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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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

In the Matter of	)	
	)	
Amendment of Section 2.106 of	)	ET Docket No. 93-59
the Commission's Rules to	)	RM-8092
Allocate Spectrum for	)	
Wind Profiler Radar Systems	)	

To: The Commission

REPLY COMMENTS OF THE

higher power than will be used in practice. The SBE has additionally learned that Type A wind profilers would never be operated with the higher power (1,500 watts) associated with "high mode" sensing but using the lower pulse repetition rate (6,500 PPS rather than 10,000 PPS) associated with "low mode" sensing, and that therefore it was inappropriate for the SBE to use the low mode out-of-band specification of -31 dBc at ±1 MHz from center frequency for the high mode power level; the appropriate out-of-band suppression for the higher-powered high mode sensing is instead -39 dBc at ±1 MHz from center frequency.

3. The SBE has further learned that the apparent inconsistencies in the NTIA report between the stated wind profiler occupied bandwidth and the occupied bandwidth shown in Figure 3-3 is due to the report's use of a -20 dBc criteria for bandwidth rather than the more commonly used half-power (-3 dBc) criteria. Also, the SBE now understands that the reference to wind profiler emission spectra being equivalent to a 7-pole band filter that is 3 dB down at ±4 MHz from center frequency refers to bandwidth response of the wind profiler antenna array, and not to the wind profiler transmitter.

4. The SBE has also learned that it would make little sense to install a wind profiler in a populated area, as the ground clutter from man-made objects would degrade the results obtained from the wind profiler. The SBE has also learned that 450-MHz wind profilers are only practical for determining wind shear at high altitudes, and would be useless for determining wind shear at the low elevations used by aircraft near airports. Finally, the SBE has been advised that the reports of installation of a 449-MHz wind profiler at Brookhaven airport on Long Island, New York, instead apply to installation of a 6 GHz NEXRAD weather radar.

SBE STILL HAS CONCERNS ABOUT HIGH-POWERED WIND PROFILER RADARS ADJACENT TO THE 450 MHZ RPU BAND

5. Nevertheless, the SBE still has serious concerns about the proposal to install wind profiler radars with an average effective radiated power of 1,479 kW (31.7 dBk) and a peak effective radiated power of 11,481 kW (40.6 dBk) only 1 MHz removed from the Broadcast Auxiliary Remote Pickup (RPU) band. Surely the Commission has learned about the brute-force desensitization problems and out-of-band emission problems caused by co-location or adjacent area location of 460-470 MHz land mobile radio systems with high-powered (5,012 kW peak visual power, 2,506 kW average power) Channel 14 (470-476 MHz) TV stations, and similarly has not forgotten the compatibility problems between full-power UHF TV stations on Channel 69 (800-806 MHz) and trunked radio systems in the 806 to 821 MHz band.

6. Indeed, the incompatibility of high-powered transmitters and low-powered land mobile stations is borne out by the requirement for even moderately powered TV Translator and Low Power Television (LPTV) stations to protect land mobile services now operating on channels previously allocated to UHF TV stations; see Section 74.409 of the FCC Rules ("Land Mobile Station Protection"). If LPTV stations operating with a maximum transmitter power of 1 kW need to protect land mobile stations by providing a safety zone of 130 kilometers, then how can the Commission think that a safety zone of only 5 kilometers (NPRM, at Paragraph 13) is adequate to ensure no interference to mobile and fixed RPU stations only 1 MHz removed from the proposed center frequency of 449 MHz?[1]

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[1] While wind profilers aim their main beam radiation upwards, the transmitting antenna has, at best, 57 dB of suppression 90° off axis; *i.e.*, at horizontal. Thus, the out-of-band effective radiated power for a wind profiler would be 1.8 dBk TPO + 29.9 dBd main beam antenna gain -57 dB for the antenna response at ±90° -39 dB for ±1 MHz removed from center frequency, or -64 dBk. By comparison, a LPTV station could have 0 dBk TPO + ~10 dBd main beam antenna gain -60 dB out-of-band suppression (per §74.736(c)(3)), or -53 dBk, or within 10 dB of the wind profiler case. Of course, if the wind profiler antenna radiation pattern envelope only has to meet the RSEC specification of -40 dBc for 85° to 90°

7. While the revised transmitter power figures and out-of-band suppression figures provided to the SBE by helpful and informed NOAA staff show that the 624-kilometer threat distance calculation given in the initial SBE filings may have been excessive, the revised, NOAA-provided parameters still give a threat distance far in excess of 5 kilometers, as follows:

1.8 dBk average transmitter power in "high" mode

29.9 dBd main beam antenna gain

-57 dB antenna suppression at horizontal

-39 dB bandwidth at ±1 MHz from center frequency

-64.3 dBk effective radiated power at horizontal at 450 MHz

8. This, in turn, gives a distance to the 0 dBu (1 μV/m) contour of 135 kilometers,

404.37 MHz is to eliminate the interference caused to search and rescue satellites (SARSATs) operating at 406 MHz. But the SBE must point out that Broadcast Auxiliary frequencies can also be called into service at any time for safety of life communications by virtue of broadcaster's participation in the Emergency Broadcast System; indeed, the ongoing revision[3] of the entire Emergency Broadcast System has proposed a redundant "web" system that would increase the importance of 450 MHz Broadcast Auxiliary stations to the Emergency Broadcast System. So the SBE again reiterates its observation: how can NOAA, NTIA, or the Commission think that wind profilers that are causing interference to polar-orbit SARSATs 2 MHz removed, with a free space path loss of approximately 138 dB (*i.e.*, corresponding to a slant distance of approximately 400 kilometers), somehow not cause interference to Broadcast Auxiliary RPU stations that would become only 1 MHz removed and with a free space path loss of as little as 86 dB (*i.e.*, corresponding to a separation distance of 1 kilometer)? Surely the greater sensitivity of SARSATs is more than offset by the much smaller free space path loss and the greater wind profiler out-of-band emissions at ±1 MHz removed from center frequency (*i.e.*, -39 dBc)[4] compared to ±2 MHz from center frequency (*i.e.*, -46 dBc).[5]

WIND PROFILER ANTENNA SUPPRESSION MAY BE MUCH WORSE THAN -57 DB AT -90° OFF AXIS

10. The SBE has been provided with several graphs of the gain of the Platteville wind profiler antenna array at horizontal. Two of these graphs are attached to these comments, as EXHIBIT 1. Figure 4-10 to that Exhibit shows that the gain of the profiler antenna at the horizontal varies from 0 dBi (-32 dBc) to -45 dBi (-77 dBc) as a function of azimuth, with mean gain of -25 dBi (-57 dBc). This means that the effective

3 FO Docket 91-171.
4 NTIA Report, Figure 3-3.
5 *Ibid.*

radiated power of an out-of-band interfering signal at 450 MHz could be *25 dB stronger* than the -64.3 dBk figure previously derived, if the unfortunate RPU station happens to be on a bearing of approximately 265° from the wind profiler antenna array! Even Figure 4-11, which is an average of the East, North, and Vertical wind profiler antenna response, shows a peak gain of -7 dBi, or only -39 dBc– a far cry from the stated suppression of -57 dBc.

[redacted]

299 $\mu W/cm^2$ power density contour[6] is 407 meters. The SBE agrees that this poses an exposure threat to hot-air balloonists, hang-glider riders, and similar low-altitude and slow-moving airspace users, where a non-transitory exposure is possible. The SBE therefore believes that the FCC has an obligation under the National Environmental Policy Act (NEPA) to consider whether any wind profiler stations it might authorize, regardless of the exact frequency ultimately selected, are evaluated for compliance with the Commission's radio frequency radiation guidelines.

SUMMARY

14. The SBE appreciates clarifying technical information provided by NOAA staff familiar with the wind profiler program. However, the SBE remains opposed to reallocation of high-powered wind profilers to 449 MHz, only 1 MHz removed from the 450 MHz Broadcast Auxiliary RPU band. If anything, the additional technical details the SBE has learned about wind profiler radars makes it believe that they are an even greater threat to 450 MHz Broadcast Auxiliary systems than originally thought. While it may be too late to stop NOAA from shifting its existing wind profilers to 449 MHz, or even from building additional government owned and operated wind profilers at 449 MHz, the SBE must adamantly oppose the proposed FCC endorsement of this reallocation. FCC denial of the proposed reallocation would at least keep non-federal government wind profiler stations, such as those that might be operated by universities or private contractors, from creating an even larger universe of high-powered, interference-causing stations.

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6 Corresponding to the maximum permissible exposure (MPE) for uncontrolled environments under the new ANSI/IEEE C95.1-1992 electromagnetic energy exposure standard.

LIST OF EXHIBITS

15. The following exhibits have been prepared as a part of these ET Docket 93-59 comments:

1. Reproduction of Page 42, Figures 4-10 and 4-11, showing Platteville ground-level antenna patterns as a function of azimuth

2. Reproduction of RSEC wind profiler elevation pattern gain limits.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

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By
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July 15, 1993

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SBE REPLY COMMENTS TO ET DOCKET 93-59

WIND PROFILER ANTENNA GAIN AT HORIZONTAL AS A FUNCTION OF AZIMUTH

[redacted]

Wind Profiler Measurements

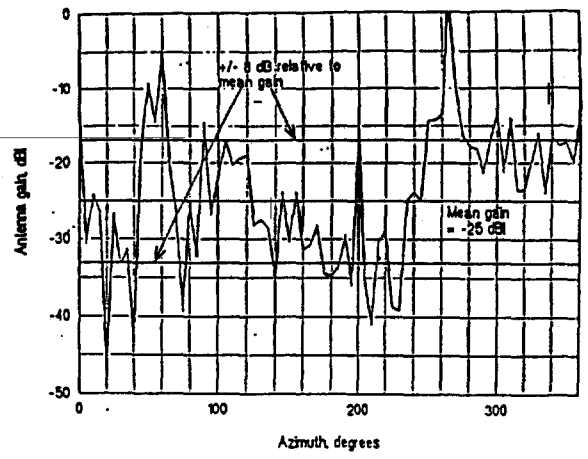
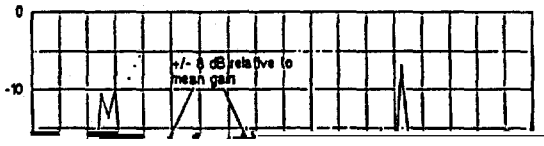


Figure 4-10. Platteville Ground-level Antenna Pattern (Vertical Mode).



[redacted]

SBE REPLY COMMENTS TO ET DOCKET 93-59

RSEC ANTENNA SPECIFICATIONS FOR 449 MHZ WIND PROFILER ANTENNA CRITERIA E APPROVED AT IRAC JUNE 8, 1993, MEETING

ANTENNA GAIN

For elevation angle E, sidelobes of 449 MHz WPR's may not exceed:

Range (deg)	Median (dBi)	Maximum (dBi)
E >= 45	0	12
5 < E < 45	-5	7
E <= 5	-20	-8

EMISSION LEVELS

Levels of Harmonics

For 449 MHz WPR's, harmonics of 449 MHz may not exceed a level 60 dB below the maximum power spectral density in any mode.