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FEDERAL COMMUNICATIONS COMMISSION
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February 7, 2000

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 Twelfth Street, SW
12th Street Lobby, TW-A325
Washington, DC 20554

**Re: MicroTrax™ Comments on Petition for Rulemaking
RM No. 9797**

Dear Ms. Salas:

MicroTrax™, by its counsel, pursuant to the FCC's Public Notice Report No. 2376 released January 2, 2000, hereby submits its comments on the petition it filed November 22, 1999 to allocate the electromagnetic spectrum pursuant to Title III of the Balanced Budget Act of 1997 and to establish a personal location and monitoring service.

Should you have any questions with respect to this petition or desire additional information, kindly contact the undersigned at your convenience.

Sincerely,



Gregg P. Skall
Counsel for MicroTrax™

Enclosure



cc by hand: Chairman William Kennard
Commissioner Susan Ness
Commissioner Harold Furchtgott-Roth
Commissioner Michael K. Powell
Commissioner Gloria Tristani
Mr. Dale Hatfield
Mr. Julius Knapp
Mr. Sean White
Mr. Herbert Zeiler
Ms. Ramona Melson
Ms. D'Wana Terry
Dr. Thomas Stanley
Mr. Eugene Thomson
Mr. Michael Pollak

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

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In the Matter of)
)
Allocation of Electromagnetic Spectrum) OET Docket No.
Pursuant to Title III of the Balanced)
Budget Act of 1997) RM No. 9797
)
Amendment of Part 90 of the Rules to)
Establish a New Sub Part Y –)
Personal Location and Monitoring Service)

To: The Commission

COMMENTS OF MicroTrax™

I. INTRODUCTION

On November 22, 1999, MicroTrax (“MicroTrax™”) by counsel and pursuant to Section 1.401 of the Commission's Rules, filed the petition that is the subject of this proceeding with the Federal Communications Commission. That petition seeks to have the Commission commence a rule making proceeding for the purpose of allocating a series of bands of electromagnetic spectrum made available to it by the Federal Government pursuant to Title III of the Balanced Budget Act of 1997 (BBA-97), and to establish a new Personal Location and Monitoring Service to which some of this spectrum will be dedicated.

MicroTrax™ remains committed to that goal and by these comments reaffirms to the Commission its intent to compete for any spectrum allocated pursuant to its petition and that is useful for its proposed Personal Location and Monitoring Service (PLMS). In that regard, it also urges the Commission to proceed with a Notice of Proposed Rulemaking (NPRM) to allocate the spectrum requested in MicroTrax™'s petition, and also to include in the notice, the rules necessary to establish the PLMS. Those rules were appended to the petition and MicroTrax™ reaffirms its continued belief in their validity.

However, we have found an error in our petition and wish to offer further refinements of the technical parameters recommended in the petition.

II. 1385 – 1390 MHz

In the petition, MicroTrax™ recommended the band 1385 – 1390 MHz as one that could be useful for PLMS. It has since been brought to our attention that this band reallocation was cancelled by the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106-65,

106th Cong., 1st Sess. Sec. 1062). That fact was acknowledged by the Commission in its Policy Statement in In the Matter of Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, released November 22, 1999, coincidentally, the same day that MicroTrax™ filed its Petition. Therefore, 1385 – 1390 MHz is no longer available.

III. OUT-OF-BAND NOISE MEASUREMENT IN 2320 – 2345 MHz

The FCC rules often require that out-of-band noise be measured in a one megahertz band. While this may be preferable for the majority of situations, MicroTrax™ believes it would be prejudicial were that standard applied to its proposed service as it might relate to the band 2320 – 2345 MHz. MicroTrax™ will propose a system for PLMS that features emissions with a strong swept tone component. That is, its waveform will be a narrowband signal, rapidly swept in frequency. Therefore, its out-of-band emissions would be expected to also consist mainly of a small number of narrowband (<< 1 MHz) signals sweeping rapidly across the adjacent bands. Laboratory measurements verify this to be so. Each of these signals is within any given one megahertz bandwidth only a fraction of the time that the transmitter is operating. Measurement over wider bandwidth than one megahertz would more properly estimate the real interference potential of any out-of-band emissions from such a system. MicroTrax™ suggests that the proper measurement bandwidth for systems using a swept tone emission pattern is the bandwidth of the individual transponder of the protected systems, i.e., those operating in the band 2320 – 2345 MHz. The allowable out-of-band power would then be scaled to reflect the increase of the measurement bandwidth beyond one megahertz.

Another way of looking at the problem is to examine what the concerns for interference in this band actually are. The matter was addressed in comments filed in 1998 by CD Radio, Inc. (now known as Sirius) regarding the susceptibility of its system to interference from out-of-band sources of radio energy.¹ Its bottom line was that out-of-band systems should not deliver more than –58.6 dBW/MHz at the S-DARS antenna terminal. But, the system they were concerned about was an RF lighting system that would be on all the time. Error correcting coding and time-diversity do not combat this kind of impairment very well. In contrast, systems designed to cope with multipath fading and shadowing should be able to withstand some interfering signals of very short duration. The FCC's rules, for example, provide that fixed wireless communications service (WCS) stations must limit their energy into the DARS band to –80 dBW in any 1-MHz band. Mobile units with a low duty cycle (12.5% or less) using TDMA and meeting certain other requirements need only limit out-of-band power to –93 dBW.

As proposed by MicroTrax™, PLMS portable units will operate at low power levels with relatively inefficient antennas and will often be located next to an absorbing or shielding object, such as in a person's pocket, or will be indoors. Most importantly PLMS portable units will,

¹ Comments of Satellite CD Radio, Inc., in ET Docket No. 98-42, July 8, 1998.

under normal conditions, operate at very low duty cycles. A typical duty cycle for a PLMS unit in the field would be less than 0.01% (a unit operating for 1/3 second every hour would have a duty cycle of 1/10,000 or 0.01%). Even in a worst case situation—say the intense seeking of a kidnap victim or of a stolen object—the duty cycle of the PLMS unit would rise to only a few percent (e.g., a block of four short-duration transmissions closely spaced in time followed by 10 to 30 seconds of no transmission, would permit accurate tracking of a person or object in an automobile).

In contrast, data terminals and telephones, two likely uses for WCS systems, engage in long sessions of more or less continuous activity. The out-of-band emission rules for these systems must recognize that they may be operating continuously in close proximity to an S-DARS receiver.

An appropriate out-of-band protection level for a PLMS user device, therefore, is -80 dBW EIRP measured in a 1-MHz band—the same level as is allowed WCS at several locations in an urban area. While this would solve the dilemma as well, MicroTrax™ believes the best solution is to measure the emissions in the bandwidth of the transponder of the protected systems rather than over every one megahertz.

IV. PEAK POWER

A similar problem exists with measurement at peak power. MicroTrax™ proposed a peak power limit of 4 watts for all of the new bands it would have the Commission allocate, except for those dedicated to PLMS. Those bands should be even more power restricted and MicroTrax™ proposes a maximum of 0.25 watts *average power* limit over a 60-second time interval. Upon reflection, MicroTrax™ believes that using peak power measurement for all bands would improperly apply the peak power levels of the narrowband out-of-band signals across the entire band over which it is swept as if that power level was present simultaneously at all frequencies. That would not be true for a swept signal. Thus, using peak power levels would erroneously record interference where there was none to the extent that the resolution bandwidth used in the spectrum analyzer did not take into account the time that the sweeping emission was present in the one megahertz bandwidth in question. This aberration is compounded to the extent that the out-of-band tones sweep over a bandwidth greater than one megahertz. For example, if the out-of-band tone sweeps over 4 MHz, then it is actually present in any given one megahertz only one-fourth of the time that the transmitter is transmitting. However, integrating the peak power readings over one megahertz would give the same reading as would be obtained if the out-of-band emissions were in only one megahertz, although the average power in the integrated power over one megahertz would be down 6 dB.

Therefore, MicroTrax™ believes that the use of average power for all power measurements would avoid this problem of over calculation of interference when swept emissions are employed. MicroTrax™ recommends that the proposed rules contain the following modification:

When measuring emission levels, the spectrum analyzer may be set to measure average power, provided the transmitter is operating at 100% duty cycle (continuous transmission). If the transmitter cannot be configured for 100% duty cycle, then peak levels shall be measured.

It should be clear that the foregoing continuous transmission method would apply only for test and measurement purposes. In operation, the maximum duty cycles should be 16% over any one-second interval (160 mSec/Sec) and the duty cycle would go down as the interval increased.

V. SLOPING

In its petition, MicroTrax™ also highlighted the need to provide protection relief on the lower side of 2300 MHz if the 2300 to 2305 MHz band was going to be usable. As we said then, the attenuation requirement for adjacent channel protection below 2300 MHz is by any estimation a drastic protection requirement. MicroTrax™ believes that the band could be made inhabitable were the government to allow some gradual sloping toward the $70+10\log(P)$ dB level rather than requiring that it be met immediately at the edge of the band. Unfortunately, MicroTrax™ has not been able to complete its studies of the matter. However, after giving it some thought, MicroTrax™ has developed the following proposal.

On frequencies below 2300 MHz, signals must be attenuated by $X + 10 \log (P)$ dB where P is the highest emission (Watts) of the transmitter inside the authorized bandwidth and $X = 43$ at 2300 MHz, $X = 70$ at and below 2295 MHz, and X varies linearly from 43 to 70 from 2300 MHz to 2295 MHz.

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 Interdepartmental Radio Advisory Committee (IRAC) to determine whether this sloped criteria could be adopted. As we said, MicroTrax™ proposes a very restrictive emission limit and this sloping to the guard band protection limit would make usable this otherwise unusable band. MicroTrax™ urges the Commission to propose a sloping standard in its NPRM so that comment on that proposal may be collected toward the end of adopting a rule in a first report and order.

VI. SPECTRUM

Since the filing of its Petition, MicroTrax™ has been contacted by many potential users of PLMS expressing their support for the service. It is hoped and anticipated that at least some of those will file their comments here. In any event, MicroTrax™ remains convinced that there is a substantial public service that could be met by PLMS and that room should be made for several providers. Therefore MicroTrax™ urges the Commission to issue its NPRM proposing the establishment of the PLMS, adopting all of the service features and rules proposed in MicroTrax™'s petition.

Furthermore, MicroTrax™ again urges the Commission to issue a comprehensive Notice of Proposed Rulemaking that would encompass all of the available bits and pieces of spectrum waiting to be allocated and assigned to allow as many service providers as possible to participate. MicroTrax™ continues to believe that the public interest would be best served by licensing this spectrum in nationwide bands to promote rapid and efficient development of nationwide services. Should the Commission not choose to grant nationwide licenses, we recommend the use of combinatorial bidding to enable users to add maximum value to the bits and pieces of spectrum made available from the government sector and innovatively create a package of spectrum best suited to their unique needs. This would be necessary because there are many individual bands of spectrum that may not be useful alone, but which may be quite satisfactory when combined with another band.

VII. CONCLUSION

MicroTrax™ continues to urge deployment of all spectrum identified in its Petition. Most especially, however, it urges the Commission to proceed with expedience to allocate five of the six bands it requested for PLMS, excluding the sixth, being the band 1385 – 1390 MHz, reclaimed for Federal Government exclusive use. Furthermore, MicroTrax™ urges the Commission to expeditiously issue a Notice of Proposed Rulemaking to establish the Personal Location and Monitoring Service as suggested in its Petition.

Respectfully submitted,

MICROTRAX™

By: _____


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