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

In the Matter of	)	
	)	
Amendment of Part 22 of the Commission's Rules To Benefit the Consumers of Air-Ground Telecommunications Services	)	WT Docket No. 03-103
	)	
Biennial Regulatory Review – Amendment of Parts 1, 22, and 90 of the Commission's Rules	)	

COMMENTS OF VERIZON WIRELESS

Dated: September 23, 2003

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I. THE COMMISSION SHOULD RETAIN THE AIRBORNE CELLULAR PROHIBITION.

In the Notice of Proposed Rule Making, FCC 03-95, released April 28, 2003, ("NPRM"), the Commission asks whether it should repeal or modify its prohibition against the use of cellular equipment while airborne. The Commission states that there are technological developments that may facilitate the use of cellular equipment on airborne aircraft without causing interference to terrestrial cellular operations or posing aeronautical risks.[1]

Verizon Wireless opposes repeal or modification of the airborne cellular prohibition. The Commercial Mobile Radio Services ("CMRS") industry provides service to over 140 million subscribers.[2] While Verizon Wireless understands the Commission's desire to expand air-ground services, it must be careful not to do so in a manner that will degrade the service that 140 million plus CMRS subscribers depend on.

The airborne cellular prohibition, codified at Section 22.925 of the Commission's rules,[3] was adopted by the Commission in 1991 based on evidence that cellular telephones, when used in airborne aircraft, have a much greater transmission range than

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1 NPRM at 11-12, para. 22.

2 Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 02-379, FCC 03-150, *Eighth Report* (released July 14, 2003), at paras. 17 and 59 (subscriber estimates based on year end 2002 figures) ("Eighth CMRS Competition Report").

3 47 C.F.R. § 22.925.

land-based cellular telephones.[4] In the Airborne Cellular Order, the Commission found that cellular operations depend on frequency reuse -- using the same frequency several times among different cell sites in a market. Frequency reuse is possible in terrestrial applications because the cellular signal is attenuated by obstructions on the land. Airborne cellular transmissions, on the other hand, do not attenuate as rapidly because there are no obstructions. As a result, multiple cells may receive airborne transmissions at the same time thus interfering with multiple cellular transmissions on the land.[5]

While cellular service has changed a great deal since the airborne cellular prohibition was adopted in 1991, the factors the led the Commission to adopt the airborne cellular rule remain the same. Airborne cellular transmissions will be received by multiple cellular base stations on the ground causing harmful interference to terrestrial cellular operations. Moreover, detailed studies that have been submitted to the Commission in a separate proceeding involving AirCell, Inc., conclusively document the harmful effect that airborne cellular transmissions have on terrestrial cellular operations. They show that airborne calls harm terrestrial service, even when steps are taken to minimize the potential for interference. The record in that proceeding confirms the wisdom of the Commission's prohibition of airborne cellular calls. Section 22.925 should be retained.

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[4] Amendment of Section of Part 22 of the Commission's Rules in the Matter of Airborne use of Cellular Telephones and the Use of Cell Enhancers in the Domestic Public Cellular Radio Service, CC Docket No. 88-411, FCC 91-399, *Report and Order*, 7 FCC Rcd 23 (1991) ("Airborne Cellular Order").

[5] *Id.*, 7 FCC Rcd at 23, para. 5.

AirCell is a company that uses the cellular frequencies of its terrestrial cellular carrier partners to provide air-ground communications services to its customers. AirCell claims that it is able to avoid causing harmful interference to terrestrial cellular operations because it uses low transmitter power, horizontal wave polarization, and operates on non-standard control channels.[6] The Commission granted AirCell a waiver of the airborne cellular rule based on these measures and its interpretation of data from test results conducted by AirCell. Verizon Wireless, AT&T Wireless, and Cingular Wireless, have challenged the Commission's decision to grant that waiver to AirCell, because of concerns that AirCell's operations cause harmful interference to terrestrial cellular operations.[7]

Recently, the Commission's Wireless Telecommunications Bureau sought comment on a proposal by AirCell to expand and extend the waiver.[8] In its reply comments submitted in that proceeding, AirCell submitted an analysis of the interference effects of illegal airborne cellular calls prepared by consultant John R. Doner.[9] The Doner Report simulates 1000 illegal cellular calls placed from airborne aircraft overlying

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6 *See* AirCell, Inc. Petition, Pursuant to Section 7 of the Act, For a Waiver of the Airborne Cellular Rule, Or, in the Alternative, for a Declaratory Ruling, FCC 00-188, 15 FCC Rcd 9622, 9623-9624 (2000) ("AirCell Order).

7 *See AT&T Wireless Services, Inc. v. FCC,* 270 F.3d 959 (D.C. Cir. 2001) (*AWS v. FCC*), *remanding AirCell, Inc.,* 15 FCC Rcd 9622 (2000) (AirCell Order), *aff'g AirCell, Inc.,* 14 FCC Rcd 18,430 (WTB 1999) (Reconsideration Order); 14 FCC Rcd 806 (WTB 1998) (Bureau Order).

8 Public Notice, *Wireless Telecommunications Bureau Seeks Comment on Petition Filed By AirCell, Inc. for Extension of Waiver*, DA 03-721 (March 11, 2003).

9 John R. Doner, *An Analysis of the Interference Effects of Illegal Airborne Cellular Telephone Calls*, June 10, 1998, submitted as Appendix B to Reply Comments of AirCell, Inc., Docket No. 02-86 (filed June 9, 2003) ("Doner Report").

terrestrial cellular systems.[10] The Doner Report concludes that "for each illegal airborne cellular call which is placed over an urban cell system at busy hour, 1.7 legitimate AMPS [analog cellular] calls will be degraded or ended, and of those two categories, 16 out of 17 of the degraded calls will be degraded to the level that they must be terminated."[11] In addition, because AMPS systems monitor channels for serious interference and de-allocate channels if such interference is found, Doner concludes that "a single illegal airborne call will adversely affect an average of 3.95 customers, either by seriously degrading their call (usually causing termination), or preventing access to the system in the first place."[12] The Doner Report, therefore, makes clear that the concerns that led the Commission in 1991 to adopt the airborne cellular rule still exist.

The primary issue being debated in the AirCell proceeding is whether the modified equipment used by AirCell and designed to limit interference causes harmful interference to terrestrial cellular operations. In order to prove their harmful interference claims, Verizon Wireless, AT&T Wireless and Cingular Wireless hired V-Comm, a respected telecommunications-engineering consultant, to conduct an extensive independent test of AirCell's interference potential.[13] These test results were submitted by the three carriers in their joint opposition to AirCell's waiver extension request.[14]

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10 Doner defines an illegal cellular call as one placed using a standard 600 mw cellular handset placed from an airborne aircraft. *Id.*, at 4, note 2.

11 *Id.*, at 5.

12 *Id.*, at 6.

13 Verizon Wireless refers to the AirCell test results here to demonstrate the harmful interference effects of airborne cellular transmissions and the need to retain the airborne cellular prohibition. Verizon Wireless does not intend to re-argue the issues raised in the AirCell proceeding in this forum. Nevertheless, because the evidence submitted by

The V-Comm test measured AirCell's interference potential respecting analog, TDMA, and CDMA cellular service. V-Comm conducted a two-phase test to assess the level of AirCell interference, including real-world, representative flight test and drive test data. V-Comm followed up that test with a case study to assess how widely the interference would be felt from a given AirCell airborne transmission.[15]

In Phase 1 of the test, received AirCell signal strengths were measured in flight tests in the New York-New Jersey-Philadelphia corridor, so as to be representative of the signal strength actually received in an area with substantial aviation traffic. First, V-Comm measured the received signal strength of AirCell transmissions under a variety of conditions so as to determine the maximum potential interference levels. Second, V-Comm performed flight tests to measure received AirCell signals in practice. V-Comm found that AirCell signals were received at a wide variety of signal strengths. V-Comm found that AirCell signals are received at levels of -94 to -129 dBm, which are "strong enough to cause harmful interference" to terrestrial calls at typical levels. V-Comm also found that AirCell units are more likely to transmit at high power levels when distant

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Verizon Wireless in the AirCell proceeding is relevant to the proposals raised in this proceeding, Verizon Wireless incorporates filings in that proceeding by reference and asks the Commission to consider those filings in this proceeding.

[14] AirCell Petition for Extension of Waiver, Docket No. 02-86, DA 03-721, Comments in Opposition to Petition for Extension of Waiver (filed April 10, 2003 by AT&T Wireless, Inc., Cingular Wireless LLC, and Cellco Partnership d/b/a Verizon Wireless) ("Cellular Opposition") at 35.

[15] *Id.*, at 35-36, citing V-Comm, Inc. Engineering Report of the AirCell Compatibility Test ("V-Comm Report") at § 9.18 and §§ 2.2-2.2.4 (the V-Comm Report was included as Exhibit II to the Cellular Opposition).

from their serving station and within close range of unaffiliated carriers' receivers, causing harmful interference.[16]

In Phase 2 of its compatibility test, V-Comm injected various levels of simulated AirCell interference into cell site receivers during actual drive tests with analog, TDMA, and CDMA units under real-world operating conditions. The received signal strength during the drive tests closely resembled actual customer usage. This permitted V-Comm to determine the nature and extent of the interference that occurs at various levels of received AirCell interference. No noise was injected during the test; the actual system noise floor was used.[17]

In the analog test, V-Comm concluded that harmful interference at the suburban site clearly occurred at -114 dBm in the drive test, and that calls under less favorable conditions, such as in-building calls or calls in the outer parts of a larger cell, would occur in the -117 to -123 dBm range. In the TDMA test, V-Comm concluded that harmful interference occurred at the suburban test site at levels of -120 to -117 dBm, and that calls made in-building or at the outer parts of a larger cell would encounter interference at lower levels. In the CDMA test, V-Comm concluded that harmful interference is expected to occur within the -114 to -120 dBm range.[18]

Finally, V-Comm conducted a case study of how AirCell usage aboard a typical flight will affect the terrestrial service along its route. V-Comm analyzed a flight path from Dulles Airport to Teterboro (N.J.) Airport, near New York City, to illustrate how

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16 Cellular Opposition at 37-42 citing V-Comm Report at § 3.

17 Cellular Opposition at 43 citing V-Comm Report at § 4.1.

18 Cellular Opposition at 43-60 citing V-Comm Report a § 4.

broadly terrestrial service would be affected, using a variety of antenna and technology variables. For purposes of the case study, V-Comm used -114 dBm to represent the received AirCell signal strength that would be considered harmful interference, because this level unquestionably caused harmful interference effects in its analog, TDMA, and CDMA tests. The case study demonstrates that AirCell will cause harmful interference to a great many cell sites along the flight corridor. For example, if slant-45 receive antennas are used, 223 analog or TDMA cell sites or 1564 CDMA cell sites would receive interference along the corridor, representing 223 analog calls, up to 11,150 TDMA calls, or 31,280 CDMA calls that would receive harmful interference due to a single AirCell unit's operation. If AirCell deployment and usage increases from the current minimal levels, there will be a widespread impact on terrestrial service. For example, there are about 113 commercial flights each day on the same route used in the case study, and thousands of other flights in the same area. Widespread AirCell usage in the Washington-New York corridor would affect hundreds of times the number of calls that the case study showed would receive harmful interference.[19]

The AirCell test results are relevant to this proceeding in two ways. First, the test results demonstrate conclusively that airborne cellular transmissions cause harmful interference to analog and digital terrestrial cellular operations, even when steps are taken to minimize the potential for such interference. Taken together with the Doner Report, these test results present overwhelming evidence that airborne cellular transmissions cause harmful interference to terrestrial cellular operations. Based on this evidence, the Commission must retain Section 22.925 of the Commission's Rules.

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[19] Cellular Opposition at 60-66 citing V-Comm Report at § 6.

Second, the AirCell test results are relevant because they demonstrate that even modified cellular equipment causes harmful interference to terrestrial cellular operations. Thus, contrary to statements in the NPRM, there is no evidence that any technological developments exist that could allow use of modified cellular equipment on airborne aircraft without causing harmful interference to terrestrial cellular operations.[20] Accordingly, the Commission should not modify Section 22.925 to allow any airborne cellular transmissions.

II. THE COMMISSION SHOULD ADOPT AN AIRBORNE RESTRICTION FOR PCS.

Section 22.925 only prohibits airborne transmission on cellular frequencies. There is no parallel provision restricting or prohibiting airborne transmission on personal communications service ("PCS") frequencies. PCS systems, however, like cellular systems rely on frequency re-use and will likely suffer similar harmful interference effects if airborne PCS transmissions are allowed. For this reason, the Commission should take this opportunity to adopt an airborne transmission prohibition for PCS as well.[21]

III. LICENSING REQUIREMENTS AND PROCEDURES.

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20 *See* NPRM at 11-12, para. 22 ("There clearly are significant technological developments that may facilitate the use of such equipment on airborne aircraft without causing interference to terrestrial operations or posing aeronautical risks, as well as heightened interest from the airline industry in permitting such use").

21 Alternatively, the Commission could move the airborne cellular rule to Part 20 of the Commission's rules – pertaining to CMRS – and modify the rule to apply to all broadband CMRS transmissions.

Verizon Wireless supports the proposed conforming amendment to section 22.157 and its recodification as new section 1.958 to state that the results of distance calculations under Parts 21 and 101 must be rounded to the nearest tenth of a kilometer. Applying a single distance calculation method to all Wireless Radio Services will provide regulatory certainty and consistency to service providers licensed under the Part 22 rules. In addition, Verizon Wireless favors the recodification of section 22.159 to Part 1, Subpart F that would standardize the terrain elevation calculation method applicable to all Wireless Radio Services (except the 470-512 MHz band).

IV. OPERATIONAL AND TECHNICAL REQUIREMENTS

Verizon Wireless supports elimination of emission mask requirements given the Commission's trend toward increased reliance on the use of out-of-band emission ("OOBE") limits.[22] However, if these requirements are removed, enforcement of existing OOBE limits will be essential. Verizon Wireless could not support elimination of emission masks absent the continuation of OOBE limits at their current levels. Verizon Wireless supports adoption of OOBE limits for those Part 22 services that are currently not subject to OOBE limits.

The NPRM correctly concludes that the flexibility limitation of section 22.363, *Directional Antennas* and section 22.361, *Standby Facilities – Technical Requirement for Directional Antennas* are no longer necessary given the FCC's current policy of granting flexibility to licensees to allow mobile or fixed operations. Accordingly, Verizon Wireless agrees that section 22.363 and table C-2 to section 22.361 should be eliminated. Similarly, given the current regulatory environment where the Commission allows fixed

[22] NPRM at 17-18, para. 38.

and mobile services to operate on a co-channel basis, the polarization restrictions are no longer necessary or effective in reducing interference. Accordingly, Verizon Wireless favors elimination of section 22.367, *Wave Polarization*.

In addition, Verizon Wireless agrees with the Commission "it is now universally understood in the wireless industry that PMS licensees may operate in-building radiation systems within their licensed geographic areas without prior FCC approval."[23] Verizon Wireless thus concurs with the Commission's tentative conclusion that section 22.383 should be eliminated and that the cross-reference to this section in 22.352(c)(7) should be eliminated.

However, Verizon Wireless asks the Commission to clarify that boosters may only be operated by a licensee or pursuant the licensee's permission and control. Commission action is necessary because there are commercially available boosters that

[23] NPRM at 19-20, para. 45.

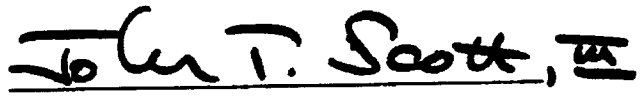
can be purchased and operated by non-licensees without the approval and control of the licensee. These off-the-shelf boosters can cause considerable disruptive interference to licensed cellular networks.

Dated: September 23, 2003

Respectfully submitted,

Verizon Wireless

By:



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