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

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FEDERAL COMMUNICATIONS COMMISSION  
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In the Matter of: )  
 )  
Amendment of Section 2.106 )  
of the Commission' Rules )  
to Allocate Spectrum for Wind )  
Profiler Radar Systems )

ET Docket No. 93-59  
RM No. 8092

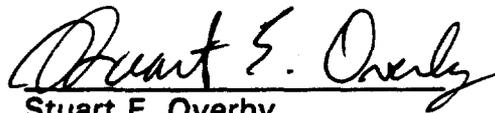
COMMENTS OF MOTOROLA, INC.

Motorola, Inc. ("Motorola") herewith submits its comments in the above-captioned proceeding concerning the allocation of radio spectrum for wind profiler radar systems. In particular, Motorola is concerned that the operation of wind profilers in frequency bands immediately adjacent to UHF land mobile stations poses significant interference concerns. The FCC, in cooperation with the NTIA and other affected industry parties, should develop operational and installation standards for wind profilers that would lessen their interference potential to all adjacent services.

Respectfully Submitted By:



Michael D. Kennedy  
Director, Regulatory Relations  
Motorola, Inc.  
1350 Eye Street, N.W.  
Suite 400  
Washington, D.C. 20005  
(202) 371-6951



Stuart E. Overby  
Manager, Regulatory Programs  
Motorola, Inc.  
1350 Eye Street, N.W.  
Suite 400  
Washington, D.C. 20005  
(202) 371-6940

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## I. INTRODUCTION

In this proceeding, the Commission has proposed to allocate spectrum at 449 MHz for wind profiler radar systems and has also initiated an inquiry on the need for allocating additional spectrum at 915 MHz.<sup>1</sup> Wind profilers are sensitive Doppler radars that measure wind speed and direction and are increasingly used in atmospheric and meteorological applications. Several experimental stations have already been licensed to governmental entities to operate at 404 MHz but the National Telecommunications and Information Agency ("NTIA") now recommends that both government and non-government wind profilers should be assigned frequencies in the band 448 - 450 MHz. Finally, in response to a petition for rule making filed by Radian Corporation, the FCC is soliciting input on the need for an additional non-government allocation for wind profilers at 915 MHz.

As the world's premier manufacturer of land mobile radio equipment, Motorola is concerned that the installation of these high powered devices on the center frequency 449 MHz poses a significant interference threat to private land mobile stations operating at 451 MHz and above. In its Notice, the Commission specifically invites comments on this issue but does not propose to adopt any operational restrictions on wind profilers to reduce their interference potential. In part, the Commission's position is apparently based on an NTIA study that

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<sup>1</sup> Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum for Wind Profiler Radar Systems, ET Docket No. 93-59, 8 FCC Rcd 2546 (1993) ["Notice"].

concludes that wind profilers need only be physically separated by 1.2 miles from a land mobile receiver operating at 451 MHz in order to avoid causing interference.<sup>2</sup> Coupled with the assertion that wind profilers will likely be installed in rural areas, the Commission apparently believes that this relatively small interference zone mitigates against the adoption of specific standards to protect private land mobile stations.

## II. COMMENTS

Motorola's preliminary analysis demonstrates that the NTIA underestimates the interference area created by wind profilers with respect to mobile operations in the 451 MHz range. In addition, there is little guarantee that these devices will not be located in areas of heavy land mobile use. For example, an NTIA report shows the planned locations of several government wind profilers and some of these are very close to populous urban areas such as Chicago, Illinois.<sup>3</sup> Further, it would appear that airports would be ideal locations to install wind profilers in order to

Motorola strongly suggests that the FCC and the NTIA cooperate with affected industry parties to craft operational requirements for wind profilers that lessen their true interference potential to private land mobile operations.

In its electromagnetic compatibility study between wind profilers and broadcast auxiliary stations operating at 450 MHz, the NTIA supplied the following parameters for typical wind profilers:

Peak Transmitter Power	+ 72 dBm
Sideband Rolloff at $\pm$ 2 MHz	- 45 dB
Antenna Gain	+ 32 dBi
Off Axis Gain at 90°	- 25 dB

When measuring the amount of interfering signal likely to be received, it is critical to account for the bandwidth of the subject communications receiver. In Enclosure 2, the NTIA provided a plot of the emission spectra of typical wind profiler transmissions that shows that such signals are attenuated by 45 dB at frequencies 2 MHz from the carrier. Plots of emission spectra are typically made using spectrum analyzers over a 300 Hz bandwidth. However, UHF land mobile receivers typically have bandwidths of 18 kHz and will therefore receive more energy than that suggested by the emission spectra plot. Motorola estimates the difference in interference received to be approximately 18 db. Given all of these parameters, Motorola calculates that wind profilers would emit over 100 watts ERP in the direction of the horizon within a given land mobile receiver bandwidth at 451 MHz.

If we were to allow an interfering signal from the wind profiler as high as the land mobile receiver's static sensitivity, which is 0.5  $\mu$ V or -113 dBm, we can

compute the necessary separation between a land mobile receiver and a wind profiler transmitting 100 watts ERP. Relying on Hata's representation of the Okumura propagation prediction curves, we have calculated the following required separations as a function of the height of the radar transmitter.

Radar Height (ft)	Required Separation (mi)
5.0	8.6
7.5	10.6
10.0	12.3
12.5	13.6
15.0	14.8

These values differ considerably from the fixed separation of 1.2 miles proposed by the NTIA. Part of the apparent discrepancy could lie in the fact that the NTIA did not account for different heights above ground of the radar transmitter or the operating bandwidths of land mobile receivers. In any event, it is clear that high powered wind profilers operating at 449 MHz offer the potential to interfere with land mobile operations at 451 MHz at far greater levels than that suggested by the NTIA.

Motorola's concern with the interference potential of these devices does not necessarily mean that it is opposed to the Commission's proposed allocation. Indeed, wind profilers provide valuable data for a variety of applications and their use should be accommodated in the spectrum. Motorola believes, however, that operational and installation standards should be prescribed by the Commission in order to lessen the interference potential. In particular, it will be necessary to reduce the amount of energy transmitted through the side lobes along the ground.

Solutions range from improved antenna performance to locating the radar in an earthen berm or other energy absorbing structure. Motorola recommends that the FCC and the NTIA discuss such changes with the manufacturers of wind profilers and the mobile communications industry to determine what methods are most useful.

### **III. CONCLUSION**

Motorola supports the Commission's proposals to make spectrum available for wind profiler radars but suggests that the Commission display more sensitivity to protecting critical land mobile operations at 451 MHz. Standards should be adopted that reduce the amount of energy that wind profilers transmit along the surface of the earth in order to lessen their interference potential.

**MOTOROLA, INC**