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Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, DC 20554

In the Matter of	)	
	)	
Allocation of Electromagnetic Spectrum	)	**RM-9797**
Pursuant to Title III of the Balanced	)	
Budget Act of 1997	)	
	)	
Amendment of Part 90 of the Rules to	)	
Establish a New Subpart Y - Personal	)	
Location and Monitoring Service	)	

To: The Chief
Office of Engineering and Technology

REPLY COMMENTS OF ARRL,
THE NATIONAL ASSOCIATION FOR AMATEUR RADIO
IN RESPONSE TO PETITION FOR RULE MAKING

ARRL, The National Association For Amateur Radio (ARRL), by counsel and pursuant to Section 1.405 of the Commission's Rules [47 C.F.R. §1.405], hereby respectfully submits its reply to the February 7, 2000 comments of Microtrax, Inc. (Microtrax), the Petitioner in this proceeding. Microtrax, in its Petition, seeks the allocation of a series of eleven frequency bands for a new Personal Location and Monitoring Service (PLM) to be utilized for location monitoring and identification of persons and objects. Microtrax and ARRL each submitted timely comments in this proceeding; those of ARRL discussed but one of the proposed allocations for this new Service, the 2300-2305 MHz band. ARRL's comments showed that the Microtrax system is incompatible with significant, incumbent Amateur radio operations in that band. In response to the comments filed on or about February 7, 2000 by Microtrax relative to the 2300-

2305 MHz band,[1] ARRL states as follows:

1. ARRL's comments noted that the Microtrax PLM system at 2300-2305 MHz, in terms of its out-of-band emission limits, is incompatible with protection of NASA and other government operations below 2300 MHz which require protection. Indeed, Microtrax vaguely alludes to such in its Petition, at 15, stating that:

> Microtrax believes that PLMS may be able to use this band effectively while meeting the stringent adjacent channel interference restrictions required to protect the Government Deep Space Network receivers on the lower side and the WCS and satellite DARS allocations on the upper side of the band. As suggested earlier, however, some sloping of the out of band emission requirement in the immediately adjacent lower band may be necessary to allow for economically feasible implementation.

What Microtrax means by "sloping", however, is a far more intrusive plan than this reference would indicate, and Microtrax does not mean to suggest that its PLM system can actually meet the emission restrictions imposed in order to protect the Government operations below 2300 MHz. Rather, without saying so directly, it asks to be allowed a substantially greater occupied bandwidth (200% greater) than is available at 2300-2305 MHz. At pages 6 and 7 of its comments, the concept of "sloping" is argued as a means of making the band 2300-2305 MHz, as Microtrax puts it, "inhabitable" (i.e. usable for the operation of its device). The admission is that, without "sloping" at the band edges, the 2300-2305 MHz band would not be a viable candidate for the PLM system.

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[1] The instant Reply Comments address only one aspect of Microtrax' comments: those which discuss the possible emission mask for its use of the 2300-2305 MHz band. The remainder of the Microtrax comments relate to bands other than 2300-2305 MHz, and are thus of no interest to ARRL.

2. "Sloping" should be identified for what it is — emission of energy outside the band proposed to be allocated, into the adjacent allocated band (AOB). Until recently, there has been some confusion on how much energy could permissibly be emitted in an AOB. Fortunately, studies by the International Telecommunication Union Radiocommunication Study Group 1 (spectrum management and monitoring, in which the United States is a participant) have matured to the status of a Draft New Recommendation (DNR) now ready for approval by Study Group and adoption by administrations.[2] The DNR recommends, *inter alia*:

> **1** that the necessary bandwidth, and preferably the overall occupied bandwidth, of any emission should be maintained completely within the band allocated to the service in question, including any offsets such as Doppler shift or frequency tolerances;
>
> **2** that, where other methodologies are not available in existing ITU-R Recommendations, the out-of-band power of an emission falling into the adjacent band allocation should be evaluated and, where appropriate, in order to avoid unacceptable interference into the adjacent allocated bands, this out-of-band power should be reduced for the outermost frequency assignments and/or for out-of-band emissions (Notes 1 and 2);
>
> **3** that the above *recommends* 1 and 2 should be regarded as providing basic requirements and guidance; however for specifically identified cases where more detail is required, this will be a subject of further study;
>
> **4** that the methodology described in Annex 1 should be used as an example of a generic approach to addressing this problem.
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> NOTE 1 — In this Recommendation the term "adjacent allocated band" means the frequency band immediately adjoining (See RR No. S4.5 ...). This Recommendation does not apply to the case in which the adjacent allocated band is used by one administration for the same service.

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[2] The document reflecting the results of these studies is Draft New Recommendation ITU-R SM.[AOB], out-of-band emissions falling into adjacent allocated bands, Revision 1 to Document 1-5/TEMP/150, dated January 11, 2000.

NOTE 2 — For the purpose of this evaluation, when actual measurements are required, care should be taken that, if relevant, the power of spurious emissions, as defined in Recommendation ITU-R SM.329, is excluded.

As far as can be determined, current Commission, IRAC and ITU regulations generally require that the occupied bandwidth (99% of the power) of a system be *within* the assigned band and *within* the allocated band. This means that only 0.5% of the power (-23 dB) could be in each of the lower and upper boundaries of the occupied bandwidth.[3]

4. In addition, there are normally out-of-band (OOB) emission limits, or masks, applicable to most services regulated by the Commission or by NTIA through the IRAC. The OOB region exists between the edge of the necessary bandwidth and 250% of the necessary bandwidth beyond which spurious emission limits are applicable. For practical reasons, relief from the above OOB and spurious limits would require a thorough technical study of potential interference from the Microtrax system to incumbent systems in adjacent allocated bands. The burden would be on the newcomer to prove that it would not interfere with, or place constraints on the future growth of, systems in adjacent allocated bands. Incumbent users in adjacent

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[3] See NTIA, Chapter 6, Definitions, *Manual of Regulations & Procedures for Federal Radio Frequency Management,* and CFR 47 § 2.202, Bandwidths. ITU Radio Regulations Terms and Definitions are:

S1.152 *necessary bandwidth:* For a given *class of emission*, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions;

S1.153 *occupied bandwidth:* The width of a frequency band such that,' below the lower and above the upper frequency limits the *mean powers* emitted are equal to a specified percentage of $\beta/2$ of the *mean power* of a given emission. Unless otherwise specified in an ITU-R Recommendation for the appropriate *class of emission*, the values of $\beta/2$ should be taken as 0.5%.

allocated bands could not be asked to, and could not, accept constraints such as frequency separation (i.e., a guard band just inside the adjacent allocated band), geographical separation (restricting locations where systems in the adjacent allocated band could be located), time limitations, additional filtering, and antenna directivity or polarization requirements on systems. Nor could such constraints be acceptable to new users of the adjacent allocated band. Microtrax is seeking to place the cart significantly before the horse here. Its effort is to seek the allocation without establishing compatibility with either incumbent in-band or incumbent OOB users, either above or below 2300-2305 MHz. What it proposes is essentially a system with a 15 MHz occupied bandwidth in a 5 MHz allocation, and it does not even define the levels of spurious emission outside the OOB segment. ITU-R SM.329 regulates limits for spurious from a given emission into all other bands in the radio spectrum, and it is highly unclear whether the Microtrax system meets those limitations.

5. Of particular concern is the primary allocation to SPACE RESEARCH (space-to-Earth)(Deep Space only) in the band 2290-2300 MHz. In addition, the band is also allocated on a primary basis to government FIXED and MOBILE except aeronautical mobile.[4] The only non-government allocation in the band 2290-2300 MHz is SPACE RESEARCH (space-to-Earth)(Deep Space only), i.e., not to fixed or mobile. Microtrax has not made any technical showing that "sloping" would not interfere with, or constrain, operations in adjacent allocated bands. The comments merely suggest that:

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[4] NTIA's Spectrum Use Summary 137 MHz - 10 GHz (as of August 22, 1997) states: NASA uses this band for Deep Space Network space-to-earth telemetry. These activities support or will support Voyagers 1 and 2, GALILEO, ULYSSES, Cassini (radio science experiment), and other deep space missions. Radio Astronomy observations are also conducted in this band.

> Microtrax will continue to perform its study of this standard and will report its results and conclusions to the Commission as soon as they are available. In the meantime, it requests that the FCC consult with the National Telecommunications and Information Administration and the Indepartmental (sic) Radio Advisory Committee (IRAC) to determine whether the sloped criteria could be adopted.

Microtrax' comments indicate that its system cannot use the band 2300-2305 MHz unless it is allowed to exceed out-of-band emission limits normally required to protect incumbent users below 2300 MHz.[5] Microtrax implies in its explanation of sloping that its system requires at least 15 MHz of bandwidth to accommodate its sloping signal. This is not a reasonable basis for an allocation in a segment that consists of only 5 MHz. Its admission that its device cannot meet the typical emission mask required in order to protect sensitive services below 2300 MHz,[6] coupled with the absence of any technical showing of compatibility makes a convincing case that the band 2300-2305 MHz is simply not wide enough for the Microtrax system, and it is therefore inappropriate.

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[5] When the Commission established the Wireless Communications Service, Part 27 of the Commission's Rules, which would operate in a lower allocated segment of 2305-2320 MHz (5 MHz further away from the protected allocations than the proposed Microtrax PLM system), it imposed a firm out-of-band emission limit of 70 + 10 log (p) on ***all frequencies below 2300 MHz***. See, *Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service,* 6 CR 771, FCC 97-50, released February 19, 1997.

[6] Microtrax, having made no showing of compatibility with adjacent-band users, ignores the fact that the Part 27 WCS, operating above 2305 MHz, is a very flexible service which accommodates fixed and mobile uses generally. Any newcomer to 2300-2305 MHz would have to establish compatibility, therefore, with the wide panoply of potential Part 27 licensees and uses that are likely to be operating at and above 2305 MHz.

Therefore, the foregoing considered, ARRL, The National Association For Amateur Radio, again respectfully requests that the Commission take no action on the instant Petition relative to the 2300-2305 MHz band.

Respectfully submitted,

ARRL, THE NATIONAL ASSOCIATION FOR AMATEUR RADIO

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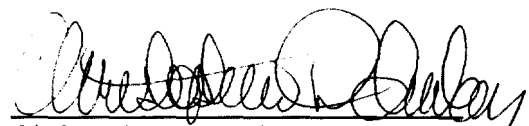
By: 
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February 22, 2000

CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby certify under penalty of perjury that I caused to be served, this 22nd day of February, 2000, via United States Mail, postage prepaid, a copy of the "REPLY COMMENTS OF ARRL, THE NATIONAL ASSOCIATION FOR AMATEUR RADIO IN RESPONSE TO PETITION FOR RULE MAKING" on the following:

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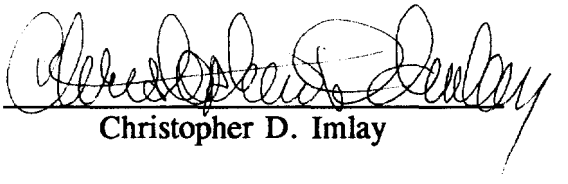

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* - via hand delivery