

# Exhibit 10

BEFORE THE  
FEDERAL COMMUNICATION COMMISSION  
WASHINGTON, D.C. 20554

In the matter of 47 C.F.R. 97.313 )  
Amendment to the Amateur Radio )  
Power Limit. )

P.R. Docket No.

By: Society for the Promotion of  
Amplitude Modulation (S.P.A.M.)  
Post Office Box 27  
Potrero, California 92063

Date:

## Background

1. On July 22, 1983 the Commission adopted a Report and Order, 48 FR 34746 (August 1, 1983) in this proceeding replacing the former input power standard with one based upon peak envelope power output. This Report and Order was later modified by two Errata, 48 FR 37224 (August 17, 1983) and 48 FR 44814 (September 30, 1983).

2. The Report and Order grandfathered the input power measurement for AM DSB operation until June 2, 1990 to minimize the impact of this rule change.

## Introduction

1. In this petition we will set forth new facts and analysis that the use of the peak envelope power measurement standard to indicate the interference potential of an AM DSB emission is erroneous.

2. The loss of the grandfathered input power standard for AM DSB will have a greater impact today because of the renewed interest in AM operation.

3. The amendment in this petition will be reconcilable with the requirements of Section 324 of the Communications Act of 1934 (47 U.S.C. 324) which prescribes that one should use minimum amount of power necessary to carry out the communication desired.

4. In this petition we will show how many 1 KW AM transmitters may be effected after June 2, 1990.

5. We will provide facts which will show the P.E.P. power meters have errors of 3db when measuring an AM DSB emission.

6. Changes in this petition will standardize the amateur power output measurement with all other services which use power output to control interference.

#### Interference

1. Amateur Radio Service has a power limit to control interference. The level of interference is the ratio between the desired station and the undesired station as measured by the recovered audio at the receiver's detector.

2. To control interference by limiting the power output of a transmitter, the power standard should be equal to the amount of recovered audio regardless of the emission used.

3. To illustrate our point, with equal peak envelope power output from a SSB transmitter and a CW transmitter, the recovered audio at the receiver's detector will also be equal between the two signals. If we replace the CW transmitter with a 100% modulated AM transmitter running equal peak envelope power output, the recovered audio will not be equal. The AM signal's recovered audio will be 6db lower than the SSB signal's audio. The interference potential from the AM DSB signal will also be 6db lower and not equal to the SSB signal with the same P.E.P. output. In order for the AM signal to have equal interference potential with the SSB signal the carrier power of the AM signal must be equal to the P.E.P. of the SSB signal.

4. In Exhibit 1 is a comparison chart of AM DSB and SSB signals taken from the Radio Communication Handbook of the Radio Society of Great Britain. The chart compares various P.E.P. power levels of SSB transmitters to a 100% modulated 100 watt transmitter. The chart also shows recovered audio and compares signal to noise at each power level.

5. Spectrum analysis of a AM DSB signal provides the same results as Exhibit 1. In Exhibit 2 is a picture of a spectrum analyzer display. The AM DSB signal is 100% modulated by a sine wave. The display shows 3 signals the lower sideband, the carrier, and the upper sideband. Both

sidebands are 6db below the carrier, in fact the carrier has the most potential for harmful interference.

6. Peak envelope power standard fails to indicate the true power of a AM DSB signal. This apparent power can only be measured in the time domain and it's only purpose is to measure the capabilities of a linear amplifier, which is why the standard was developed in the first place. It is a primary example of the inapplicability of the P.E.P. standard to certain emissions.

7. The greatest interference potential from a AM signal is the carrier, not the apparent power in the sidebands. Other services which employ AM DSB recognize this fact. To control interference, they control the carrier power output. We know of no other service which is as tightly regulated as the AM broadcast Service in terms of control of interference. The Commission amended the regulations for this service to allow stations to run 125% positive peak modulation. In terms of peak envelope power this would be a 64% increase in power, yet stations were not required to reduce their power.

#### Adverse Impact

1. From 1960 to 1983 operation of AM DSB was on the decline. At the rate of decline, by 1990 most if not all amateur station would have stopped using AM. The Society and it's members have worked very hard to turn this situation around.

2. In 1983 the Society for the Promotion of AM

had 362 members, today we have over 1000 and we are growing.

3. One kilowatt AM transmitters operating in the United States today breaks down to 423 commercial units and over 1000 homemade units. The value of this equipment at todays prices with a average cost of 1000 dollars per transmitter is \$1,420,000 dollars. This price does not include the thousands of hours that the amateurs spent building or restoring this equipment.

#### Use of Minimum power

1. The Communication Act of 1934 prescribes that one should use the minimum amount of power necessary to carry out the communication desired. The Act does not prescribe a technical standard, but is more a statement of common sense. From a technical stand point it can be measured in terms of signal to noise/interference. As the ratio between the signal to noise/interference becomes smaller, the desirability of the communication is less. It follows that if you increase the power by 3db the signal to noise/interference will also increase by 3db.

2. In Exhibit 1 the chart shows the signal to noise ratio between AM and SSB transmitters at various SSB power levels. From this chart it is reasonable to conclude that it would take 9db less power for a SSB transmitter to carry on the same desired communication than the AM transmitter and it would even be less for a CW transmitter. With the change from the input power standard to the peak

envelope power output standard, CW received a 3db increase and AM may be reduced by 3db. We don't see how the Commission can reconcile this with the requirements of Section 324 of the Communications Act of 1934. There is a direct correlation between the communication effectiveness, and harmful interference potential, ie. the greater the communication effectiveness the greater the potential for harmful interference.

#### P.E.P. Measurement

1. In experiments made by the Society using the peak envelope standard on a AM transmitter with 500 watts of carrier output, we discovered a major discrepancy between the results of the two methods the Commission employs in determining output power. The transmitter was first tested by using an oscilloscope, the results confirmed 2000 watts P.E.P. with the transmitter modulated to 100%. With a in line Kenwood SW-2000 P.E.P. power meter, the meter would only display a 1000 watt reading and 750 watts in the average mode. Checking with other members we have found that they have experienced the same problems. The meters seem to work correctly on other types of emissions other than AM DSB.

#### Standardize Output Measurement

1. The Amateur Service is the only service to try and use the peak envelope power standard to control the

interference potential for all 14 authorized emissions. Other services which are also covered under Title 47 use two methods to measure power output. In (47 C.F.R. 2.985) Measurements Requirements, is the methods for measuring the power output for all type accepted equipment. Paragraph (a) deals with all transmitters other than sideband and carrier control. Paragraph (b) spells out the requirements for sideband and carrier control transmitters.

2. For transmitters which have emissions with carrier, the power output is measured with the carrier power standard. Carrier power is defined as the average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.

3. For transmitters which have suppressed or control carrier, the power output is measured by the peak envelope power standard.

4. Out of the 14 authorized emissions in the Amateur Radio Service, most contain carrier, only two don't. The carrier power standard is the appropriate standard to use when measuring emissions which have carrier, such as AM DSB and is the recommended standard in the C.C.I.R guidelines.

#### Amendment

1. We respectfully urge the Commission to

consider the following amendment to the Amateur Radio Power Limit:

97.313 (b) No station may transmit with a transmitter carrier power exceeding 1.5 KW. Emissions with suppressed carrier are limited to a maximum of 1.5 KW PEP.

#### Benefits

1. What we have proposed in this petition is not new. The methods and standards have been around for years. They are used each day to control interference in other services. Commission enforcement personnel are already familiar with the test procedures and would not need additional training or equipment.

2. By using two standards one can have a common 1500 watt power limit which provides equal power limitations to all emissions.

3. The amendment will provide equal limitations to all emissions in terms of actual interference potential.

4. This amendment fulfills the requirements of Section 324 of the Communication Act of 1934, based on signal to noise/interference.

5. The amendment will not obsolete 1,420,000 dollars worth of equipment, which is currently legal.

6. This amendment will not have any adverse impact on other modes of operation.



### Conclusion

1. What benefit is there to the Amateur Service or the public interest in the loss of 1,420,000 dollars worth of equipment? This flies in the face of logic when such action is not supported by the facts. The use of the peak envelope power standard fails to indicate the true interference potential of an amplitude modulated signal. The technical evidence shows that the interference potential of a 100% modulated AM signal is not equal to four times the carrier power. Rather, the greatest interference potential comes from the carrier it's self.

2. It is true most of our radio services have technical regulations that exercise interference control by limiting power. It is also true that most do so by using two power standards. The selection of the appropriate power standard is based on the class of emission and most services follow the C.C.I.R. guidelines. The use of both carrier and peak envelope power standards are justifiable because of the number of authorized emissions in the Amateur Radio Service which are subject to this power limit.

3. At issue is not the fact that only one percent of amateurs happen to engage in AM DSB operation. Rather, AM DSB is a authorized emission and is subject to the power limitation rule. What's at question, is the carrier power or

the peak envelope power standard the appropriate standard to use on emissions which contain carrier? It makes little difference if the current P.E.P. output standard only effects one percent of the amateurs, an inappropriate standard is still inappropriate no matter how many amateurs it effects.

4. The Commission committed itself to a review of the power limit if it appears to be justified. In light of the amount of equipment that may become obsolete, the problems with P.E.P. power meter measurements, and the lack of the P.E.P. output standard to indicate the true interference potential of an AM DSB emission warrants a review. We are not asking for special treatment, rather, we are seeking a power limit which is equal and fair, which does not provide a advantage to any type of emission. We think the use of the carrier power standard for emissions which contain carrier makes sense. We hope that the Commission will take into account the successful use of this standard in other services. By adopting this amendment to the Amateur Radio Service Power Limit will provide the level playing field the Commission was looking for. We have set forth new facts that were not considered during Docket 82-624. We have used the time during the grandfather period to gather the facts and explore other remedies. We think we have put together some very strong points which merits the Commission's consideration. We hope we can have this matter resolved before June 2, 1990. If this is not possible, we request an extension of the input power

before June 2, 1990. If this is not possible, we request a  
extension of the input power standard for AM DSB emission  
until the Commission can consider our petition.

Norman A. Scott WB6TRQ  
President of S.P.A.M.

# EXHIBIT ONE

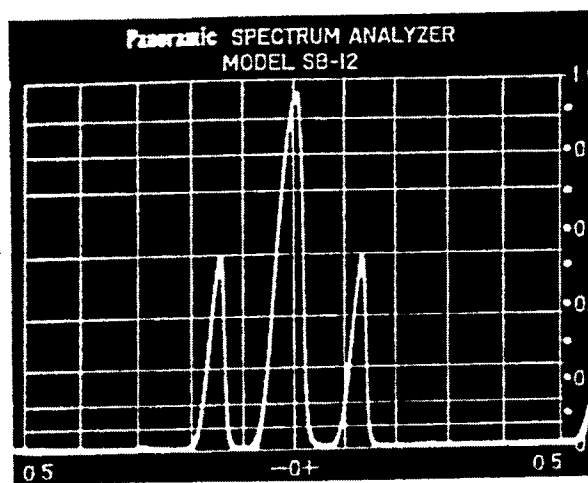
## RSGB—RADIO COMMUNICATION HANDBOOK

	AM 100 WATT DC INPUT 50 W AUDIO FROM MODULATOR (A)	SSB EQUAL SIDEBAND POWER (B)	SSB EQUAL RATED POWER (C)	SSB EQUAL PEAK POWER (D)
RATED POWER	0.25 LSB 1 C 0.25 USB Rated carrier power = 1	0.5 LSB Rated PEP = 0.5	1 LSB Rated PEP = 1	4 LSB Rated PEP = 4
VOLTAGE VECTORS	LSB 0.5 C 1 USB 0.5	0.7 LSB	1 LSB	2 LSB
RF ENVELOPE	PEV = 2 PEP = 4	PEV = 0.7 PEP = 0.5	PEV = 1 PEP = 1	PEV = 2 PEP = 4
RECEIVED SIGNAL AUDIO VOLTAGE	LSB + USB = 1	= 0.7	= 1	= 2
NOISE VOLTAGE FOR ARBITRARY NOISE POWER EQUAL FOR AM & SSB PER kHz BANDWIDTH	Voltage = 0.1 for 6kHz receiver bandwidth	Voltage = 0.07 for 3kHz receiver bandwidth	Voltage = 0.07 for 3kHz receiver bandwidth	Voltage = 0.07 for 3kHz receiver bandwidth
SIGNAL TO NOISE RATIO	$20 \log \frac{1}{0.1} = 20\text{dB}$	$20 \log \frac{0.7}{0.07} = 20\text{dB}$	$20 \log \frac{1}{0.07} = 23\text{dB}$	$20 \log \frac{2}{0.07} = 29\text{dB}$

Fig 4.123. Power relationships for a.m. and ssb transmission. Single tone sine wave modulation.

1

EXHIBIT TWO





# Exhibit 11

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

In the Matter of

Amendment of Section 97.313 of the  
Commission's Rules Governing  
Transmitter Power Standards in the  
Amateur Radio Service

RM-

To: The Chief, Private Radio Bureau

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## PETITION FOR RULE MAKING

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THE AMERICAN RADIO RELAY  
LEAGUE, INCORPORATED  
225 Main Street  
Newington, CT 06111

Christopher D. Imlay  
BOOTH, FRERET & IMLAY  
1920 N Street, N. W.  
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Washington, D. C. 20036

April 2, 1990

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

In the Matter of

Amendment of Section 97.313 of the  
Commission's Rules Governing  
Transmitter Power Standards in the  
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RM-

To: The Chief, Private Radio Bureau

PETITION FOR RULE MAKING

The American Radio Relay League, Incorporated, (the League), the national, non-profit association of Amateur Radio Operators in the United States, by counsel, and pursuant to Section 1.401 of the Rules, hereby respectfully requests that the Commission issue a Notice of Proposed Rule Making at an early date looking toward the amendment of Section 97.313(b) of the Rules governing the Amateur Radio Service. The proposed rule change would eliminate the "sunset" provision in the present rule governing transmitter power of amateur stations using A3E emissions. In support of its proposal, the League states as follows.

I. Introduction

1. In 1982, the Commission issued a Notice of Proposed Rule Making, FCC 82-410, (released October 1, 1982) in Docket 82-624, which proposed to update the rules governing maximum transmitting power in the Amateur Radio Service. The premise was that the rules, which generally governed transmitter



input power, were "archaic" and difficult to enforce because of the measurement techniques required. The Commission emphasized in the Notice that it desired to avoid changing the actual power that amateur stations use<sup>1</sup>. It was proposed that measurement of input power be replaced by an output power measurement, and that maximum transmitter power would be stated in terms of peak envelope power.

2. In the Notice, it was stated that a single figure for authorized maximum PEP output was difficult to ascertain, as the PEP output differs, assuming a constant input power, depending on the type of emission used. Ideally, the Notice stated, one maximum figure should be specified for all stations other than those operated by Novice licensees. Though the Commission initially considered an output power of 1000 watts PEP, that level was not proposed, because the Commission's intent was not to reduce existing operating privileges. Instead, 1500 watts PEP output was proposed, which actually constituted an approximate 3 dB increase in maximum permitted power for CW and FM emissions<sup>2</sup>.

3. With respect to AM DSB operation, however, the Notice stated that the proposed PEP power limitation would have a significant impact. Those operations, when subjected to the new power limit, would be restricted to approximately half of their former maximum operating power. Of this, the Notice

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<sup>1</sup> See the Notice, at Paragraph 2.

<sup>2</sup> Id., at paragraphs 13, 14.

stated that "(w)hile this power reduction might be appropriate for an emission type which, by today's standards, is spectrum inefficient, the Commission recognizes that there is still some interest in this mode." So, the Commission proposed to "grandfather" the existing power limitations for five years for amateurs using AM DSB, and asked for comment on whether that period would be an appropriate length of time for the "grandfather" term.

4. The Report and Order issued in that proceeding, FCC 83-345, released July 22, 1983, noted that a significant number of the comments received in response to the Notice objected to the impact on AM DSB operation. The League's comments stated that "(t)his effort by the Commission to lessen the negative impact that its proposal would have on these amateurs (using AM DSB) is appreciated by the League. Nevertheless, the Commission should go one step further and make this grandfathering provision permanent". The Commission refused to do so, suggesting that the special measurement training which would be required for Commission staff in order to enable effective enforcement would not be justified, in view of the limited number of users of the mode. Thus, the June 1, 1990 cutoff date for the grandfather provision was established.

5. In its present form, Section 97.313(b) states, in relevant part, that:

Until June 2, 1990, a station transmitting emission A3E is exempt from

[the 1.5 kW PEP transmitter power limitation] provided that the power input (both RF and direct current) to the final amplifying stage supplying the RF power to the antenna feed line does not exceed 1 kW, exclusive of power for heating the cathodes of vacuum tubes.

It is to the sunset provision of this rule that the instant petition is addressed. Paragraph 6 of the Report and Order in Docket 82-624 stated that "if it appears that there is any justification to do so, we will reconsider [the grandfather provision] at [the cutoff date]". That cutoff date is rapidly approaching, and the League believes that there is justification for revisiting the matter at the present time.

## II. The League's Proposal Would Maintain the Status Quo

6. Due to the imminence of the cutoff date for full power AM DSB operation, the concern of AM DSB enthusiasts about the rule has again been raised. They suggest, primarily, that the Commission agreed to institute a five-year grandfather period for the maximum power limitation based on the level of interest remaining in the mode at that time. Indeed, that was the stated basis for the grandfather provision in the Report and Order in Docket 82-624. Judging from the comments received by the League urging that present AM power limits be maintained, and from observations of on-the-air activity, it appears that interest in AM operation has not changed dramatically in recent years and certainly has not declined. Thus, it would appear that the same

justification for creating the five-year grandfather period now supports revisiting the option of permanent grandfathering of AM DSB power limits.

7. From the League's perspective, the most important principle at stake is that privileges once earned should not be reduced, absent an overwhelming public interest justification for doing so. No such public interest justification appears to exist. AM operators, who constitute a relatively small minority of amateurs, voluntarily limit their operations to spot frequencies or to narrow segments of the telephony subbands; this reduces the potential for interference to users of other modes in the crowded high-frequency bands.

8. Elimination of the 'sunset' provision will have no significant effect upon the introduction of new AM DSB equipment in the amateur bands. New equipment that would be affected by implementation of the 1500-watt PEP output limitation invariably is either homemade or has been converted from commercial service. Linear amplification of an AM DSB signal is possible, but only at reduced efficiency amplifier. This limits the PEP output power, at less than 1000 watts DC input, to less than 1500 watts PEP output.

### III. Conclusion

9. While the Commission's action in 1983 in changing to a PEP output measurement was entirely proper, and while the

"grandfather" clause in effect for the last several years was a reasonable approach, given the Commission's assumption that there would be a constant decline in the amount of AM DSB operation during that period, the assumption has not proven correct. There is still in the Amateur Radio Service a small, but significant number of amateurs who enjoy the use and development of AM DSB operation. The League firmly believes that the privileges earned by these amateurs should not be reduced, absent a compelling justification for the reduction of the privileges. The proposed substitute rule set forth herein should be sufficient to alleviate any concern about interference, enforcement, and reasonable standards for maximum transmitter power in the Amateur Radio Service.

10. This proceeding will inevitably extend beyond the June 2, 1990 cut-off date for the elimination of the grandfather clause. To facilitate full consideration of the matters contained herein, the League respectfully requests an extension of the cut-off date, to and including June 2, 1991, or for a shorter time if the rule proposed in the attached appendix, or similar, is adopted by the Commission.

Therefore, the foregoing considered, the American Radio Relay League, Incorporated respectfully requests that the Commission release a Notice of Proposed Rule Making at an

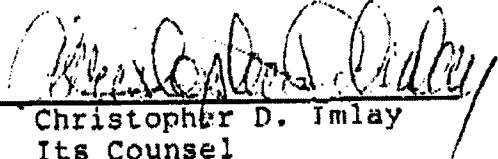
early date, proposing to substitute the text of Section 97.313(b) of the Rules contained in the attached appendix for that presently set forth in the Rules.

Respectfully submitted,

**THE AMERICAN RADIO RELAY  
LEAGUE, INCORPORATED**

225 Main Street  
Newington, CT 06111

By

  
Christopher D. Imlay  
Its Counsel

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(202) 296-9100

April 2, 1990

## APPENDIX

Section 97.313(b) of the Rules is deleted and the following substituted therefor:

(b) No station may transmit with a transmitter power exceeding 1.5 kW PEP. A station transmitting emission A3E is exempt from this requirement, provided that the power input (both RF and direct current) to the final amplifying stage supplying RF power to the antenna feed line does not exceed 1 kw, exclusive of power for heating the cathodes of vacuum tubes.

# Exhibit 12

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

In the Matter of )  
Request to amend Section 97.313 )  
of the rules to eliminate the )  
"sunset" provision in the )  
present rule governing transmitter )  
power of stations using AM (A3E) )  
emissions. )

RM-7402, 3, 4

COMMENTS by Donald B. Chester, K4KYV  
2116 Old Dover Road  
Woodlawn, TN 37191  
19 July, 1990

To the Commission:

I am in favor of this petition that proposes the retention of historic AM power privileges for the following reasons:

- (1) Privileges earned by amateur licensees should not be withdrawn unless there is an overwhelming reason or justification to do so.
- (2) Cutting the maximum power limit for AM in half renders my transmitter obsolete unless I install modifications at considerable expense.
- (3) Operation of my transmitter at the legal power limit in the past has never created any local interference problems.
- (4) A power reduction, even as small as 3 dB., limits my ability to communicate under summertime static conditions, especially in the 1.8-2.0 MHz. band where much of the present day AM activity takes place to avoid interference and congestion.
- (5) In face of the reported decline of amateur radio, AM is enjoying increased interest and enthusiasm.
- (6) Despite the decline in technical interest among U.S. amateur operators, AM operation encourages hands-on experience with transmitters thus education in fundamental radio techniques. Few amateurs are willing to tamper with the highly complex circuitry of expensive, but delicate, state-of-the-art transceivers.
- (7) Under the "grandfather" provision, AM has not enjoyed any power advantage over other modes. The maximum output power in the sidebands was limited to approximately 375 watts on voice peaks, 6 dB. below the legal maximum for SSB. The high peak-to-average power ratio of A3E is the result of a vectorial relationship between sidebands and carrier, and does not provide any communications advantage. Because the carrier and sidebands are on distinctly different frequencies, the resultant peak power of an AM signal does not cause a corresponding increase in interference to other stations using narrowband modes such as SSB or CW.



(8) The Commission made it clear that the intention of Docket 82-624 was limited to the definition and measurement of transmitter power, and that it was desired to avoid changing the actual power that amateur stations use. See paragraph 2 of the NPRM (Docket 82-624) of September 1, 1982.

#### DISCUSSION

In this matter, the Commission has three petitions on file, each of which proposes a satisfactory approach to eliminating the "sunset" provision governing AM transmitter power. Apparently with the expectation that amateur interest in full carrier A3E would continue to decline, the Commission did not diligently exhaust all possible alternatives to the AM power reduction for achieving the stated objectives of PR Docket 82-624, as described in the NPRM. It would require only minimal changes to Section 97.313 to permanently retain historic AM power levels and still satisfy those objectives. In view of continued amateur interest in AM DSB, this amendment to the rules is justified.


RM-7402, filed by ARRL, proposes the historical AM power level by permanently "grandfathering" the input power measurement. This would be satisfactory as far as the amateur community is concerned, but I am aware that the Commission has expressed objections to the equipment and training requirements, and physical safety hazards to FCC Field Operations personnel, posed by the input power method.

RM-7404, filed by Dale Gagnon, KWI, proposes the historical AM power level, using a "best case" equivalent output measurement. 750 watts carrier output is approximately the maximum power that can be attained at 1000 watts input using known technology. It is my understanding that the Canadian amateur rules have a specific power measurement category for AM of 750 watts carrier output. This would represent essentially no change in the actual AM power level from the historic figure, but merely redefine how AM transmitter power would be measured.

RM-7403, filed by SPAM, like RM-7404, proposes a carrier output standard for AM. Under this proposal, the maximum AM power limit would be increased over the historical figure by approximately 3 dB. While the AM community is seeking retention of pre-existing power privileges and not an increase in maximum power, this proposal has merit. Under Docket 82-624, other modes such as CW, FM and RTTY were given a 3 dB. power increase to 1500 watts carrier output, and it would be entirely appropriate to extend the same increase to AM DSB. Even at 1500 watts carrier output power, the intelligence-bearing sideband component of an AM signal would be limited to 750 watts p.e.p., one-half the maximum allowed SSB and other suppressed-carrier modes.

Any one of the above petitions would effectively preserve my previously earned privilege to operate my transmitter at historical power levels. The scope of these petitions is limited to the maximum AM power level. They do not attempt to revisit the issue of input versus output power. Likewise, they do not raise the issue of Section 324 of the Communications Act of 1934 (47 U.S.C. §324) which prescribes the use of minimum power to carry out the desired communication; this is a general requirement that applies equally to all modes including AM DSB, regardless of the specific maximum power limit in the rules.

Distribution: Federal Communications Commission,  
ARRL, SPAM, Dale Gagnon

  
Donald B. Chester, K4KYV

# Exhibit 13

FCC emission designators.txt

## FCC EMISSION DESIGNATORS Detailed List Last Rev. 1998

WARC-79, the world Administrative Radio Conference that rewrote many of the world's radio regulations, adopted a new system of emission classification. The traditional A (Amplitude), F (Frequency), and P (Pulse) was intuitive, but limited and clumsy when dealing with new modes.

The world's radio bodies, including the FCC, gradually phased in the new system until today it completely replaces the old one.

The formula for the new designations, loosely from ITU radio regulations 264 through 273, and Appendix 6, Part A, is:

[BBBB]MNI[DM],

where

[ ] means optional when writing emission specs.

[BBBB] = Necessary Bandwidth (shown in FCC records, but is often omitted elsewhere)

Uses a letter and three numbers. The letter goes where the decimal point should be placed, and denotes a magnitude:

H	HZ
K	KHZ
M	MHZ
G	GHZ

Some common bandwidths are:

400 HZ	400H
2.4 KHZ	2K40
12.5 KHZ	12K5
6 MHZ	6M00

M = Modulation Type

N	None
A	AM (Amplitude Modulation), double sideband, full carrier
H	AM, single sideband, full carrier
R	AM, single sideband, reduced or controlled carrier
J	AM, single sideband, suppressed carrier
B	AM, independent sidebands
C	AM, vestigial sideband (commonly analog TV)
F	Angle-modulated, straight FM
G	Angle-modulated, phase modulation (common; sounds like FM)
D	Carrier is amplitude and angle modulated
P	Pulse, no modulation
K	Pulse, amplitude modulation (PAM, PSM)

FCC emission designators.txt

L Pulse, width modulation (PWM)  
M Pulse, phase or position modulation (PPM)  
Q Pulse, carrier also angle-modulated during pulse  
W Pulse, two or more modes used

X All cases not covered above

N = Nature of modulating signal

0 None  
1 Digital, on-off or quantized, no modulation  
2 Digital, with modulation  
3 Single analog channel  
7 Two or more digital channels  
8 Two or more analog channels  
9 Composite, one or more digital channel, one or more analog

X All cases not covered above

I = Information type

N None  
A Aural telegraphy, for people (Morse code)  
B Telegraphy for machine copy (RTTY, fast Morse)  
C Analog fax  
D Data, telemetry, telecommand  
E Telephony, voice, sound broadcasting  
F Video, television  
W Combinations of the above

X All cases not covered above

[DM] = additional details, not used by FCC, optional elsewhere

D = Detail

RTTY/modems:

A Two condition code, differing numbers or durations (Morse)  
B Two condition code, same number and duration, no error check  
C Two condition code, same num & dur, error check  
D Four condition code, 1 or more bits per condition  
E Multi condition code, 1 or more bits per condition  
F Multi condition code, conditions may combine

Audio:

G Broadcast quality (mono)  
H Broadcast quality (stereo/multichannel)  
J Commercial quality  
K Commercial quality, analog freq inversion or band scrambling  
L Commercial quality, FM pilot tone (i.e. Lincomplex)

Video:

M Monochrome  
N Color

# FCC emission designators.txt

- W Combination
- X All cases not covered above

M = Multiplex type

- N None
- C Code division
- F Frequency division
- T Time division
- W Combination of above
- X All other types

## Converting Between Old & New Systems

USE	OLD	NEW
Pure carrier	A0,F0	N0N
Morse telegraphy (by ear)	A1	A1A
Modulated CW Morse	A2	A2A
AM voice	A3	A3E
SSB, suppressed carrier	A3J	J3E
SSB, reduced carrier	A3R	R3E
SSB, full carrier	A3H	H3E
Television	A5	C3F
RTTY (F.S.K.)	F1	F1B
RTTY (A.F.S.K.)	F2	F2B
FM voice (Narrowband)	F3	F3E, 20K0F3E
Packet Data/Teleprinters with Audio Sub-Carrier	20F2	20K0F2B
Data with Audio Sub-carrier	3F2 6F2 20F2	3K00F2D 6K00F2D 20K0F2D
Analog Voice	20F3	20K0F3E
Digital Voice	20F3Y	20K0F1E
Digital Facsimile without Audio Sub-Carrier	20F4	20K0F1C
Digital Facsimile with Audio Sub-Carrier	20F4	20K0F2C
Analog Facsimile	20F4	20K0F3C
Composite of Digital &		

# FCC emission designators.txt

Analog Information	3F9	3K00F9W
	6F9	6K00F9W
	20F9	20K0F9W
Packet Data/Teleprinters without Audio Sub-Carrier	20F9Y	20K0F1B
Digital Data	20F9Y	20K0F1D

## LAND MOBILE EMISSIONS

old	new	old	new
A0	N0N	P0	P0N
A1	A1A	P9	P0N
A3	A3E	A2J	J2B
A3J	J3E	A3H	H3E
A7J	J8W	A9J	J9W
A9	A9W	P1	P1D
A9Y	A1D	F2Y	F2D
F0	N0N	A0H	H0N
F1	F1B	A7	A8D
F2	F2D	F7	F8D
F3	F3E		
F3Y	F1E		
F4	F3C		
F9	F9W		
F9Y	F1D		
A2H	H2D		
A2	A2D		

## MICROWAVE EMISSIONS

old	new
F9	F8W (If bw is less than 50 convert to F2D)
F9Y	F7W (If bw is less than 50 convert to F2D)
F3	F3E
A9Y	A7W
A5	A3F
A9	A8W
A5C	C3F
F2	F2D
F5	F3F

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And here is the relevant section of FCC rules:

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From General Docket No. 80-739

Section 2.201 Emission, modulation, and transmission characteristics.

The following system of designating emission, modulation, and transmission characteristics shall be employed.

- (a) Emissions are designated according to their classification and their necessary bandwidth.
- (b) A minimum of three symbols are used to describe the basic characteristics of radio waves. Emissions are classified and symbolized according to the following characteristics:
  - (1) First symbol - type of modulation of the main carrier;
  - (2) Second symbol - nature of signal(s) modulating the main carrier;
  - (3) Third symbol - type of information to be transmitted.

NOTE: A fourth and fifth symbol are provided for additional information and are shown in Appendix 6, Part A of the ITU Radio Regulations. Use of the fourth and fifth symbol is optional. Therefore, the symbols may be used as described in Appendix 6, but are not required by the Commission.

(c) First Symbol - types of modulation of the main carrier:

- |   |   |
|---|---|
| (1) Emission of an unmodulated carrier  | N |
| (2) Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle modulated): |   |
| - Double-sideband   | A |
| - Single-sideband, full carrier   | H |
| - Single-sideband, reduced or variable level carrier  | R |
| - Single-sideband, suppressed carrier   | J |
| - Independent sidebands   | B |
| - Vestigial sideband  | C |
| (3) Emission in which the main carrier is angle-modulated:  |   |
| - Frequency modulation  | F |
| - Phase modulation  | G |

NOTE: Whenever frequency modulation "F" is indicated, Phase modulation "G" is also acceptable.

- |  |   |
|--|---|
| (4) Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence   | D |
| (5) Emission of pulses:  |   |
| - Sequence of unmodulated pulses   | P |
| - A sequence of pulses:  |   |
| - Modulated in amplitude   | K |
| - Modulated in width/duration  | L |
| - Modulated in position/phase  | M |
| - In which the carrier is angle-modulated during the period of the pulse   | Q |
| - which is a combination of the foregoing or is produced by other means  | V |
| (6) Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, a combination of two or more of the following modes: amplitude, angle, pulse | W |
| (7) Cases not otherwise covered  | X |

\*Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g., pulse code modulation) should be designated under (2) or (3).

(d) Second Symbol- nature of signal(s) modulating the main carrier:

- |   |   |
|---|---|
| (1) No modulating signal  | 0 |
| (2) A single channel containing quantized or digital information without the use of a modulating sub-carrier, excluding time-division multiplex | 1 |

- (3) A single channel containing quantized or digital information with the use of a modulating sub-carrier, excluding time-division multiplex 2
- (4) A single channel containing analogue information 3
- (5) Two or more channels containing quantized or digital information 7
- (6) Two or more channels containing analogue information 8
- (7) Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information 9
- (8) Cases not otherwise covered X
- (e) Third symbol - type of information to be transmitted:
  - (1) No information transmitted N
  - (2) Telegraphy - for aural reception A
  - (3) Telegraphy - for automatic reception B
  - (4) Facsimile C
  - (5) Data transmission, telemetry, telecommand D
  - (6) Telephony (including sound broadcasting) E
  - (7) Television (video) F
  - (8) Combination of the above W
  - (9) Cases not otherwise covered X
- (f) Type B emission: As an exception to the above principles, damped waves are symbolized in the Commission's rules and regulations as type B emission. The use of type B emissions is forbidden.
- (g) Whenever the full designation of an emission is necessary, the symbol for that emission, as given above, shall be preceded by the necessary bandwidth of the emission as indicated in Section 2.202 (b) (1).

#### Section 2.202 Bandwidths.

##### (b) Necessary bandwidths.

- (1) The necessary bandwidth shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.

-end-

## Federal Communications Commi

Before the  
Federal Communications Commission  
Washington, D.C. 20554

In the Matter of

Amendment of the Amateur	RM-7401
Service Rules to Revise	RM-7402
Transmitter Power Standards and	RM-7403
Authorized Emissions	RM-7404

### ORDER

Adopted: October 24, 1990; Released: October 31, 1990

By the Chief, Private Radio Bureau:

1. Before the Commission are four petitions for rule making<sup>1</sup> relating to the transmission of emission type A3E, commonly referred to as AM,<sup>2</sup> in the amateur service. One petition, RM-7401, seeks to remove emission type A3E from Section 97.3(c)(5) of the Commission's Rules, 47 C.F.R. § 97.3(c)(5), asserting that, with two exceptions, AM usage has been generally supplanted by emission type J3E (single sideband or SSB).<sup>3</sup> In sharp contrast, the other three petitions, RM-7402, RM-7403, and RM-7404, seek to amend Section 97.313(b) of the Commission's Rules, 47 C.F.R. § 97.313(b), to promote AM by allowing amateur stations transmitting AM a maximum output power two to four times greater than the power allowed stations transmitting any other emission type. More specifically, RM-7402 requests that the June 2, 1990, sunset date<sup>4</sup> of the AM exception to the power limitation be deleted.<sup>5</sup> RM-7403 requests that a station transmitting AM be allowed to use a carrier output power<sup>6</sup> of 1.5 kW, rather than the present standard of 1.5 kW output peak envelope power (PEP).<sup>7</sup> Similarly, RM-7404 requests that a station transmitting AM be allowed to use a carrier output power of 0.75 kW.<sup>8</sup>

2. In response to Public Notice of the petitions,<sup>9</sup> we received more than 820 comments and reply comments. The comments were generally opposed to RM-7401 and supportive of RM-7402, RM-7403, and RM-7404. Most of the commenters either stated a personal preference for AM operation<sup>10</sup> or contended that interest in vintage radio equipment<sup>11</sup> and AM operation generally has increased in recent years.<sup>12</sup> Each comment and reply has been carefully considered. We conclude that the petitions do not present new or novel questions of fact, law, or policy. Accordingly, we dismiss the four petitions for rule making as repetitious for the reasons discussed below.

3. In 1981, the Commission considered a petition for rule making requesting the same rule amendment asked for in RM-7401.<sup>13</sup> The Commission denied the petition, stating that it conflicted with the Commission's goals for the Amateur Radio Service. Deleting AM as an authorized emission still is inconsistent with the basis and purpose of the amateur service<sup>14</sup> and our desire to offer amateur operators the opportunity to experiment with practically every conceivable type of emission.<sup>15</sup> We therefore dismiss RM-7401 with no further action.

4. In regard to the other three petitions, the ARRL, Gagnon, and SPAM argue that the Commission indicated that it would reconsider its decision<sup>16</sup> phasing out the higher power authorization for an AM emission if there were any justification to do so.<sup>17</sup> All three petitioners claim that increased interest in AM since 1983 is the justification for the Commission to reconsider its 1983 power measurement decision.<sup>18</sup> The petitioners do not persuade us that there is sufficient justification to raise the power limit, as AM emissions continue to be an authorized form of amateur emissions.

5. The issue of specifying a transmitter power standard for AM that is different than the power standard for the other 1300 emission types is an issue the Commission has previously considered and denied.<sup>19</sup> Further, the Court of Appeals, in affirming this decision, found that the Commission's action was based on consideration of the relevant factors and was supported by a reasoned opinion.<sup>20</sup> The arguments raised by the ARRL,<sup>21</sup> Gagnon, and SPAM<sup>22</sup> are the same as those the Commission considered and rejected in that proceeding. The petitioners have presented no reason for us to revisit this matter. Further, the petitioners have not shown that interest in AM operation today significantly exceeds the Commission's 1983 estimate of the interest in AM<sup>23</sup> or that the expiration of the higher power authorization to AM stations is having any unanticipated effect on these stations.

6. For the above reasons, the amendments requested by the petitioners would provide no significant benefits for the amateur service or the public and are not warranted. IT IS THEREFORE ORDERED, pursuant to Sections 0.131, 0.331 and 1.401(e) of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.331 and 1.401(e), that the petitions for rule making, RM-7401, RM-7402, RM-7403 and RM-7404 ARE DENIED.

### FEDERAL COMMUNICATIONS COMMISSION

Ralph A. Haller  
Chief, Private Radio Bureau

### FOOTNOTES

<sup>1</sup> Petitions for rule making were filed by William B. Precht (Precht) (RM-7401), The American Radio Relay League, Inc. (ARRL) (RM-7402), the Society for the Promotion of Amplitude Modulation (SPAM) (RM-7403), and Dale Gagnon (Gagnon) (RM-7404).

<sup>2</sup> See Section 2.201 of the Commission's Rules, 47 C.F.R. § 2.201, for information relating to the system of designating emission types and modulation characteristics of radio waves.

<sup>3</sup> Precht petition at 1.

<sup>4</sup> Prior to June 2, 1990, amateur stations transmitting an AM emission were exempt from the 1.5 kW peak envelope power (PEP) maximum power requirement and subject only to the 1 kW direct current power input limitation. This limitation translates into an equivalent PEP output of approximately 3 kW.

<sup>5</sup> ARRL petition at 5.

<sup>6</sup> Carrier output power is the average power supplied to the antenna during one radio frequency (RF) cycle under the condition of no modulation. PEP is the average power supplied to



the antenna during one RF cycle at the peak of the modulation envelope. A carrier output power of 1.5 kW is four times greater than a PEP output of 1.5 kW.

<sup>7</sup> SPAM petition at 8.

<sup>8</sup> Gagnon petition at 2-5.

<sup>9</sup> See *Public Notice*, Report No. 1819, June 27, 1990.

<sup>10</sup> For example, see comments of Phillip Gagnon at 1, Barbara White at 1, Robert Harrison at 1, Courtney Hall at 1.

<sup>11</sup> For example, see comment of Ron Cole at 1.

<sup>12</sup> For example, see comments of Allen Steiner at 1, Charles Croatman, Jr. at 1, Joseph Neiman at 1, Rodney Sheffer at 1.

<sup>13</sup> See *Order*, RM-3665, released March 4, 1981.

<sup>14</sup> See Section 97.1 of the Commission's Rules, 47 C.F.R. § 97.1.

<sup>15</sup> 4 FCC Rcd 4719 (1989).

<sup>16</sup> See *Report and Order*, 48 Fed. Reg. 34746 (1983), *Erratum*, 48 Fed. Reg. 37224 (1983) and 48 Fed. Reg. 44814 (1983), *Memo-randum Opinion and Order*, 49 Fed. Reg. 36107 (1984) (recon-sideration granted in part), *aff'd mem.*, *Baxter v. FCC*, 774 F.2d 510 (D.C. Cir. 1985), *cert. denied*, 476 U.S. 1184 (1986).

<sup>17</sup> ARRL petition at 4, Gagnon petition at 2, SPAM petition at 4.

<sup>18</sup> SPAM estimates that its members own 1,400 1 kW AM transmitters in operation today. SPAM petition at 5. Gagnon cites the growth in SPAM membership from 362 in 1983 to over 1,000 in 1990. Gagnon also states that there is no commercial incentive for a new manufacturer to start producing these trans-mitters and that most commercial AM kilowatt transmitters still in existence have been restored and placed back in service. Gagnon petition at 3-4.

<sup>19</sup> See note 16, *supra*.

<sup>20</sup> See *Baxter v. FCC*, No. 84-1504, mem. at 2.

<sup>21</sup> *Id.* at 2-3.

<sup>22</sup> *Id.* at 4.

<sup>23</sup> *Report and Order* at 6.

# Exhibit 15

Before the  
Federal Communications Commission  
Washington, D.C.

In the Matter of

Amendment of the Amateur Service Rules  
to Revise Transmitter Power Standards

RM-7402  
RM-7404

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Petition for Reconsideration: By Dale Gagnon, KW1I

A petition, RM-7402, filed by the American Radio Relay League requested retention of historic maximum power levels for Amplitude Modulated transmitters by changing the temporary "grandfather" period for these privileges into a permanent "grandfather" period.

A petition, RM-7404, filed by Dale Gagnon, KW1I, requested retention of historic maximum power levels for Amplitude Modulated transmitters by requiring their output to be 750 watts carrier power or less. This being the equivalent of the historic 1000 watts DC input power rule.

The order released October 31, 1990 denying RM-7402 and RM-7404 did not adequately deal with the issues raised by these petitions and by the comments received in support of these petitions.

- .The petitions have been incorrectly characterized as petitions to promote AM use by allowing two to four times the power allowed other emissions.
- .The evidence for increased AM emission use since the early 1980s has been minimized.
- .The Commission has not acted consistent with its previous statements concerning special consideration based on interest in the AM mode.
- .The Commission has ignored the economic impact on amateurs who have high power AM transmitters made obsolete by the expiration of the Part 97.313 "grandfather" clause.
- .Alternative Commission actions are available that are harmless to operators of high power AM equipment and to the Commission, other amateurs and the general public as well.

A. Paragraph 1 of the denial order misrepresents the sense of RM-7402 and RM-4704 by terming the petitions as seeking the amendment of the rules to "promote AM by allowing stations transmitting AM a maximum output power two to four times greater than the power allowed stations transmitting any other emission type".

The correct sense, clearly articulated in petitions RM-7402 and RM-7404, was to seek continuation of the historic maximum power levels for AM that have been in existence for over a half-century and to conserve the earned privilege to operate AM transmitters at that level when conditions warrant.

The misstatement of the purpose of these petitions has likely biased the decision making progress in the Commission. These petitions were submitted for the preservation of historic privileges, not for promotion of the AM mode by increasing the power level.

B. I disagree with the statement of in Paragraph 2 of the denial order claiming that the petitions do not present new fact. The petitions pointed out the resurgence of use of AM on the amateur bands. This fact has been demonstrated by the 800 plus comments of support for the AM positions in the 30 day comment period following RM number assignment. Pro-AM comments following the 1981 amendment petition to ban AM numbered approximately 80. This is a ten-fold increase, an unprecedented volume for such a short comment period! The present AM community is also vital enough to have influenced the American Radio Relay League, through its board, to petition the Commission in favor of restoration of power privileges. Circulation and membership data in AM interest magazines and interest groups included in the petitions also demonstrate the fact of increased AM interest.

C. Paragraph 4 of the denial order states the Commission is not persuaded that there is sufficient justification to raise the power limit (restore historic power levels). This seems incredible when the increased interest facts in (B. above) are compared to the Commission's 1982 recognition of enough AM interest to justify a "grandfather" clause as part of the new power rule.

The critically important last sentence in this paragraph that would explain why the Commission is not persuaded to continue historic power for AM does not have precise meaning. "The petitioners do not persuade us that there is sufficient justification to raise the power limit, as AM emissions continue to be an authorized form of amateur emissions."

It is not clear what the continuation of AM as an authorized emission has to do with whether or not the petitioners have persuaded the Commission that there is sufficient justification for continuation of historic AM power levels.

D. The first part of Paragraph 5 of the denial order refers to a challenge to the 1500 PEP power level ruling shortly after its institution in 1983. In contrast, RM-7402 and RM 7404 are not challenges to the 1983 power level ruling. They are asking for a fair inclusion in the present rules based on the current interest in the AM mode. A temporary "grandfather" scheme was the solution in 1983. The petitions each ask for an alternative way to accomplish that inclusion.

E. I disagree with the premise stated in the last part of Paragraph 5, that the petitioners have presented no reason to revisit this matter. As stated earlier there is substantial evidence of considerable more AM interest in 1990 than earlier in the decade.

I disagree with the Commission's claim that AM interest today does not significantly exceed the Commission's 1983 estimate of interest in AM or that expiration of the higher power authorization is having unanticipated effects on these stations.

The information from the public documents that is available to discover the Commission's 1982/83 estimates and anticipation of the future of AM interest is summarized here.

From Notice of Proposed Rule Making for PR Docket No. 82-624, Paragraph 17, released October 1, 1982. "the Commission recognizes that there is still some interest in this mode. Consequently, we propose to "grandfather" such operations of those amateurs who currently use AM DSB emissions ... we specifically invite comments as to whether a five year period is an appropriate length of time for the "grandfather" term."

From Report and Order for PR Docket No. 82-624, Paragraph 6, released July 22, 1983. "We therefore, have decided to limit the grandfather provisions to a period ending June 1, 1990. If it appears there is any justification to do so, we will reconsider the matter at that time."

The sense of these statements shows the Commission making special consideration for a still significant mode, building in an appropriate time frame for an expected decline of interest, including a reconsideration point at the end of the time frame to check whether the arbitrary "grandfather period" length had been appropriate and making adjustments, presumably, if there is still significant interest in AM.

F. Paragraph 6 of the denial order states that the amendments would provide no significant benefit for the amateur service. This is not true. There are estimated to be over 1000 amateurs whose transmitters are now obsolete following the termination of the "grandfather" clause. Modification or dismantling of these transmitter is a significant economic penalty. Much of it falls on senior citizen amateurs who have owned and operated this equipment for decades.

G. If the Commission is not yet convinced that a permanent "grandfather" clause or a permanent output power measurement for historic AM power levels is justified, it should, as an alternative, establish another "grandfather" period of an appropriate length to test the continuing interest in this mode. This would be consistent with earlier Commission actions.

#### H. Summary

The AM community was disappointed in 1983 that the historic maximum power level for AM was not permanently embraced by the new output power measurement standards. As the decade progressed and AM usage actually increased, AM operators did not dismantle their equipment as the June, 1990 "grandfather" clause termination approached. Instead, AM enthusiasts took comfort in the statements of the Commission in the 1982 Notice of Proposed Rule Making and in the 1983 Report and Order that promised reconsideration. The justification for a separate consideration for AM maximum power levels was expected to be based on current interest levels, as it had in 1983.

The Commission has mischaracterized these petitions as requesting additional power when they are only requesting continuation of maximum power levels in place for over 50 years. The Commission has downplayed the evidence for a significant increase in AM interest, though it does appear to admit in Paragraph 6 of the denial order that the AM interest today exceeds that in 1983, but not significantly.

The Commission has not addressed the harm to amateurs that the reduction of maximum AM power rule change causes. This rule change reduces privileges earned by amateurs in the licensing process. It also obsoletes transmitting equipment causing considerable expense to amateurs. All of this might be justified if there were an offsetting advantage, but there is none. The petitions point out there is no disadvantage to other amateurs or the general public by continuing historic AM maximum power levels. The Commission can measure AM carrier power output with equipment currently in the field. No additional training of field personnel is required.

The Commission should realize that present AM interest and the prospects for future interest justify adoption of one of these petitions in new rule making. If the Commission is still unconvinced, they should admit the expiring "grandfather" period may not have been of sufficient length to determine this issue and institute another temporary "grandfather" period to test the direction of future interest in Amplitude Modulation.

Before the  
Federal Communications Commission  
Washington, D.C. 20554

In the Matter of )  
 )  
Amendment of the Amateur )  
Service Rules to Revise )  
Transmitter Power Standards )

RM-7403

Date November 23, 1990

# PETITION FOR RECONSIDERATION

By Society for the Promotion of  
Amplitude Modulation (S.P.A.M.)  
Post Office Box 27  
Potrero, California 92063

The Society for the Promotion of Amplitude Modulation, the Society, the international, non-profit association of AM amateurs operators, by its President, and pursuant to Section 1.429 of the Rules, hereby respectfully request that the Commission reconsider its decision and Order which denied our petition.

## JUSTIFICATION

1. The Commission has failed to consider all of the technical evidence which was covered in RM-7403. In the Commission Order<sup>1</sup> dated October 24, 1990, a number of false statements were made. It appears that the Commission has a hidden agenda concerning operation of the A3E emission. The Commission recognizes the benefits in offering amateur operators the opportunity to experiment with practically every conceivable type of emission but, in the case of amplitude modulation it must be done at a power level four times less than other emission types. It is quite apparent that the Commission is attempting to restrict the operation of amplitude modulation by using an inappropriate power standard which will force amateurs operating AM, sharing the same frequencies with other emission types such as J3E, to a 9 db disadvantage in terms of communication effectiveness without regard to the requirements of Section 324 of the Communications Act of 1934<sup>2</sup>.

2. It is ludicrous to suggest that our petition was developed to promote AM by allowing amateurs to operate AM

at four times greater power than other emission types. We proposed a change that wasn't limited to AM alone, other carrier emissions would be subject to the same limitations. Amplitude modulation has never enjoyed a power advantage over other emissions and it still wouldn't in our petition. The issue raised in our petition questioned the accuracy of the peak envelope power standard to predict the interference potential of an AM signal as compared to other emissions operating at the same power level.<sup>3</sup> The technical evidence clearly shows that the apparent power as viewed on an oscilloscope doesn't translate to the same signal level at the receiver. The apparent power only exists in the time domain and cannot be measured on a spectrum analyzer.<sup>4</sup>

3. A number of different power output measurement standards exist, each serves a purpose. Power output measurement standards have conversion factors between them, however this should not be construed to mean that the interference potential is equal to any of the conversion factors, indeed it is not. They are used as a matter of convenience to allow one to measure the power output with an instrument which may not be designed to indicate the power directly. The correct selection of a power standard is dependent on the class of emission: emissions which contain carrier are measured with the carrier power standard, where as emissions without a carrier are measured by the peak envelope power standard. This is the recommended practice by C.C.I.R., and is used by just about all other services. We must ask the Commission why C.C.I.R. guidelines by emission class are not applicable to the amateur service, as required by 47 C.F.R. § 2.1 "Power"?

4. The Society in its petition provided a number of reasons why the Commission should reconsider its decision, only one issue was commented on in the Order. The Commission failed to consider the number of comments it received, one of the largest ever. In 1981 the Commission received only 80 comments on that AM petition, during this last round the Commission received over 820 comments<sup>5</sup>, we wonder why this did not convince the staff that the operation of AM has increased?

5. The Commission failed to consider the adverse economic impact on amateurs who own \$ 1,420,000 worth of AM transmitters. The vast majority of this equipment is American made and most models are no longer in production, making it difficult to obtain parts to modify the transmitters to a lower power level.

6. The Commission stated in its Order they had previously considered the issue of specifying a transmitter power standard for AM that was different than the power standard for the other 1300 emissions types, which was irrelevant to RM-7403 since that is not what we proposed. Our petition recommended that

two power standards be used, carrier power standard would be used as the primary standard because it could accurately measure the majority of the 1300 emissions. The peak envelope power standard would be used as a secondary standard on emissions which do not contain carrier, as was intended when it was created. We fail to see the advantage of using one power standard in trying to predict accurately the interference potential of 1300 emission types. We were very deliberate and careful in drafting our petition not to create a special power measurement for AM. We referred to internationally recognized engineering practices in the selection of our standards.

7. In applying the peak envelope power standard to various types of emissions one encounters difficulties in terms of definition. Many emissions do not contain modulation envelopes, such as A0 type. It is clear that this standard was never intended to measure this type of emission, yet that is what we are required to do.

8. The Society in its petition made note of a very serious problem encountered in using a peak envelope power meter to measure a 100% modulated AM transmitter. We determined there could be as much as a 3db difference between the two recommended measurement techniques. The Commission never consider this fact in its Order.

9. With the current amateur power limit one can operate a double sideband transmitter at 1500 watts PEP. The double sideband signal occupies the same amount of spectrum as an AM signal, yet if we were to place a 1500 watt carrier between the upper and lower sidebands the spectrum requirements would remain the same. The 1500 watt carrier in the presence of upper and lower sideband signals represents a 100% modulated AM signal. In terms of interference, the carrier which is steady in level has the greatest potential for interference. It is impossible for the power in the sidebands or the carrier to ever combine. The Commission, as the government's technical expert should be cognizant of this fact, nevertheless the Commission claims that the above 100 % modulated 1500 watt AM signal is equal to 6000 watts in terms of interference potential. This claim is not supported by any technical evidence, yet it was used as one of the reasons for the denial of our petition.

### CONCLUSION

1. The Society welcomed the opportunity of the rule making process. We approached the process with an open mind and have used the last 5 years to investigate evidence. It was our hope that we would have a chance to take a fresh look at the Amateur



Radio Service power limit. We counted on the Commission's tradition of fairness and willingness to dig below the surface in issues before it, so far our confidence in that fact has been shaken. We found that the Commission staff is either unwilling or incapable of dealing with the AM power issue in a fair manner. The staff's position seems to be affected by the court case *Baxter v. FCC*<sup>6</sup> in which the Commission expended a great deal of resources defending the Commission's action concerning AM power. It appears that with the Commission's successful defense of its action in the courts, it is now not willing to fairly consider new evidence which may show that its original decision was erroneous. In the interest of fairness, we therefore request that the final review of our petition for reconsideration be forwarded to the Commission for action.

2. It is unconscionable to continue to ignore the technical evidence, we encourage the Commission to use its engineering resources and support their claim that the interference potential of an AM signal is equal to four times the carrier power. We wonder how the Commission can measure the power output of an amateur stations operating AM when we have shown in-line peak envelope power meters to be inaccurate!

3. The Commission has turned a deaf ear to the number of comments in support of our petitions, one of the largest ever. We wonder how many supporting comments are needed to persuade the Commission to reconsider its decision. The amateur community has spoken loud and clear on this matter with overwhelming support for a power limit change.

4. The Commission has stated that our petition would provide no significant benefits for the amateur service or the public, we strongly disagree. We see a great deal of benefits for the amateurs who own 1,420,00 dollars worth of AM equipment which will be lost. There are benefits in having power limit standards that accurately reflects the interference potentials of all of the emissions they are applied to, if the standards are based on sound engineering practices and are already used by the Commission in other services. We must ask, who benefits by the Commission's action denying our petition? The answer is no one.

5. We urge the Commission to reverse its decision and move forward issuing a notice of proposed rule making to change the amateur radio service power limit. We have provided a number of reasons that justify a change. The Society and its members have the right to expect a fair and impartial review of the facts. It is are desire to resolve this matter and reach a favorable conclusion within the framework of the Commission Rules, however we will pursue this matter to its logical end.