Before the
Federal Communications Commission
Washington, DC 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	)	

To: The Commission

COMMENTS OF CINGULAR WIRELESS LLC

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Cingular Wireless LLC ("Cingular") hereby responds to the Commission's *Notice of Proposed Rulemaking* in this proceeding, FCC 03-95 (April 28, 2003) (*NPRM*), *summarized,* 68 Fed. Reg. 44003 (July 25, 2003).

INTRODUCTION AND SUMMARY

The Commission's review of its air-ground and related rules is being conducted not only as part of the biennial review required by Section 11 of the Communications Act, 47 U.S.C. § 161, but also under the Commission's general authority to adopt rules pursuant to Sections 4(i) and 303(r) of the Act, 47 U.S.C. §§ 154(i), 303(r), to further the public interest objectives of Section 1, 47 U.S.C. § 151.[1] As a result, the Commission must consider: (i) whether the current rules are "no longer necessary in the public interest" in light of competition; and (ii) whether the public interest requires new or changed rules.

One overriding public interest concern is protection from interference. Part 22 spectrum is made available for the provision of service to the public. The service offered to the public cannot be reliable and cannot meet the public's needs if it is subjected to interference. The

[1] *See NPRM* at ¶¶ 1-4, 88.

Commission should tailor its rules to prevent interference that reduces the quality or capacity of service or otherwise makes the service less capable of meeting the public's needs. Presently, the Commission seems to be limiting efforts in this regard to the prevention of "harmful" interference, which it characterizes as repeatedly interrupting or seriously degrading service.

The Commission should take steps to minimize interference to avionics from Part 22 services in the interest of public safety and homeland security. The public is clearly not served if the Commission eliminates rules that enhance air safety by preventing interference with aircraft systems. Likewise, the Commission should also take steps to ensure that terrestrial communication systems the public relies on for public safety reasons are not degraded by interference from airborne transmissions.

The Commission should also further the core public interest objective of efficient spectrum utilization. The public is disserved when spectrum is used in an inefficient way, given the limited spectrum resources available to providers of public telecommunications and information services.

Commercial Air-Ground Rules. The Commission should revisit its commercial air-ground service rules in light of the fact that there is only one licensee using spectrum intended for multiple providers, even as cellular spectrum has been used to provide an alternative form of air-ground service. First, the technical rules for commercial air-ground service should provide sufficient flexibility to facilitate the use of the 800 MHz air-ground band for the air-ground service currently using cellular spectrum pursuant to waivers. The technical rules should also be liberalized to allow licensees to introduce new technology and to provide a wider variety of services than were envisioned over a decade ago. Second, no terrestrial service should be permitted in the commercial air-ground band at this time, due to the potential for interference with safety-critical service. Third, all commercial air-ground service should be located in the

800 MHz spectrum specifically dedicated for that service, and service currently offered via waiver using cellular spectrum should be relocated there, also. Fourth, the Commission should realign the 800 MHz air-ground uplink and downlink bands to be compatible with other 800 MHz services.

Airborne Cellular Usage Ban. The Commission should retain its current ban on airborne use of cellphones. This ban serves two important purposes: prevention of interference with terrestrial cellular systems and avoidance of interference with avionics. There is substantial evidence that airborne transmissions cause widespread interference to terrestrial cellular service even when mitigation measures are employed. There is also evidence that avionics are affected by cellphone use aboard airplanes, and a study is underway regarding the extent of such effects. At this time, there is no basis for eliminating or modifying the ban.

Other Rule Changes. Cingular supports a number of other rule revisions proposed by the Commission, such as codifying standardized methods for calculating distance and elevation, and use of out-of-band emissions limits instead of emission masks.

I. REVISION OF THE COMMERCIAL AIR-GROUND SERVICE RULES

A reexamination of the rules regarding commercial air-ground services is warranted in light of the changed structure of the air-ground industry and the current way in which such services are provided. There is currently only one licensee in the air-ground band authorized to serve commercial aviation, even though the rules permit the licensing of multiple licensees.[2]

[2] There were initially six entities licensed to provide commercial air-ground service, but the rules did not limit the number of licensees to six — the Commission adopted an "open entry" policy under which there was no ceiling on the number of licensees. *See Allocation of the 849-851/894-896 MHz Bands,* GEN Docket 88-96, *Report and Order,* 5 F.C.C.R. 3861, ¶¶ 49-51, 64 (1990) (*Air-Ground Order*), *recon. in part,* 6 F.C.C.R. 4582 (1991). The Commission utilized a single initial filing window, which resulted in six licensees, but reserved the right to open additional filing windows at a later date. *Air-Ground Order* at ¶ 105. Under the open entry

(continued on next page)

Moreover, that band is subject to relatively inflexible technical rules that place significant limitations on the services that can be offered. Cingular offers no specifics about the requisite changes to the technical and operational air-ground rules. Those recommendations may be best left to entities with an interest in delivering such service. Cingular's focus herein is on the interference to existing cellular operations that will be eliminated if the Commission directs AirCell, Inc., to cease operations in cellular frequencies and to set about the process of becoming an air-ground licensee and the interference potential of any terrestrial use of air-ground spectrum.

A. Make the Technical Rules for Commercial Air-Ground More Flexible

When the Commission adopted its commercial air-ground rules, it intended the rules to provide licensees with "substantial flexibility" concerning technology.[3] The standards incorporated in the rules were established to facilitate the initial development of the spectrum, based on 1990's "current technology," but indicated that the standards were "subject to change with the availability of new technology."[4] At the same time, the Commission recognized that by adopting the technical rules that it found necessary for competitive sharing of this spectrum among multiple licensees, "some temporary 'freezing' of technology is inevitable."[5]

That temporary freeze lasted more than a decade. Due in part to the technical limitations imposed on use of commercial air-ground spectrum by the rules and by the incumbent air-ground industry over the last decade, a form of commercial air-ground service is being offered in the

(footnote continued)
policy, each licensee has equal access to all of the channels in the frequency block assigned to a given base station location.

3 *Air-Ground Order* at ¶ 66.

4 *Id.* at ¶ 99.

5 *Id.* at ¶ 69.

cellular band by AirCell, Inc., pursuant to a temporary waiver of Section 22.925 of the rules. [6] AirCell uses capacity purchased from terrestrial cellular licensees to serve modified cellphones aboard general aviation and commercial aircraft. AirCell's use of the cellular band for air-ground service has raised serious concerns among some cellular carriers. The airborne mobile units operate at a considerable distance from the serving base stations and cause harmful interference to co-channel analog and digital cellular operations in the market being overflown.[7]

AirCell has shown that there is some demand for commercial air-ground service that is not being met by the single incumbent commercial air-ground operator. It is unclear, however, how great that demand is — AirCell currently serves about 1400 airborne units and has presented no quantitative estimates of the potential market for its service, but it is only beginning to serve commercial airlines.[8]

In addition, the public's demand for airborne telecommunications has changed over the years. Members of the flying public today have an interest not only in making the voice telephone calls for which the commercial air-ground service rules were designed, but in accessing the Internet for purposes such as sending and receiving email, visiting websites,

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6 *See AirCell, Inc.,* 15 F.C.C.R. 9622 (2000), *remanded in part sub nom. AT&T Wireless Services, Inc. v. FCC,* 270 F.3d 959 (D.C. Cir. 2001), *order on remand, AirCell, Inc.,* FCC 02-324 (Feb. 10, 2003), *petition for review pending sub nom. AT&T Wireless Services, Inc., et al. v. FCC,* Case No. 03-1043 (D.C. Cir. filed Feb. 26, 2003); *see also AirCell, Inc.,* Docket 02-86, Petition for Extension of Waiver, filed March 28, 2002 by AirCell, Inc. AirCell has claimed that the airborne mobile equipment currently used in the commercial air-ground service band is prohibitively expensive and bulky for use in small aircraft. *See, e.g., 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,* at 28 (Oct. 9, 1997) ("This existing equipment is too bulky, heavy, and costly to be practical for most smaller aircraft.")

7 *See, e.g., AirCell, Inc.,* Docket 02-86, Comments in Opposition to Petition for Extension of Waiver, filed April 10, 2003 by AT&T Wireless, Inc., Cingular Wireless LLC, and Verizon Wireless.

8 *See* AirCell, Inc. *ex parte* presentation filed September 4, 2003 in WT Docket 02-86, at 2; *see also NPRM* at ¶15 & n.48.

accessing office networks, and retrieving multimedia content. Some companies are considering offering these types of services via satellite and, thus, will not utilize air-ground spectrum.

Given that there is at least some demand for commercial air-ground service beyond that being provided under the current commercial air-ground service rules, those rules should be revised to give companies, such as AirCell, the incentive and ability to use spectrum dedicated to commercial air-ground service for their service offerings. Moreover, the shift in public demand for capacity from voice-only to voice and broadband data demonstrates that a fundamental reexamination of the technical rules for commercial air-ground service is warranted. Flexible commercial air-ground rules would permit this spectrum to be more efficiently and intensively used. The revisions would have the added benefit of elimination of AirCell's utilization of and interference with spectrum dedicated to terrestrial cellular service.

B. Do Not Permit Terrestrial Service on Air-Ground Spectrum at This Time

While the Commission should grant air-ground licensees additional technical flexibility, it should not allow the use of the air-ground spectrum for terrestrial service, either by the air-ground licensees or by others, at this time. (*See NPRM* at ¶ 20.) As discussed in the following section, there are serious interference concerns arising from concurrent terrestrial and airborne use of the same spectrum, because the technical characteristics of terrestrial and airborne service do not facilitate isolation of the two types of service from co-channel and adjacent channel interference.

The interference concern is especially significant to the extent the air-ground service is used by the public or by aircraft operators for public safety-related purposes. The Commission has long recognized that interconnected air-ground telephone service has important public safety

implications.[9] In fact, the public safety benefits of expanded air-ground service availability were an important justification for the Commission's grant of a waiver to permit AirCell to provide such service over cellular frequencies.[10] In the absence of extensive test data showing that terrestrial use of air-ground frequencies will not diminish the reliability of air-ground service, the Commission clearly should not authorize the provision of terrestrial service on air-ground frequencies and thereby jeopardize its availability for public safety needs.

C. Bar Air-Ground Use of Cellular Spectrum and Transfer All Such Service to the Air-Ground Band

Once the commercial air-ground rules have been revised to provide greater technical flexibility and permit use of the air-ground spectrum by companies such as AirCell, the Commission should terminate AirCell's and any others' existing experimental authorizations and waivers for the use of terrestrial spectrum for air-ground service. AirCell and any other like-minded entity then can move their current or future operations to the 800 MHz commercial air-ground spectrum.

Cellular licensees should *not* be given "greater flexibility to provide various air-ground services" in the cellular band, *see NPRM* at ¶ 22, because of the potential interference that is inevitable when a spectrum band is used for two technically incompatible purposes. The Commission is well aware of the difficulty of "shoehorning" fundamentally incompatible uses of spectrum into a single band. While this may sometimes be necessary, it should be avoided whenever possible. Terrestrial mobile service and air-ground mobile service present such a

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[9] *See Air-Ground Order* at ¶ 18 ("inflight communications can provide an additional means of emergency communications"), *recon. in part,* 6 F.C.C.R. 4582 (1991).

[10] *See AirCell, Inc.,* 15 F.C.C.R. 9622, 9643-44 (2000) (air-ground communications "may provide 'safety-related voice communications between pilots and emergency personnel, and can be used to uplink in-cockpit, up-to-the-minute weather and air traffic information as well as potentially provide in-flight monitoring of airframe and engine operations, serving to better inform ground personnel of aircraft operations.'").

situation. Terrestrial cellular networks are designed to provide service to low-power mobiles located within defined cellular geographic service areas. To accomplish this objective, they utilize a grid of base stations that reuse spectrum intensively, with each cellsite using transmitters and sensitive receivers to cover a relatively small area. Air-ground systems, on the other hand, use base stations located much farther apart, communicating with airborne mobile units that may be located a considerable distance from a base station.

In AirCell's system, for example, the base stations are typically located about 150 miles apart and communicate with mobiles that may be located as far as 80 or 90 miles away. Because AirCell uses spectrum that is allocated for terrestrial cellular service, its airborne mobile units transmit on cellular frequencies while flying in the vicinity of numerous terrestrial cellsites where the same frequencies are used for terrestrial cellular service. Moreover, to overcome radio frequency path loss, its mobiles typically transmit at their highest power when they are most distant from their serving base station. As a result, the airborne mobiles may be transmitting at maximum power when flying near cellsites of unaffiliated cellular carriers where the same frequencies are used by terrestrial mobile units that may be received by the base station at very low signal levels. Cellsite receivers need to be very sensitive to maintain communications with a mobile located indoors or at the outer boundaries of cell coverage. A line-of-sight signal from a nearby airborne unit operating at its maximum power presents a source of potentially harmful interference with weak terrestrial signals. Further aggravating this problem is the fact that the signals from terrestrial mobile phones are subject to severe multipath fading while the signals from the airborne units are not.

The airborne-terrestrial incompatibility problem is compounded by the fact that an air-ground call using cellular spectrum is being made from a moving airplane that passes over and near many terrestrial cellsites, potentially interfering with many calls at multiple locations. A

study by V-Comm, Inc. on behalf of a coalition of carriers showed that a single AirCell call sustained over the course of a flight between airports in the Washington and New York areas would present potentially harmful co-channel interference to hundreds or thousands of cellsites and as many as 31,280 terrestrial calls.[11]

AirCell is currently in a start-up phase with only about 1400 units, and calling volume is light, so the full effect of its operations on terrestrial service has not yet occurred. AirCell claims demand for its service will grow. The inevitable result will be an increasing number of terrestrial calls impaired and/or disrupted by AirCell's operations. In fact, the Commission has acknowledged that AirCell operations can "produce objectionable interference resulting in noisy calls that would be annoying to [a terrestrial] caller."[12]

The Commission should ensure that AirCell's growth does not cause "noisy" calls and "objectionable," "annoying" interference to millions of terrestrial cellular calls, even if such interference does not constitute "harmful interference." The simple fact is that air-ground service is fundamentally incompatible with co-channel terrestrial cellular operations. There is no need for AirCell to use cellular spectrum for this service when it could be operating on unused air-ground spectrum and that operation would not affect terrestrial cellular service. Millions of terrestrial cellular calls should not be subjected to potential impairment or disruption by air-ground calls that could easily be accommodated by moving AirCell's operations to the 800 MHz

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[11] *See* AT&T Wireless, Inc., Cingular Wireless LLC, and Verizon Wireless, Comments in Opposition to Extension of Waiver, *AirCell, Inc.,* WT Docket 02-86, at 65 (April 10, 2003) (*Opposition Comments*), *citing* Exhibit 2, V-Comm, Inc., *Engineering Report of the AirCell Compatibility Test,* § 6.4, Tables 6.4-B and 6.4-C.

[12] *AirCell, Inc., Order on Remand,* 18 F.C.C.R. 1926, ¶ 22 (Feb. 10, 2003), *pet. for review pending sub nom. AT&T Wireless Services, Inc. v. FCC,* Case No. 03-1043 (D.C. Cir. filed Feb. 26, 2003).

commercial air-ground spectrum. AirCell's air-ground service should be moved from cellular spectrum to the air-ground band as soon as possible.

D. Realign the Air-Ground Bands

In addition to revising its air-ground rules to provide licensees with increased technical flexibility, the Commission should consider reversing the uplink and downlink bands for 800 MHz air-ground service. Currently, ground stations transmit in the 849-851 MHz band, while airborne mobile stations transmit in the 894-896 MHz band. In other 800 MHz services, however, base stations use the higher of the two bands allocated for the service, while the mobile stations use the lower paired band.[13] The air-ground service should be aligned with the other 800 MHz services, to promote compatibility with other 800 MHz services and facilitate the introduction of more advanced technology while minimizing the potential for interference.

II. CONTINUE TO BAN AIRBORNE USE OF CELLULAR PHONES

Currently, Section 22.925 of the rules, 47 C.F.R. § 22.925, bars all use of cellular phones while airborne. This rule was adopted specifically to prevent interference to terrestrial cellular systems,[14] but also serves the important public safety objective of helping to safeguard aircraft electronic systems from interference. The rule continues to be necessary for both reasons.

Exhaustive tests conducted by V-Comm, Inc. on behalf of Cingular, AT&T Wireless, and Verizon Wireless, have demonstrated that airborne transmissions in the cellular frequency band have the potential to cause widespread disruption to terrestrial cellular communications.[15] This

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[13] For example, the cellular bands are 824-849 MHz (mobile) and 869-894 MHz (base). *See* 47 C.F.R. § 22.905.

[14] *See Airborne Use of Cellular Telephones,* 7 F.C.C.R. 23, ¶ 4 (1991); Public Notice, *Cellular Units Not Authorized for Airborne Use,* Report No. CL-142, Mimeo 0200 (CCB Oct. 11, 1984).

[15] *See* V-Comm, Inc., *Engineering Report of the AirCell Compatibility Test,* Exhibit 2 to *Opposition Comments.*

is even true for airborne transmissions utilizing AirCell's technology, which AirCell claims is designed to minimize terrestrial interference.[16]

Airborne transmissions from ordinary cellphones would have none of the technical safeguards employed by the AirCell phones and would therefore have a greater potential for interference. A cellphone in the cockpit or near the window of an airborne plane has a direct line of sight to numerous cellular base stations over a wide area. The higher the plane's altitude, the more base stations fall within its line of sight and the greater the potential harm. The phone's signal is likely to be transmitted at the highest power level, due to distance from the cell sites. It can be received at multiple sites within a system, or even at sites in several different systems, simultaneously. As Figure 1 illustrates, there is line of sight propagation between the aircraft and cell sites; it ranges from directly below the plane (elevation angle $\theta = 90°$) to the horizon ($\theta \sim 0°–5°$).

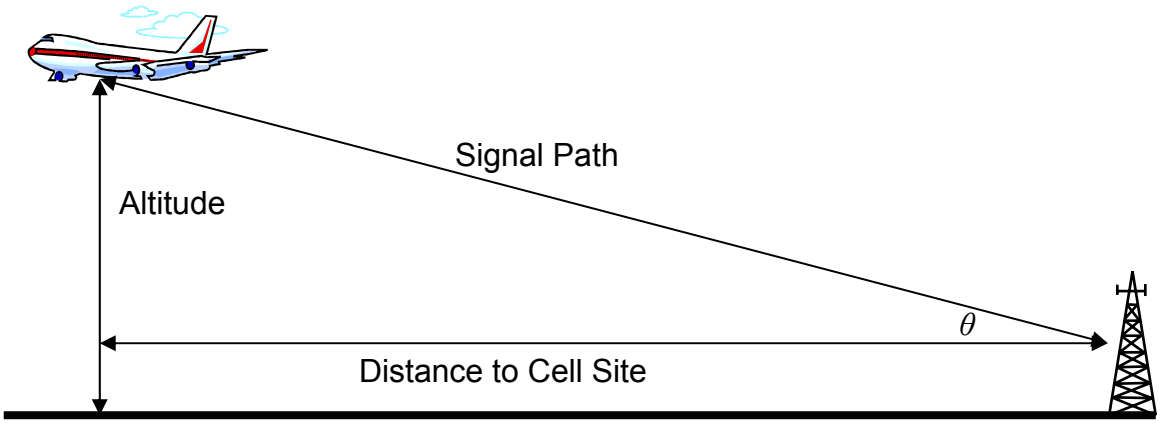


Figure 1. Geometry for propagation from aircraft to terrestrial cell site base station.

[16] AirCell phones transmit at lower power levels than terrestrial phones, and use horizontally-polarized antennas with shaped patterns that are intended to minimize terrestrial interference, among other things. In addition, AirCell transceivers are designed to meet FAA avionics standards, to prevent interactions with aircraft electronic systems.

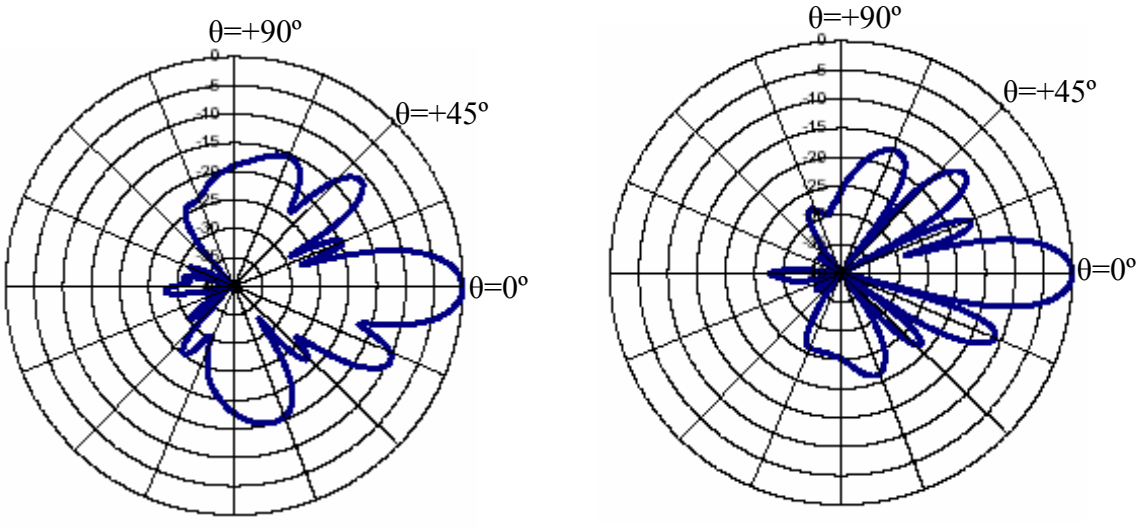
Antennas at the cell site have been selected for terrestrial service and thus have their greatest gain at or near the horizontal plane. Typical antennas used at terrestrial cell sites have significant antenna gain (as high as +14 dBi, or higher), at elevation angles that would be encountered when receiving airborne signals, as shown in Figure 2, below. The elevation-plane radiation patterns, as shown, are plotted as normalized to a relative maximum of 0 dB at an elevation angle of 0º, *i.e.,* at the horizon. The actual peak gain of each antenna is shown below each plot in Figure 2 and must be taken into account when determining the antenna gain in a given direction. For example, by scaling the right hand antenna plot (Allgon Model 7263), the antenna gain at 5º above the horizon is only reduced by approximately 1 dB from its maximum. Thus, at 5º, the gain has decreased from +15 dBi to approximately +14 dBi. Similarly, the antenna pattern on the left (Allgon Model 7390) in Figure 2 would have a gain of approximately +9.5 dBi at a 5º elevation angle.

Even at high elevation angles, there can still be significant antenna gain. Also, while some "nulls" are evident in the patterns, it is quite possible to have antenna gains as high as 0 to 3 dBi at upward-looking elevation angles. Furthermore, in most cases the nulls in an antenna pattern are relatively narrow in terms of angular extent. As shown in Figure 2, over the range of the upward-looking elevation angles the antenna gain is generally between –15 dBi to +15 dBi.[17]

In some cases down tilt is used on terrestrial base station antennas, especially in urban areas, to minimize interference into other terrestrial cell sites. This can result in a slight reduction of received airborne signal strength but only at very low elevation angles. For example, when down tilt is used, the down tilt angle is usually only a few degrees (*i.e.,* 3º-5º)

[17] The radiation patterns, as shown, are plotted as normalized to 0 dB. The actual peak gain of the antenna is shown below each plot in Figure 2.

and, as shown in Figure 2, this would only provide a decrease in the base station antenna gain near the horizon.



Allgon Model 7390
Gain = 10.5 dBi

Allgon Model 7263
Gain = 15 dBi

Figure 2. Example elevation-plane antenna patterns for cellular base stations.

Numerical results for RF propagation loss and received signal strength from an airborne transmitter are shown in Table 1 below. Note that the results are presented for 3 different values of receive antenna gain (+15 dBi, 0 dBi, -15 dBi) to illustrate the range of possible receive signal strength values. As the data show, it is certainly possible that a cellular phone in an aircraft at 35,000 feet can produce significant power levels at a terrestrial base station (*e.g.,* reference sensitivity for a GSM base station receiver is −104 dBm at a carrier to interference ratio of 9 dB). In the data presented in Table 1, a transmit EIRP of 33 dBm (2 Watts) was assumed for the airborne cell phone and a loss of 3 dB was included to account for cables within the terrestrial cell site receive path. In some cases, body losses and other losses in the phone may limit the actual EIRP to only 24-30 dBm. Also, the transmitted signal level may be lower due to propagation losses within the aircraft and/or losses as the signal propagates through the aircraft windows. However, it is quite possible that airline passengers would use their cellphones when seated at the aircraft window in which case the losses would be relatively low. Similarly, cell

phones being used on aircraft at lower altitudes would experience lower path loss resulting in higher signal levels at the terrestrial base station.

Distance to Cell Site (miles)	Elevation Angle (deg)	Free Space Pathloss (dB)	Receive Signal Strength (dBm)		
			Receive Antenna Gain = +15 dBi	Receive Antenna Gain = 0 dBi	Receive Antenna Gain = -15 dBi
0	90.00	-111.42	-66.42	-81.42	-96.42
1	81.38	-111.52	-66.52	-81.52	-96.52
2	73.14	-111.80	-66.80	-81.80	-96.80
3	65.55	-112.24	-67.24	-82.24	-97.24
4	58.77	-112.78	-67.78	-82.78	-97.78
5	52.84	-113.39	-68.39	-83.39	-98.39
7	43.28	-114.69	-69.69	-84.69	-99.69
10	33.37	-116.60	-71.60	-86.60	-101.60
15	23.65	-119.32	-74.32	-89.32	-104.32
20	18.13	-121.50	-76.50	-91.50	-106.50
30	12.20	-124.77	-79.77	-94.77	-109.77
40	9.09	-127.18	-82.18	-97.18	-112.18
50	7.16	-129.08	-84.08	-99.08	-114.08
100	3.05	-135.04	-90.04	-105.04	-120.04

Table 1. Analysis of the signal path and received power from an airborne cell phone (altitude = 35,000 ft., frequency = 836 MHz, EIRP = 33 dBm).

Clearly, airborne cellphone use should not be permitted unless and until measures are in place to ensure that the signal from an airborne cellphone will not reach terrestrial base stations. Proponents of this type of service, such as AirCell, must be required to demonstrate how this could be accomplished. It would be impracticable to rely on handsets that include special technology to limit power while airborne. Obviously, handsets without such technology would still be used by members of the public, who would unknowingly attempt to use their ordinary handsets while airborne.

An on-board picocell could theoretically be used to communicate with the passengers' phones and keep their transmit power at the minimum level. However, this would only be able

to control the transmit power of the phone if the phone effectively "roamed" onto the picocell before attempting to transmit to terrestrial systems. If the phone recognized one of the terrestrial signals as being from a "home" or "preferred" system, it would attempt to communicate with the terrestrial cell site at full power, rather than with the on-board picocell. In addition, the on-board picocell would have to employ multiple technologies (*e.g.,* analog, TDMA, GSM, CDMA) and operate on both the cellular and PCS bands, to ensure that it will be visible to the many types of cellphones that may be brought aboard an aircraft.[18]

AirCell has suggested that phones could be prevented from communicating through terrestrial sites, and instead could be controlled by the on-board system, if the aircraft uses "blocking" and "jamming" devices to mask the existence of the terrestrial sites.[19] The Commission has made clear, however, that such devices may not be used.[20] The signal emitted by such devices could not be prevented from leaking out of the aircraft cabin and potentially interfering with terrestrial cellular service. Moreover, the operation of such devices, which are transmitters operating in the cellular band, would not be permissible except under the control of the cellular licensee where they are operated.

Air safety concerns also justify keeping the rule. There are significant unanswered questions about the degree to which cellphones may interfere with aircraft electronics. In the

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[18] The picocell could not rely only on analog cellular technology, because many phones do not have 800 MHz analog capability. Likewise, it could not employ only one specific digital technology, because phones using other technologies would attempt to communicate with stations on the ground instead of the picocell.

[19] *See* AirCell, Inc., *Personal Cell Phone Use Inflight,* presentation by Steve Cutbirth, Director, Airline Sales, AirCell, Inc., to WAEA Technical Committee, July 30, 2002, at 10, 31 (submitted to the FCC by AT&T Wireless, Inc., Cingular Wireless LLC, and Verizon Wireless as Exhibit A to their Emergency Petition for Declaratory Ruling, filed August 29, 2002).

[20] *See AirCell, Inc., Order,* 17 F.C.C.R. 19586, ¶ 4 (WTB 2002) ("We take this opportunity to emphasize that intentional jamming or interfering with other radio signals would constitute a violation of the Communications Act.").

United Kingdom, the Civil Aviation Authority recently issued a study of cellphone interference with aircraft avionics that found "various adverse effects," including freezing the aircraft's compass, destabilizing indicators, causing significant VOR errors, and causing background noise on audio outputs.[21] The CAA paper recommended that the U.K. continue to prohibit cellphone use in aircraft.[22] Similar occurrences of interference to aircraft avionics have been reported in other countries.[23]

The U.S. aircraft manufacturer Boeing has also tested cellphones' potential to interfere with avionics. It summarized the results as follows:

> Boeing conducted a laboratory and airplane test with 16 cell phones typical of those carried by passengers, to determine the emission characteristics of these intentionally transmitting PEDs. The laboratory results indicated that the phones not only produce emissions at the operating frequency, but also produce other emissions that fall within airplane communication/navigation frequency bands (automatic direction finder, high frequency, very high frequency [VHF] omni range/locator, and VHF communications and instrument landing system [ILS]). Emissions at the operating frequency were as high as 60 dB over the airplane equipment emission limits, but the other emissions were generally within airplane equipment emission limits. One concern about these other emissions from cell phones is that they may interfere with the operation of an airplane communication or navigation system if the levels are high enough.[24]

Moreover, RTCA, Inc., which acts as an advisory committee to the Federal Aviation Administration, has established a committee to study the interference potential of personal

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21 Civil Aviation Authority, Safety Regulation Group, *Effects of Interference from Cellular Telephones on Aircraft Avionic Equipment,* CAA Paper 2003/3, at v (April 30, 2003), *available at* <http://www.caa.co.uk/docs/33/capap2003_03.pdf>.

22 *Id.*

23 Ian Gerard, *Mobiles Ring Out Air Warning,* The Australian, Sept. 15, 2003, *available at* <http://www.news.com.au/common/story_page/0,4057,7267895%255E401,00.html>.

24 Boeing Co., *Aero,* No. 10, *Electromagnetic Interference from Passenger-Carried Portable Electronic Devices* (2003), *available at* <http://www.boeing.com/commercial/aeromagazine/aero_10/interfere.html>.

electronic devices, including current-generation cellphones and picocells. RTCA expects to release a report on the first phase of its tests, which will include cellphones, in January 2004;[25] a later report will address newer technologies, including picocells and ultra-wideband devices. The FAA will rely on this report in its ongoing reassessment of its rules regarding personal electronic device usage on aircraft.[26]

Given the documented adverse effects of cellphone interference on avionics, there is no legal basis upon which the Commission could eliminate or modify its rule at this point. Indeed, the PCS rules in Part 24 should be expanded to include the prohibition on the airborne use of wireless handsets.

Elimination of the prohibition in section 22.925 of the Commission's rule would be misinterpreted by some members of the public as a signal that it is safe to use cellphones aboard aircraft. Unless and until there is undisputed evidence that this is the case and the FAA concludes that there is no safety-related reason to restrict airborne cellphone use, the Commission should defer to the FAA's expert judgment, which is that the prohibition should remain in place.

III. OTHER ISSUES

A. Elimination of "Common Carrier" References

The Commission has proposed eliminating several references in Part 22 to licensees as common carriers, and replacing such references with the word "licensee" or its equivalent. Cingular supports these proposals. (*NPRM* at ¶¶ 24, 28, 30, 36, 77.)

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[25] *See* RTCA, Inc., SC-202, Portable Electronic Devices, <http://www.rtca.org/comm/-sc202.asp>.

[26] *See NPRM* at ¶ 11.

Part 22 licensees may often be common carriers, but they should not be so limited. In many cases, Part 22 licensees act as information service providers rather than as common carriers, and the rules should be amended to eliminate any specific common carrier requirement.

B. Elimination of "Radio Common Carrier" and "Wireline Common Carrier" Definitions

Cingular supports the deletion of the definitions of "Radio Common Carrier" and "Wireline Common Carrier" from Section 22.99. (*NPRM* at ¶ 29.) These terms are obsolete.

C. Computation of Distance and Elevation

Cingular supports the Commission's proposal to codify standardized methods for computing distance and elevation. (*NPRM* at ¶¶ 32-34.) Given the universal use of computers for computing distances, it would be prudent to require the computation of distances to the nearest 0.1 km. The most accurate method for computing distances is the "Great Circle Route" method, which assumes a spherical earth. Most distance and bearing calculation programs already use this method. Accordingly, this method should be incorporated into the rules.

D. Emission Masks vs. OOBE

The Commission has sought comment on possible revision or elimination of emission mask-based rules (Sections 22.357, 22.359, and 22.861 of the rules), and reliance on out-of-band emission (OOBE) limits, as in the cellular and PCS rules. (*NPRM* at ¶ 38.) Cingular agrees that OOBE limits should replace emission masks. Accordingly, Sections 22.357, 22.359, and 22.861(a)-(b) should be eliminated, and Section 22.861(c) should be revised to reflect OOBE limits.

CONCLUSION

With respect to the commercial air-ground service, the Commission should

- revise its rules to:
  - realign the bands for compatibility with other 800 MHz services, and
  - allow more technical flexibility;
- require all air-ground service to be in specifically designated air-ground bands;
- move air-ground service currently offered in the cellular band to the air-ground band; and
- retain the airborne cellular usage ban because it both protects terrestrial service from interference and promotes air safety.

Respectfully submitted,

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