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FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

15 JUN 1993

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Honorable Bob Smith
United States Senate
332 Dirksen Building
Washington, D.C. 20510

Dear Senator Smith:

This is in response to your letter of May 17, 1993, in which you inquired on behalf of the New Hampshire Flying Tigers, regarding the Notice of Proposed Rule Making (Notice) in PR Docket No. 92-235, 57 FR 54034 (1992). Your constituents are specifically concerned about the potential impact of our final rules on radio remote controlled airplane hobbyists.

Model airplane users have shared spectrum on a secondary basis with industrial users for over 25 years. The low power industrial user and the radio control model airplane hobbyists effectively share spectrum through geographic separation. We are enclosing the Report and Order in GEN Docket 82-181, 47 FR 51875 (1982), which provided the current 50 channels for radio controlled model airplanes. These rules, adopted at the behest of the model airplane community, provide no protection from interference from licensed sources. We further note that the radio environment is inherently hazardous and that even primary allocations suffer from problems. For example, model aircraft users receive interference from other model aircraft users and from certain TV channels. Thus, model aircraft must be, and in fact are, capable of operating with some interference.

Congressional

DUE: 6-16-93

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LETTER REPORT

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TITLE	MEMBERS NAME	REPLY FOR SIG OF
Congressman	Bob Smith	BC

CONSTITUENT'S NAME	SUBJECT
Richard Bono	inq. comments on PR Docket 92-235

REF TO	REF TO	REF TO	REF TO
PRB/kr 6-9-93			

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REMARKS:

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BOB SMITH
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United States Senate

WASHINGTON, DC 20510-2903

PRB
92-235

COMMITTEES:
ARMED SERVICES
ENVIRONMENT AND PUBLIC WORKS
JOINT ECONOMIC COMMITTEE

2295

May 17, 1993

Mr. James Quello
Acting Chairman
Federal Communications Commission
1919 M Street, NW
Washington, D.C. 20554

Dear Chairman Quello:

I have received many letters from constituents who are concerned about the FCC's proposal contained in PR Docket 92-235. I contacted your office previously and promptly received a response that seemed to respond to the concerns of the RC community. However, I recently received the enclosed comments from the New Hampshire Flying Tigers flying club. They very convincingly respond to the information sheet put out by the FCC. I ask that you please review this document and respond to me so that I may better address their concerns.

I thank you in advance for your assistance in this matter. Please forward your reply to my assistant, John O'Neal.

Sincerely yours,

Bob Smith

Bob Smith, U.S.S.

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

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JLO
RC models

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them	)	PR Docket 92-235

31815

Introduction:

The New Hampshire Flying Tigers is an Academy of Model Aeronautics (AMA) chartered Radio Control (RC) model flying club located in Southern New Hampshire. We have approximately 80 active members. Collectively we own approximately 200 transmitters and receivers that meet the new 1991 technical standards for RC systems (R/CMA-AMA "Gold" rating and narrow band, dual conversion receivers).

Our flying field is located in the corner of an industrial park. This is an active industrial park with several factories, and manufacturing businesses. Within one mile of this industrial park are several schools, churches, retail businesses, residential homes, and public recreation parks.

Because of the location of our flying site, we have strict safety rules and regulations. We have two appointed safety officers, and a committee whose sole purpose is to ensure that our safety regulations are followed. This is because we want to insure that there are no safety violations that could cause damage to property or someone to become hurt.

We are very concerned about what we have been hearing from the FCC in regard to this NPRM. We started looking into the facts as we have them and realized that this NPRM will not provide a safe environment for our RC aircraft to operate in. Additionally, we feel that the "information sheet" as distributed by the FCC to many Senators and Congress persons has misrepresented the facts.

Therefore, our reply to this NPRM is to present the issues as stated by the FCC in the information sheet, but to include comments from the RC communities point of view.

Discussion:

The following information was originally prepared by the FCC and distributed to Senators and Congress persons to answer their concerns about NPRM 92-235. As this "Information sheet" seems to have omitted the view of the RC community

2.0 FCC Question:

What is the relationship between fixed and mobile land mobile operations and radio control operations?

2.1 FCC Answer:

Radio control channels are located between fixed and mobile channels. The radio control channels overlap with the fixed and mobile channels. Radio control operations are unlicensed and are secondary to fixed and mobile operations. This means that radio control operations must accept interference from fixed and mobile users, and may not cause interference to such users.

2.2 RC Answer:

The radio control use of these channels has been without too many problems in the past. This is because most of the users in this band are fixed stations. If a fixed station is causing interference to an RC channel (or pair of channels) then the offending channel(s) can be not used in that particular area. This scheme works only because the RC operators were sharing the band with **fixed** stations, that are easy to locate and identify. Yes, because of current FCC rules, we are legally considered the 'secondary' users. Because of the nature of the fixed stations with which we share the band, we are able to peacefully coexist.

We have developed new technologies to allow our equipment to reject signals that are 10 kHz away from our channels, as the fixed stations currently are. The NPRM proposes channel spacing of 2.5 kHz with a frequency tolerance of 50 parts per million (PPM). This places these signals right in the middle of the pass band of an RC receiver, which requires other signals to be at least 10 kHz away so as not to cause interference. This does not leave any room for a reasonable frequency tolerance. A frequency tolerance of 50 parts per million (50 PPM) would allow for a drift in frequency of 3.6 kHz. This would place the proposed signals right on top of our RC channels and still be considered in tolerance!

3.0 FCC Question:

What changes are proposed in PR Docket 92-235 that have raised the concern of radio control operators?

3.1 FCC Answer:

We have proposed that over a 20 year period, 20 kHz mobile channels in the 72-76 MHz band be replaced with 5 kHz mobile channels. Apparently, radio control operators believe that this would make many of their frequencies unusable.

3.2 RC Answer:

Yes, this would make most of our frequencies **unusable**. Our state of the art receivers can reject signals that are 10 kHz away. The proposal has new channels 2.5 kHz from our center frequencies. If a tolerance of 50 parts per million (50 PPM) was allowed (as specified in the NPRM), then these new signals could deviate as much as 3.6 kHz. This places these new signals right on top of our channels. We must also remember to take into account that these signals are modulated with information. This information modulation causes a signal to occupy space and be wider than the carrier alone. This means that a signal just 2.5 kHz away from our RC channels if modulated with a deviation of 1 kHz would occupy at least 2 kHz of spectrum (the carrier frequency and 1 kHz above and below the carrier frequency). Current technology narrow band FM signals use a deviation of 5 kHz which consumes at least 10 kHz of band width. The proposal is promoting the use of new 5 kHz channels. This would consume plus and minus 2.5 kHz, occupying a full 5 kHz of band width. This will leave **no space** between the proposed 5 kHz channels for the RC channels to occupy. This also leaves **no space** to allow for any reasonable frequency tolerance (even an impractical frequency tolerance of 0 PPM)! Summary: Current RC equipment can **NOT** tolerate a signal closer than 10 kHz.

4.0 FCC Question:

Private land mobile, common carrier, and radio control users have peacefully shared spectrum in this band for many years. Would these changes lead to problems between various classes of users?

4.1 FCC Answer:

We can not categorically state that authorized mobile operations under the current or proposed rules could never harm radio control operations. However, in practice, all types of users can and do operate without conflict, although there are rare occurrences of interference between these users. We believe that under our proposed rules they should remain rare.

First, permitted power levels for both services are comparable. (For radio purposes, 3/4 of a watt is indistinguishable from 1 watt.) In approximate terms, this means that even if a factory and a radio control hobbyist shared a channel, which they would not under this proposal, the radio control user's model airplane would continue to stay under control as long as the plane is reasonably closer to the hobbyist's radio transmitter than the factory's radio transmitter. The fact that two users would not be using the exact same frequency significantly reduces risk of interference.

4.2 RC Answer:

Yes, the power levels are very similar, but 3/4 of a watt is the legal maximum power that an RC transmitter can use. As all RC transmitters are battery powered, most of these transmitters actually output less than the legal maximum output power to conserve battery life (a typical RC transmitter output is between 1/4 and 1/2 of a watt). Also keep in mind that model aircraft do not usually stay very close to the transmitter. As many flying sites are near industrial parks (and therefore factories), many RC aircraft can fly very near, or directly over a factory. Since the receiver is now closer to the factory transmitter than the controlling RC transmitter, the aircraft will go out of control due to the interference from the factory transmitter! Also, due to allowed frequency tolerances, the factory transmitters could legally be right on top of the same channel that the RC aircraft is using. On top of this is the fact that only the better RC receivers can reject a signal that is as close as 10 kHz. Signals as close as the proposed 2.5 kHz can **NOT BE TOLERATED and WILL cause INTERFERENCE!** Even if the proposed frequency tolerance was much tighter, the modulation of the signal in the proposed new service would cause it to consume all of our channel space and thereby interfere with our signals!

4.3 FCC (answer continued):

Second, the proposed narrow band technical requirements are much stricter than current requirements. Thus, a 2.5 kHz frequency separation between land mobile and radio control users should be adequate given modern radio control equipment and the proposed land mobile equipment.

4.4 RC Answer:

NO! Our current state of the art equipment developed under the 1991 stricter standards can only tolerate a signal as close as 10 kHz. If that transmitter was physically close to the RC operations, then 10 kHz may not even be enough spacing. This is from experience with current state of the art RC equipment. One must remember to also take into account the frequency tolerance of both systems, and the space that each modulated signal will consume, not just the center frequency and tolerance of an unmodulated carrier signal of the proposed new service.

4.5 FCC (answer continued):

Third, land mobile operations authorized on the 72-76 MHz band are <u>*not*</u> *car phones. Rather, these channels are used in limited locations such as a factory or construction site, mainly for non-voice operations to monitor or control expensive equipment such as overhead cranes. Model airplane enthusiasts seek clear areas and fields. Thus, the two classes of users rarely notice each other. The proposed technical standards would not change this important fact.*

4.6 RC Answer:

NO! This may be true out in the farm-lands of the Midwest. Here in congested New England, or any other industrialized area of the country, there are not many

This new service should be located in a different part of the spectrum. There is plenty of other spectrum that is available, such as the 220 MHz to 222 MHz spectrum that was recently taken from the Amateur Radio service. Also there are large amounts of unused spectrum in the UHF television channel range. The government is allocated huge amounts of spectrum that is under-utilized. I would think that such operations as proposed in the NPRM should not consider any frequency below 150 MHz to be sure that such operations would not be subject to interference from distant signals that can propagate over large distances during sunspot activity every 11 years.

5.0 FCC Question:

Would the technical rules for the fixed users be changed?

5.1 FCC Answer:

No. We are not proposing technical changes because such changes could have a significant adverse impact on other users, including mobile users and radio control operators.

5.2 RC Answer:

The proposed new channels will have a significant adverse impact on the radio control operators. It will cause operation of our aircraft to be unsafe. Possibly causing someone to be killed when a flying model is interfered with from the proposed new channels, or an overhead crane to go out of control from interference from a nearby RC operator.

6.0 FCC Question:

Would any changes be required of radio control users?

6.1 FCC Answer:

No. Current technical and operational requirements for radio control operations are compatible with the proposed changes for private land mobile radio use.

6.2 RC Answer:

Not True! The current technical and operational requirements of radio control equipment are not compatible with the proposed changes! Our equipment can only tolerate signals that are 10 kHz away from our frequencies. This spacing allows for a reasonable frequency tolerance. Also, the current operation is not mobile (and is fixed). This allows interference to be located and handled with on a case by case basis. When such interference is identified, we can stop using the channels that are interfered with (as required by our current secondary status). If the proposed changes are adopted, we could never be sure where such interference is coming from, so we could not take corrective actions. Also the proposed 2.5 kHz channel spacing would definitely interfere with our operations that frequently occur very close to factories, construction sites, and industrial parks.

7.0 FCC:

Finally, we recognize that our proposed rules are based on the information available at the time we wrote them. We seek constructive information in order to adopt final rules that meet our objectives of expanding capacity for private land mobile radio users with minimal or no harm to all existing users of the spectrum.

7.1 RC Answer:

Yes, we recognize that you may not have reviewed the technical standards of equipment that current RC operators are using or can purchase. Please review our actual operating practices and do not base your decisions on theory. Please consider much of the available spectrum for these new users. If that is not an option, and I don't know why it wouldn't be for a new technology, then please provide spectrum for RC operations as primary users. The new frequencies should provide enough spectrum for us to migrate to in time. It should also be above 150 MHz. Since our models must be kept in sight to allow us to maintain control of them, VHF or UHF frequencies would be ideal. Remember that there are hundreds of thousands of citizens using RC equipment in this country. This must be taken under consideration. We must have primary use of spectrum to insure safety. We would be willing to pay license fee's to be considered primary users, if that is necessary.

We do feel that the FCC is trying to allow for more usable spectrum space by asking users to migrate to narrower channels. This, in general, is a good idea. But plans such as this must take into account us so called 'secondary users'. By our sheer numbers, RC operations can not be ignored. If you must adopt this new narrow band width channel scheme, please provided a place for safe RC operations in one of the following two manners:

- Provide a new frequency band for RC operations to migrate to. Include at least the same number of channels that we currently have allocated (50 channels for aircraft use, and 30 channels for land operations). The new band can safely be of the 5 kHz narrow band specifications, because all equipment manufactured for this band can be designed for this new narrow band width. Also, because there will be no overlapping channels, there will be no problem with interference. This new band should be above 150 MHz to minimize potential interference from ionospheric propagation. Allow 8 years for current RC equipment to be used on the current band. Open the new band for use by RC systems within 2 years. Do not allow the proposed 5 kHz use of 72-75 MHz for 10 years. This will allow all RC operations to migrate to the new band in an orderly fashion with minimum impact on RC users or manufacturers.

- If there is no new band of sufficient spectrum space to provide for an equivalent number of RC channels (80, 5 kHz channels), then do not allow the RC channels to be overlapped by the new 5 kHz channels. Provide for the proposed new channels to be at least 5 kHz from our current channels. This would provide us with non-overlapping interference free 5 kHz channels. Allow the proposed land mobile 5 kHz channels to be used after 10 years. Provide regulations to force a migration of RC equipment to the new 5 kHz channel spacing in at least 8 years. This will insure that by the time that the new land mobile 5 kHz channels are implemented, that the RC industry has had enough time to implement the new technology that is required to operate properly in this new environment.

Either of these schemes will allow the RC operations to continue without problems or undue hardship. The RC industry has just completed a similar change in equipment. In 1991 all RC operations had to become narrow band to allow operation within the 10 kHz spacing that we now enjoy. By allowing a ten year migration period, an undue burden will not be placed on the RC operators. This solution is only feasible if RC operations are provided for directly. Since

We do understand that frequency spectrum is a natural resource. This is similar to real estate. Once all the spectrum is used, more of it can not be manufactured. There is very little spectrum that is allocated for the direct use of the general public. The small amount of spectrum that the radio control operators are using is probably the only organized public use of any spectrum. As our national parks are preserved for the orderly use and enjoyment of the general public, the spectrum allocated for radio control operations should also be guarded and preserved.

Respectfully submitted,

Richard Bono
Assistant Safety Officer,
New Hampshire Flying Tigers RC Club