITU-R P.1546-2 Prediction Method Accuracy for DRM Local Coverage Using the 26 MHz Band*: 57th Annual IEEE Broadcast Technology Symposium, October 31-November 2, 2007; *DRM (Digital Radio Mondiale) Local Coverage Tests Using the 26 MHz Broadcasting Band*: IEEE Transactions on Broadcasting, Vol 53, March 2007; *Digital Radio Mondiale Field Trials in Brasilia for Local Coverage Using the 26 MHz Band*: IEEE International Symposium on Broadband Multimedia Systems and Broadcasting, March 28-29, 2007, Orlando FL; *DRM Field Trials in ITU Region 2: Local Coverage Using the 26 MHz and MW Simulcast*: 7th Workshop on Digital Radio Broadcasting, September 14-15, 2006, Erlangen, Germany; *Local Coverage Using the Digital Radio Mondiale International Standard: Time Variability Characterization*, IEEE International Symposium on Broadband Multimedia Systems and Broadcasting, Las Vegas NV, April 2006.

⁵ In July 2008 the Commission licensed Digital Aurora Radio Technologies in Delta Junction, Alaska, to test DRM for coverage of the entire State from a single transmitter site. Although it represents a novel and potentially valuable application of DRM for domestic broadcasting, the Digital Aurora station is not designed for local service and will not utilize the 26 MHz band.

With the recent advent of Application-Specific Integrated Circuits (ASICs) offering polyband, multistandard reception including DRM, the number of DRM-capable receiver models will increase. Obviously the establishment of local 26 MHz services, even for niche markets, should stimulate production of receivers.

SKYWAVE DOES NOT PRECLUDE 26 MHZ LOCAL SERVICE

The 26 MHz band is occasionally subject to potentially useful long distance ionospheric "skywave" propagation. Skywave intensity depends on factors that include sunspot number, season, time of day and location.

It has been shown that the field strength levels of distant skywave signals from transmissions designed for local 26 MHz use, even under the "worst" skywave conditions for local broadcasting assignments, will not cause harmful interference to the local broadcaster's protected contour at a "first hop" distance in the region around 600 miles from the interfering source.⁶ The skywave suppression antennas mentioned earlier reduce this potential even further, minimizing the fraction of the energy that is propagated in a skywave direction, both from the transmitter directly and from possible "ground bounces" near the transmitter.

THE 26 MHZ BAND IS UNIQUE

Traditional long-range international use of the 26 MHz band is effectively zero across all the approximately 11 years of the sunspot cycle. It is rare that the Maximum Usable Frequency (MUF) for long distance shortwave broadcasting reaches the 26 MHz level.

⁶ See *The Use Of The DRM System For Local Broadcasting in the 26 MHz Broadcasting Band and the Potential for Skywave Propagation Interference Between Two or More Broadcasts Operating on the Same Frequency Channel (Co-Channel Interference)* (October 2007) and *26 MHz DRM Skywave Analysis: Part 2 Update* (January 2008) by H. Donald Messer, both at www.26mhz.us.

The Commission can confirm these facts by examining the data of the High Frequency Coordinating Committee over the years as collected in accordance with the semi-annual assignment requirements of the ITU-R Article 12.

International broadcasters typically decline 26 MHz in favor of allocated bands lower in the HF spectrum that offer year-round long-distance reliability. For these reasons the 26 MHz band is not even included on many of the millions of AM HF receivers in the field.

Simply put, the 26 MHz HFBC band is unused. If the Commission wished to "reserve" a fraction of the total 430 kHz for international use, it could easily do so at the lower end of the 26 MHz band for perhaps 30 kHz total.

Three average power levels could be defined to satisfy different broadcasters: station classes at 10, 100 and 1000 watts, each a maximum amount for the class. Protected contours for each could be defined by field strength levels consistent with those needed for DRM reception indoors. (This, as an approximation, should be around 15 dB less than that needed for FM reception.) Assignments can be made locally on the basis of a plan that is adapted for the expected use (10 kHz, 20 kHz channels) with a guarantee that there will neither be local interference nor first adjacent interference from neighboring localities.

Numerous tests in other countries have established the quality and reliability of 26 MHz for local broadcasting. The undersigned anticipate tests in the U.S. to gather data on the interference robustness of this system, and are engaged in discussions with entities potentially eligible for 26 MHz licenses. Following such developments, the Commission should entertain a Petition for Rulemaking to establish a 26 MHz Broadcasting Service and licensing scheme.

ABOUT THE COMMENTERS

H. Donald Messer, Dr. Eng., chaired the Technical Committee of the DRM Consortium during 2000-2007 and was the initiator and a principal author of the DRM Broadcaster's User Manual. He was until recently the Chief, Spectrum Division, Voice of America, and was also chairman of the National Radio Systems Committee's evaluation and standardization groups for what is now HD Radio. He has been a key designer and evaluator of all the current digital modulation techniques used in terrestrial and satellite delivery during the past two decades.

Bennett Z. Kobb, M.S., SMIEEE, covered the telecommunications and consumer electronics industries as a trade journalist for 20 years. His broadcasting background includes on-air operations, manufacture of broadcast equipment and preparation of TV and FM license applications. He is the author of *Wireless Spectrum Finder* (McGraw-Hill, 2001) and publishes websites devoted to DRM broadcasting and the Experimental Radio Service.

Respectfully submitted,

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