

FM Station, Technical Standards
Modulation
Rules, Amendment

Second Report and Order adopted increasing peak modulation level to 110%. This will allow licensees to maximize their use of FM subchannels.

—*Amendment of Parts 2 and 73*
BC Docket No. 82-536

FCC 84-113

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION**

WASHINGTON, D.C. 20554

In the Matter of
Amendment of Parts 2 and 73 of the Commission's Rules Concerning Use of Subsidiary Communications Authorizations

BC Docket No.
82-536

SECOND REPORT AND ORDER

Adopted: March 29, 1984; Released: April 9, 1984

BY THE COMMISSION:

Introduction

1. On April 7, 1983, the Commission adopted a *First Report and Order*, in BC Docket No. 82-536, amending parts 2 and 73 of the Commission's Rules concerning use of the subsidiary communications authorization (SCA).¹ The rule changes removed restrictions that limited the use of FM subchannels. Specifically, the rule changes permit the use of FM subcarriers for transmitting non-programming material in addition to programming material; operating subcarriers on a 24-hour basis regardless of whether the main channel is on-the-air; increasing the upper limit restricting the instantaneous sidebands of subcarriers in the FM baseband to 99 kHz; removing the requirement that only frequency modulated subcarriers be transmitted; eliminating the program log requirements for subcarriers; and eliminating the requirement for a formal subcarrier application (Form 318).

¹ 48 Fed. Reg. 28445, June 22, (1983).

2. Further, the *First Report and Order* held open the comment period on the issue of increasing the maximum modulation deviation for FM broadcast stations when using subchannels. Specifically, the Commission sought additional information on two specific issues prior to adopting a new modulation limit. The two issues are:

- (A) The degree of reception degradation caused by adjacent channel stations using peak modulation exceeding 100%;
- (B) Whether short-spaced stations would suffer adjacent channel interference to any greater extent than normally spaced stations.

Four parties filed comments on increased modulation limits during the extended comment period.²

Comments

3. Parties providing comments and engineering reports indicate that increased modulation levels of up to 115% are feasible, however, at levels of 115% or greater interference problems begin to occur. After conducting its own studies and reviewing data submitted by others, American Broadcasting Companies (ABC) observes slight adjacent channel problems in some receivers at modulation increases of 115% to 120%. ABC, however, believes that such problems can be minimized, if not eliminated by new receivers that have been properly designed for the assigned FM bandwidth. Bahakel and the joint comments of the National Association of Broadcasters, Westinghouse Broadcasting and Cable, Inc., and National Public Radio conclude from special studies that peak modulation may be increased to 110% with no adverse impact or reception degradation to adjacent channel stations, whether such stations are normally or short-spaced. These joint commenters suggest that a 110% modulation limit is the best approach. The Consumer Electronics Group of the Electronic Industries Association (CEG/EIA) does not object to a 10% increase in the maximum deviation when two subchannels are operating. Although approving an increase in modulation limits, the CEG/EIA cautions the Commission that, over time, the cumulative effect of minor changes in the interference protection given FM broadcast stations could result in a deterioration of FM as a quality broadcast service.

² Parties filing comments include: Bahakel Communications, Ltd., American Broadcasting Companies, Inc., Consumer Electronics Group of the Electronic Industries Association, and the joint comments of the National Association of Broadcasters, Westinghouse Broadcasting and Cable, Inc. and National Public Radio.

Conclusion

4. Based on the data submitted by commenting parties, we are amending our rules to permit peak modulation levels up to but not exceeding 110% when transmitting subchannels. By permitting such increases in modulation level, we are confident that multiple subchannels can be operated without degradation to the main channel and without adversely impacting short-spaced stations.¹

5. Our action today provides further flexibility to FM licensees who may wish to transmit subchannels. By increasing peak modulation levels to 110%, we will reduce fears expressed by FM licensees regarding the impact subchannel operations would have on main channel broadcast program reception if modulation levels were limited to 100%. The data submitted in this proceeding indicate that peak modulation levels of 110% when transmitting subchannels would not result in reception degradation of the main channel signal and that short-spaced stations would not suffer adjacent channel interference to any greater extent than normally spaced stations.

6. Pursuant to the Regulatory Flexibility Act of 1980, the Commission's final analysis is as follows:

I. Need for and Purpose of the Rules.

The Commission has concluded that permitting modulation levels to be increased to 110% would enhance the public interest by providing opportunities for extending and diversifying subchannel service and for improving the efficiency of spectrum utilization.

*II. Summary of issues raised by public comments in response to the initial regulatory flexibility analysis, Commission assessment, and changes made as a result.**A. Issues raised.*

1. No issues or concerns were raised specifically in response to the initial regulatory flexibility analysis. All parties agreed that increasing peak modulation levels up to and including 110% would not significantly alter the degree of reception degradation caused by adjacent channel stations using such increased modulation levels. Additionally, parties agree that short-spaced stations would not suffer adjacent channel interference to any greater extent than normally spaced stations.

³ Until negotiations are completed with government of Mexico, FM licensees with 199 miles of Mexico/United States boarder are limited to 75 kHz and peak modulation levels not exceeding 100%

B. *Assessment*

1. The Commission views the absence of specific claims of adverse impact with respect to increasing peak modulation levels to 110% as indicative of their lack of potential for negative effects on small business.

C. *Changes made as a result of such comments.* None.

The Commission's other alternatives were: (1) not to permit maximum modulation levels above 100%; and (2) to permit maximum modulation levels above 110%. The deny an increase in maximum modulations levels above 100% would have decreased the likelihood that FM licensees would choose to operate two full service subchannels. FM licensees would be less willing to operate two full service subchannels for fear of possible negative effect on reception of main channel service. Permitting maximum peak modulations levels to be increased to 115% or 120% may be feasible, however, engineering studies indicate that increases to 115% or greater may produce adjacent channel problems in some receivers. Therefore, the Commission concludes that by increasing the maximum modulation level up to and including 100% we are providing FM licensees greater flexibility in operating subchannels, while insuring against adjacent channel interference.

7. Authority for adoption of the rules contained herein is contained in Sections 2, 4 (i), and 303 of the Communications Act of 1934, as amended.

8. Accordingly, IT IS ORDERED, that Part 73 of the Commission's Rules IS AMENDED as set forth in the Appendix, effective upon adoption pursuant to 5 U.S.C. §553 (d)(1).

FEDERAL COMMUNICATIONS COMMISSION

WILLIAM J. TRICARICO *Secretary*

APPENDIX

Section 73.319 is amended by redesignating subparagraph (d)(4) as (d)(3) and adding new text for paragraph (d)(4) to read as follows:

§73.319 FM multiplex subcarrier technical standards.

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(d) * * *

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(3) * * *

(4) Total modulation of the carrier wave during transmission of multiplex subcarriers used for subsidiary communications services must comply with the provisions §73.1570(b).

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Section 73.322 is amended by revising paragraph (j) to read as follows:

§73.322 FM stereophonic sound transmission standards.

* * * * *

(j) The total modulation of the main carrier by the stereophonic pilot subcarriers and all stereophonic sound subcarriers and subsidiary communications subcarriers, if used, just comply with the maximum modulation limits specified in §73.1570(b)(2).

Section 73.342 is amended by revising paragraph (b)(3) to read as follows:

§73.342 Automatic transmission system facilities.

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(b) * * *

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(3) The transmitting system must have a device that will detect and adjust the peak level of modulation. If the modulation exceeds more than 10 bursts of peak modulation within a one minute period as measured at the output terminals of transmitter, the program audio input signal to the transmitter modulators must be automatically adjusted downward until these limits are not exceeded. For the purposes of this requirement, a sequence of repetitive instances of modulation exceeding the prescribed limits occurring within a single 5 millisecond interval will be considered to be one burst. The station must comply with the provisions of §73.1570 with respect to the minimum and maximum modulation levels.

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Section 73.542 is amended by revising paragraph (b)(3) to read as follows:

§73.542 Automatic transmission system facilities.

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(b) * * *

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(3) The transmitting system must have a device that will detect and adjust the peak level of modulation. If the modulation exceeds more than 10 bursts of peak modulation within a one minute period as measured at the output terminals of transmitter, the program audio input signal to the transmitter modulators must be automatically adjusted downward until these limits are not exceeded. For the purposes of this requirement, a sequence of repetitive instances of modulation exceeding the prescribed limits occurring within a single 5 millisecond interval will be considered to be one burst. The station must comply with the provisions of §73.1570 with respect to the minimum and maximum modulation levels.

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Section 73.1570 is amended by revising paragraph (b)(2) to read as follows:

§73.1570 Modulation levels; AM, FM, and TV aural.

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(b) * * *

(1) * * *

(2) *FM Stations.* The total modulation must not exceed 100% on peaks of frequent reoccurrence referenced to 75 kHz deviation. However, stations providing subsidiary communications services using subcarriers under the provisions of §73.319 concurrently with the broadcasting of stereophonic or monophonic programs may increase the peak modulation deviation as follows:

(i) The total peak modulation may be increased 0.5% for each 1.0% subcarrier injection modulation.

(ii) In no event may the modulation of the carrier exceed 110% (82.5 kHz peak deviation).

Note: Stations with transmitter sites located within 320 kilometers (199 miles) of the common United States-Mexico border may not exceed 100% modulation on peaks of frequent reoccurrence until such time as the Commission issues a notice that the bilateral agreement with Mexico on FM Broadcasting is amended to to permit greater modulation when transmitting multiplex subcarriers.

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