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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	)	
	)	
Creation of a Low Power Radio Service	)	MM Docket No. 99-25
	)	

To: The Commission

SUPPLEMENTAL COMMENTS OF
INTERNATIONAL ASSOCIATION OF AUDIO INFORMATION SERVICES

The International Association of Audio Information Services ("IAAIS"), formerly known as the National Association of Radio Reading Services, files these Supplemental Comments in response to the Notice of Proposed Rulemaking ("NPRM") on the creation of a low power radio service ("LPFM").

Introduction

IAAIS submitted initial Comments in this proceeding on April 28, 1999. However, based on more recent information that has become available, IAAIS is submitting these Further Comments because it is vitally concerned that LPFM, if authorized, will destroy or irreparably harm an existing service to the blind and print disabled that operates in the FM band nationwide. Radio reading services on FM subcarriers provide a single, vital link to the larger world for those who suffer from disabilities that impair access to printed material. IAAIS urges the Commission not to jeopardize the existing provision of critical audio information to a disability group (the blind and print disabled) by moving forward with LPFM. The FM subcarriers used by radio reading services are already fragile due to the physics of the FM signal and its subcarriers. The

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authorization of LPFM – and the further congestion it imposes on the FM band -- may well spell the death knell for some or all radio reading services.

Background On IAAIS

IAAIS, formerly known as the National Association of Radio Reading Services, is a nonprofit organization committed to establishing and maintaining services that provide access to printed information for individuals who cannot read conventional print because of blindness or any other visual, physical or learning disability ("print disabled" individuals). IAAIS provides its members with information and resources to further its mission of providing audio versions of printed matter to the print disabled. In addition, IAAIS promotes radio reading services publicly.

IAAIS membership is composed of over one hundred (100) organizations nationwide that provide radio reading services to the print disabled public.[1] Radio reading is the reading of printed materials, particularly newspapers, books and magazines to the print disabled public. These broadcasts are primarily transmitted to listeners via FM subcarriers.

IAAIS members and other radio reading services supply a necessary service to a significant number of print disabled individuals. Every 11 minutes, an individual in the United States loses their sight.[2] In the United States, 1.1 million individuals are legally blind and another twelve million people have visual impairments that cannot be corrected by glasses.[3] Indeed, a study conducted by the Library of Congress' National Library Services for the Blind

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[1] Indeed, over one hundred and fifty (150) radio reading services provide critical services to the blind and print handicapped throughout the United States.

[2] THE BRAILLE INSTITUTE, GENERAL STATISTICS ON BLINDNESS (visited July 27, 1999) <http://www.brailleinstitute.org/Media-Statistics/html>.

[3] NATIONAL EYE INSTITUTE, NATIONAL INSTITUTE OF HEALTH, VISION RESEARCH – A NATIONAL PLAN: 1999-2003 (1998).

and Physically Handicapped found that three million (3,000,000) Americans are print disabled, either due to severe visual impairment or to physical conditions, such as paralysis, lack of muscle coordination, missing arms or hands or prolonged weakness.[4] Many users of radio reading services are individuals who can see, but because of conditions such as cerebral palsy or multiple sclerosis, are unable to hold newspapers, books and magazines. Additionally, the elderly greatly rely on radio reading services. Indeed, over two-thirds of those with visual impairments are over age 65,[5] and over half of those are legally blind.[6] Furthermore, the number of individuals age 65 or over is expected to more than double by the year 2030, which will undoubtedly increase the number of visually impaired and print disabled individuals.[7] The IAAIS estimates that radio reading services serve a potential population numbering over one million individuals in the United States alone.

Introduction to Radio Reading Services

Radio reading services began in 1969 in Minnesota when two amateur radio enthusiasts developed the technology to distribute audio versions of newspapers using the FM subcarriers of Minnesota Public Radio. Most radio reading services are broadcast via FM subcarriers pursuant to subsidiary communications authority ("SCA") from the FCC.[8] Because the primary FM

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[4] NATIONAL LIBRARY SERVICE FOR THE BLIND AND PHYSICALLY HANDICAPPED, LIBRARY OF CONGRESS, FACTS: BOOKS FOR BLIND AND PHYSICALLY HANDICAPPED INDIVIDUALS 2 (1999).

[5] NATIONAL EYE INSTITUTE, *see supra* note 3.

[6] THE BRAILLE INSTITUTE, *see supra* note 2. In fact, 13.5 percent of people over age 65 are legally blind. *Id.*

[7] NATIONAL EYE INSTITUTE, *see supra* note 3. Indeed, by the year 2030, the number of legally blind Americans is estimated to double. Prevent Blindness America, Eye Problems (visited July 27, 1999) < http://www.preventblindness.org/eye_problems/eye_problems.html>.

[8] Radio reading services, which were initially broadcast solely on the FM subcarriers of local radio stations, can also be heard via cable in some areas and on the Internet, using streaming audio technology. Because many of radio reading service listeners cannot afford to subscribe to

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signal of a radio station uses less than the allotted 200 kHz channel, SCAs can make use of excess bandwidth in the FM spectrum. Thus SCAs allow for more efficient use of the spectrum by FM subcarriers that can carry additional signals.

When FM radio was still broadcasting in mono, each FM station had two subcarriers available for lease to radio reading services. With the advent of FM stereo, which uses an FM subcarrier, each FM station was limited to one subcarrier. About the same time, an increasing number of commercial entities were finding uses, including revenue-generating uses, for FM subcarriers, and it became more difficult for the financially restricted radio reading services to find affordable FM subcarriers. In 1983, the Commission ruled that noncommercial educational FM stations must provide must provide their subcarriers to radio reading services at cost, upon request.[9] Thus, the vast majority of radio reading services are associated with public radio stations.

Radio reading services broadcast over FM subcarriers cannot be heard on traditional radio receivers. Rather, the radio reading service typically provides a specially-tuned receiver to listeners after determining their eligibility for the reading service program. Almost all of the radio reading services provide their services and receivers at no cost to the subscriber. The radio reading services typically operate on shoe-string budgets. They receive financial support from listener contributions, fundraising events, public service organizations, endowments, and local and state funding. Many radio reading services are associated with a number of institutions and

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cable and do not have the means to access the Internet (and because both of these distribution systems require largely visual use, which does not benefit the majority of print-impaired recipients), radio reading services continue to rely primarily on FM subcarriers for delivery nationwide.

nonprofit organizations, such as universities, public radio stations, and city or state library systems, which also offer financial support.

Radio reading services are instrumental in the lives of their listeners. These services allow print disabled individuals to hear news, features, sports, business, opinion, advertisements and other materials from newspapers, books and magazines. Even such basic information as grocery and department store ads and the comics (that the non-disabled take for granted) are provided over radio reading services. Many of the radio reading services provide audio descriptions of visual events and places, such as theater, museum exhibits, nature trails and parades. For example, the Los Angeles Radio Reading Service has provided live, on-site audio descriptions of the Tournament of Roses Parade since 1994, and makes its broadcast available to other radio reading services nationwide. These services allow the print disabled citizens of the United States to participate more fully in society. Radio reading services are, emphatically, in the public interest.

The Commission, itself, has recognized that the existing base of radio reading services distributed by FM subcarriers is substantial and that 42 of the top 50 Standard Metropolitan Statistical Areas are served by a radio reading service offered over an FM subcarrier.[10]

Because radio reading services rely primarily on FM subcarriers, any Commission action that affects the availability of FM subcarriers will have a substantial impact on the ability of the members of IAAIS to broadcast to the print disabled public. If FM subcarriers can no longer reliably be used for the radio reading services, many listeners who depend on the services would

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[9] *Report and Order*, BC Docket no. 82-1, 48 FR 26608 (1983), *as corrected* 48 FR 29872.

[10] *Amendment of Part 2 of the Rules and Regulations to Establish an Allocation in the 220-225 MHz band for Radio Reading Services*, 2 FCC Rcd 5154 (1987).

be left with no alternative means of accessing newspapers, books and magazines. The costs to radio reading services of having to "move operations" to another FM subcarrier due to LPFM interference are astronomical compared to the budgets of radio reading services.[11]

Impact of LPFM on FM Subcarriers

The NPRM is devoid of any studies of the impact of LPFM on FM subcarriers. In fact, the use of FM subcarriers by existing stations is not mentioned at all in the NPRM or on the Commission's LPFM website. Neither the proponents of LPFM nor the Commission appear to have studied the issue of LPFM impact on FM subcarriers at all. By virtue of these omissions, IAAIS, as a potentially affected party, feels obliged to speak out in order to ensure the continued existence and development of radio reading services nationwide. Moreover, by the lack of study, the Commission appears to have shifted the burden in the LPFM proceeding onto groups like IAAIS – the proponents of LPFM should be bearing the burden, not IAAIS. Because radio reading services are largely nonprofit services that operate on a thin financial margin under tight budget constraints, IAAIS is not in a position to fund a full-blown study of the impact of LPFM on radio reading services on its own.

For this reason, IAAIS urges the Commission to pay close attention to the results of the FM Receiver Laboratory Test Report by the Consumer Electronics Manufacturers Association (CEMA), commissioned by NPR and CPB (the "CEMA Study"). From the CEMA Study, IAAIS draws these conclusions for FM subcarriers used by radio reading services:

[11] For example, one radio reading service estimated that it would require 57% of an already stripped-down budget to equip its listeners with receivers capable of receiving a different subcarrier. This estimate does not include the lease costs which might be associated with a move from a public radio station subcarrier (which must be leased at cost) to a commercial radio station subcarrier (which need not be leased at cost).

* The FM band is already a hostile environment for public radio stations and other FM band users (like radio reading services) that use a lightly processed, low-modulated signal (such as talk – quite obviously, the critical component of a radio reading service.)

* The introduction of LPFM will make a hostile Rf environment even worse and adversely affect the public's enjoyment of radio services, thereby jeopardizing the provision of quality radio service (including radio reading service) to listeners.

* If the more robust FM signals are susceptible to degrading interference from LPFM, then FM subcarriers, which are far more fragile signals, will be much more affected and degraded by LPFM.

* The 92 kHz subcarrier needed more than twice as much protection in order to achieve a listenable signal and combat interference from 1st adjacent signals based on existing contour protection rules. Thus, authorization of LPFM stations that abide by existing 1st adjacent channel protection criteria will adversely impact FM subcarriers like those used by radio reading services.

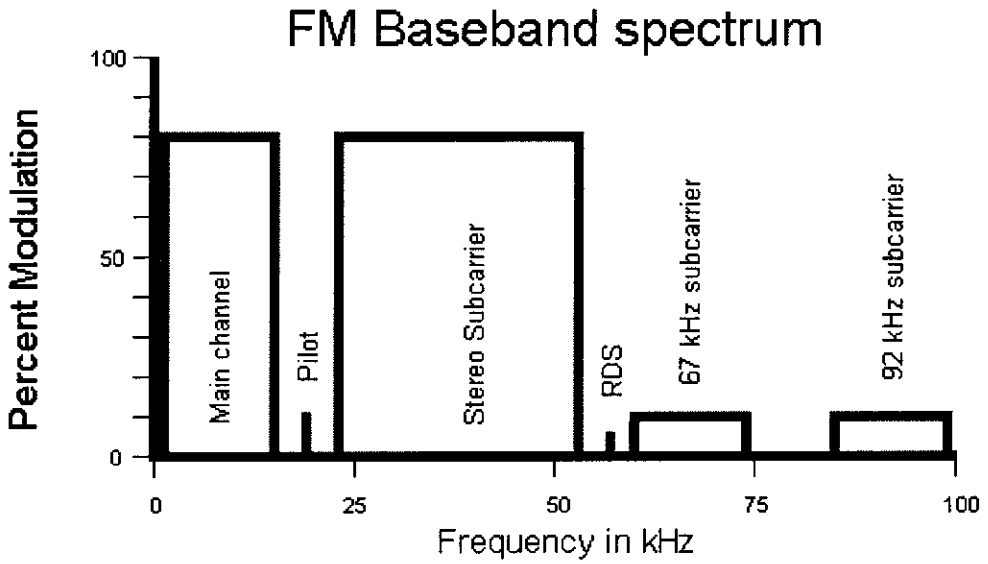
On the basis of this information alone (and given the lack of countervailing information provided by LPFM proponents or the Commission in the NPRM), IAAIS opposes LPFM.

Moreover, the physics of FM subcarrier use and the individual experiences of radio reading services in real-world Rf environments indicate that such services must already battle huge Rf environment odds in order to provide quality radio reading services to the public. The survival of radio reading services from 1969 to the present – despite these odds -- indicates the print disabled public's dependence on, and commitment to, radio reading services.

For example, subcarriers are already very fragile transmissions that are susceptible to interference. Even in the current Rf environment, a subcarrier transmission sounds inferior compared to a primary FM stereo operation. There are technical reasons for this. Based on a comparison of signal-to-noise ratios for the main channel and the subcarriers, subcarriers are approximately 20 times more sensitive than FM stereo operations (which, in turn, are more sensitive to interference than FM mono operations.) Subcarrier transmissions already suffer from 6-10 times sensitivity loss compared to the main channel because the subcarrier modulates

the main carrier at a maximum of 10%.[12] Thus, the existing Rf environment for FM subcarriers, like those utilized by radio reading services, is hostile.

Set forth below is a graphic representation of a subcarrier (courtesy of the website of ComPol, Inc.).[13]



The elimination of 2nd and 3rd adjacent channel protection will exacerbate interference for radio reading services. The Commission proposed the elimination of 2nd and 3rd adjacencies in order to permit more LPFM stations in urban and mid-sized markets. Yet, as explained above, radio reading services already operate in 42 of the top-50 markets with a fragile signal in a hostile FM band environment – eliminating existing adjacency protections and adding in LPFM stations will only destroy, or at least, further degrade reception of radio reading services in those areas. There is also a problem with SCA receivers that will be made inherently

[12] *See* Jon GrosJean, *Radio Receivers*, in NAB Engineering Handbook 1139, 1145 (8th ed. 1992).

[13] Attachment 1 contains a printout from the ComPol, Inc. website that describes SCA technology. IAAIS thanks ComPol, Inc. for permission to refer to its website and use its diagram in these Comments.

worse if LPFM is authorized. Unlike a standard FM receiver, a receiver for FM-SCA has no protection from adjacent channel interference. The least impractical method would require SCA manufacturers to use an expensive filter and thereby increase the cost of the receiver beyond the ability of the radio reading service to purchase for its blind listeners. Even if the subcarrier receiver's selectivity could be increased so that second and third adjacent channel signals could be better filtered out, the amount of crosstalk and noise from the main channel would increase so that the talk programming on the subcarrier would be degraded to the point that the programming would become unlistenable.

IAAIS submits that the public interest will not be served if thousands of print disabled individuals lose existing service because of LPFM stations. Even if LPFM is a laudable concept, the loss of existing service to the portion of the 3 million Americans who are print disabled, and who could benefit from radio reading services, will not serve the public interest.

For all of these reasons, IAAIS respectfully urges the Commission not to authorize LPFM.

Respectfully Submitted,

INTERNATIONAL ASSOCIATION OF AUDIO INFORMATION SERVICES

By: _____

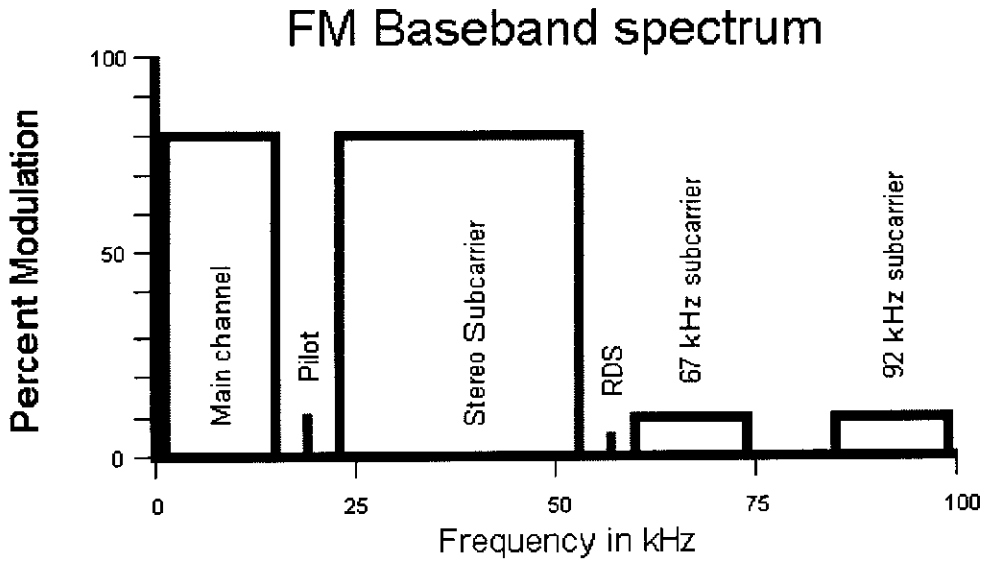
Its: President

SCA Technology

ComPol, Inc. did not invent SCA, but we have done a lot to perfect it. On this page is a simple explanation, so that people with no technical background can understand how it works.

When the FCC established the FM broadcast system, they assigned each station a channel with a width of 200 kHz. For example, the station assigned to 88.1 MHz which is really 88,100 kHz is authorized to use frequencies from 88,000 to 88,200 kHz. When a tone of a certain frequency is transmitted over FM, the bandwidth of the transmitted signal is a minimum of twice that frequency. Thus, frequencies up to 100 kHz can be transmitted on an FM broadcast station. When you consider that the average person can only hear frequencies up to 15 kHz, this leaves a lot of space on the FM transmitter for other signals.

The frequencies from 19 to 53 kHz are used for transmission of stereo. Thus, the frequencies from 53 to 100 kHz are not usable for the transmission of programming. SCA takes advantage of this extra space by converting the special programs into frequency bands that center on 67 and 92 kHz through frequency modulation of those frequencies. Because they are well beyond human hearing range, they have no effect upon reception of normal programming. At the receiver, the subcarriers are converted back down to their original frequencies.



The diagram above shows the assignment of frequencies used in an FM transmitter. The main

channel is the program heard with a monaural FM radio. These frequencies extend from below 25 Hz to 15 kHz. At 19 kHz, is the stereo pilot. The pilot is used to extract the stereo programming, which exists from 23 to 53 kHz. At 57 kHz is the RDS subcarrier used for data to carry such information as the station's callsign, and the name of the selection currently playing. From 60 to 74 kHz is the 67 kHz subcarrier and from 85 to 99 kHz is the 92 kHz subcarrier. Notice that the amplitude of the subcarriers is very low compared to the main and stereo. This prevents interference to stations on adjacent channels.

The technical nomenclature for SCA transmissions is: FM subcarrier on FM carrier, frequency division multiplexing. SCA is a legal term which is short for Subsidiary Communications Authorization.

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