

**Before The  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

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

**COMMENTS OF QUALCOMM INCORPORATED**

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## SUMMARY

QUALCOMM Incorporated (“QUALCOMM”) applauds the Commission for initiating this proceeding to improve air-ground telecommunications service for American consumers. The technology can be developed to provide 3G-type, high speed, advanced broadband data and voice services to airborne subscribers, and there appears to be strong demand for these services. However, there is not sufficient dedicated, paired spectrum available to deploy this technology.

Consequently, there is a substantial need for an allocation of a significant amount of dedicated, paired spectrum below 6 GHz to enable the provision of advanced broadband data and voice services to airborne subscribers. As noted in the NPRM, several airlines have expressed interest in these services, and consumer demand is likely very strong, given that the terrestrial wireless carriers who have deployed 3G services in the United States and around the world have experienced tremendous subscriber growth and usage.

To meet this need, QUALCOMM believes that the FCC should allocate at least 60 MHz of paired spectrum below 6 GHz for next generation air-ground service. The public interest warrants such an allocation because of the apparent substantial demand for these services and the benefits they would bring to the American public. In addition, this allocation is necessary because the current allocation of just 4 MHz in the 849-851 and 894-896 MHz bands is woefully insufficient and is subject to overly intrusive technical rules. For a licensee to provide broadband data and voice services nationwide with sufficient capacity to serve what is likely to be a growing number of subscribers requires much more spectrum than 4 MHz and requires channels that are much wider than the 6 KHz channels required by the FCC’s rules for the 4 MHz of 800 MHz spectrum. For all of these reasons, the FCC should allocate at least 60 MHz of paired spectrum below 6 GHz to enable Americans to enjoy vastly enhanced air-ground services.

The FCC should divide the new allocation into three 20 MHz paired blocks to give each licensee sufficient bandwidth and should not impose the type of highly restrictive licensing and technical rules as govern the 849-851 and 894-896 MHz bands. Those rules severely limit the potential uses of those bands. The licensees of the new spectrum should have the greatest possible flexibility in designing their networks. Finally, after the new allocation is made, the 849-851 and 894-896 MHz bands could be vacated and reallocated for a more appropriate use.

Turning to the ban on the airborne use of cellular phones in Section 22.925 of the FCC's rules, the purpose of that rule, to prevent harmful interference to terrestrial cellular networks, remains valid today, and the Commission should retain the rule. In fact, the Commission should prohibit the airborne use of PCS phones to provide similar protection against harmful interference to terrestrial PCS networks. Indeed, the Commission should review its rules to ensure that all personal electronic devices brought on to airplanes do not cause harmful interference to terrestrial wireless networks operating on licensed spectrum.

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**COMMENTS OF QUALCOMM INCORPORATED**

QUALCOMM Incorporated (“QUALCOMM”), by its attorneys, hereby submits its Comments in the above-captioned proceeding initiated by the Commission in its Notice of Proposed Rule Making, FCC 03-95, released April 28, 2003, (NPRM), to consider changes to the Commission’s rules to improve the air-ground telecommunications services available to the public on commercial airplanes. See NPRM at ¶1.

**I. Introduction**

QUALCOMM is pleased to respond to the NPRM and to provide the Commission with its views as to how the Commission can modify its rules to enable the American public to benefit from vastly improved, state-of-the-art air-ground telecommunications services. The technology can be developed to provide 3G-like, high speed, advanced broadband data and voice services to airline passengers, and QUALCOMM believes that the consumer demand for this service is likely strong, based on the demand to date for these same types of wireless services provided now to terrestrial subscribers. What is lacking to enable the provision of these exciting new

services to airborne subscribers is a sufficient amount of dedicated, paired spectrum below 6 GHz and a set of flexible technical rules to govern the use of that spectrum. QUALCOMM hopes that the Commission will allocate such spectrum expeditiously in this proceeding and looks forward to working with the Commission in this effort.

By way of background, QUALCOMM is a world leader in developing innovative digital wireless communications technologies and delivering and enabling products and services based on the digital wireless communications technologies that it develops. QUALCOMM's code division multiple access ("CDMA") technology is America's fastest growing digital communications technology. Due to its unsurpassed voice quality, system capacity, spectral efficiency, privacy, and inherent flexibility, QUALCOMM's CDMA technology is the basis for all third generation ("3G") wireless products and services, which to date have been deployed by 57 carriers based in the United States and 29 other countries around the world.<sup>1</sup> These products and services based on 3G CDMA enable wireless data to be sent and received at very high speeds: the first release of 1xRTT, which has been deployed here in the United States by Sprint PCS, Verizon Wireless, ALLTEL, US Cellular, and other carriers, enables data to be sent and received wirelessly at peak rates of 144 kbps, and the first release of 1xEV-DO, deployed here by Monet Mobile and soon to be deployed commercially by Verizon Wireless in Washington, DC and San Diego, enables data to be sent and received wirelessly at peak rates of 2.4 mbps, a speed that is comparable to wireline broadband technologies such as cable modems and DSL.

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<sup>1</sup> As of August 31, 2003, 23 of those operators have reported that they already have a total of 59 million subscribers for 3G CDMA services. Moreover, the 57 carriers who have deployed networks based on 3G CDMA are based throughout North and South America, Europe, Asia, Australia, and New Zealand. Information about the proliferation of 3G CDMA networks is updated periodically and available at [www.3gtoday.com](http://www.3gtoday.com).

Thus, QUALCOMM's 3G CDMA state-of-the art technology enables subscribers to enjoy high speed wireless data service.

Moreover, QUALCOMM develops applications itself and works with other third party developers to ensure that subscribers to its 3G CDMA technologies enjoy a wide variety of exciting, innovative, and useful applications. QUALCOMM's CDMA technology is used in both terrestrial and satellite-based wireless networks, and QUALCOMM broadly licenses its CDMA technology to over 100 leading handset and infrastructure equipment manufacturers around the world.

QUALCOMM has a particular interest in ensuring that enhanced air-ground telecommunications are available to airborne subscribers. As wireless phones and other devices based on 3G CDMA continue to proliferate here in the United States and elsewhere, millions of subscribers are relying on them for ubiquitous service. These subscribers want to be able to enjoy the same high speed wireless data services and high quality voice services wherever they go, which is one of the great benefits of a CDMA-based terrestrial network.

Accordingly, while QUALCOMM believes that it is essential for the Commission to ensure that terrestrial networks receive any and all the necessary protection from harmful interference from air-ground communications, QUALCOMM also believes that it is important that the Commission take the necessary steps set forth herein to make it possible for wireless subscribers to enjoy high quality, advanced, 3G-like broadband data and voice service on while flying on airplanes, without causing any harmful interference to terrestrial networks, through the allocation of a sufficient amount of dedicated, paired spectrum. The Commission should be able to achieve both of these objectives in this proceeding.

## **II. The FCC Should Allocate At Least 60 MHz of Dedicated, Paired Spectrum Below 6 GHz to Enable the Provision of Next Generation Air-Ground Service, Including Broadband Data and Voice Service**

To improve air-ground service, and specifically to make available to airline passengers a service even approaching the type of high speed, broadband wireless data service now available to wireless subscribers from terrestrial networks, an allocation of at least 60 MHz of dedicated, paired spectrum below 6 GHz is required. The public interest strongly favors the FCC making this allocation for the reasons already discussed and amplified as follows.

### **A. There Is Substantial Interest and Demand for Next Generation Air-Ground Service**

The NPRM itself describes substantial interest in enhanced air-ground service. As the NPRM explains, a number of airlines are exploring a variety of technologies for enhancing communications during flight, including the deployment of technologies which would enable airborne passengers to surf the Internet. NPRM at ¶16. These technologies are, however, extremely limited, and none entails the provision of high speed data service to airline passengers. The technologies being considered by the airlines include: 1) satellite-based technology, which is extremely expensive to deploy; 2) an enhanced version of Verizon Airfone's present air-ground service provided in the 849-851 and 894-896 MHz bands, which is constrained due to the narrow channels required by the Commission's rules and the small amount of bandwidth and which does not entail high speed data service; 3) Bluetooth or other 802.11 unlicensed technology, which are not yet integrated into most handsets and which could cause harmful interference; and, 4) AirCell's system, which is not yet authorized by the Commission for digital service and which, according to the analyzes previously filed with the Commission by Verizon Wireless, Cingular, and AT&T Wireless, will cause harmful interference to terrestrial cellular networks.

Consequently, there is definitely a great deal of interest in the provision of enhanced air-ground service. However, the technologies which are available under the Commission's existing spectrum allocations and other technical rules are quite limited and will not deliver high speed, broadband data service.

There is additional evidence that consumer demand for high speed, broadband service for airborne subscribers is high, namely the growing demand for high speed, broadband data services for terrestrial subscribers. For example, Sprint PCS has been offering its 3G CDMA Vision data service on an all-you-can-eat basis since November 2002, and already had over 2.1 million subscribers for the service as of June 30, 2003. Likewise, as of June 30, 2003, Verizon Wireless reported that subscriber usage of its 3G CDMA Express Network continues to increase substantially.

Accordingly, the demand for high speed, broadband data service from the terrestrial carriers who can provide such service is growing, and there is every reason to believe that the subscribers enjoying these services also want to be able to enjoy them while traveling by air or to be able to receive communications from co-workers or loved ones who are traveling by air. Thus, the Commission should conclude that there is substantial interest in and demand for the provision of high speed, 3G-type broadband data service to airborne subscribers.

**B. The Current Allocation of 4 MHz at 800 MHz Will Not Enable Anyone to Offer Next Generation Air-Ground Service**

The present allocation of 4 MHz of spectrum at 849-851 and 894-896 MHz, the only allocation of dedicated spectrum for air-ground service, is simply insufficient for the provision of high speed, 3G-type broadband data and voice service to airborne subscribers. For a licensee to provide broadband data and voice service with sufficient capacity to provide service to subscribers on airplanes all over the country will require considerably more spectrum than 4

MHz. No terrestrial carrier could provide these services to its subscribers with only 4 MHz. Indeed, no terrestrial carrier operates with less than 10 MHz of paired spectrum in any given market, and the six major nationwide terrestrial carriers all have double, triple, or a higher multiple of that in most of their markets around the country. There is no avoiding the plain fact that the Commission has to allocate much more dedicated, paired spectrum below 6 GHz to achieve the objective the Commission set forth for this proceeding in the NPRM, namely to enhance the options for air-ground telecommunications service on commercial airplanes for the public. NPRM at ¶1.

The technical rules governing the 849-851 and 894-896 MHz bands also prevent it from being used to offer broadband data service and thus consign any data service offered on the bands to a low speed service. Pursuant to § 22.857 (a) (2) (ii) of the Commission's rules, 47 C.F.R. § 22.857 (a) (2) (ii), the communications channels for any network using this spectrum to serve commercial airplanes can be only 6 KHz wide. By contrast, the channels in a CDMA network are 1.25 MHz wide, over 200 times wider. Likewise, the channels in a WCDMA network, the 3G technology many GSM operators are opting to deploy, are 5 MHz, over 800 times wider than the channels required by § 22.857 (a) (2) (ii). Finally, even in a GSM network, a 2G network which is not capable of providing high speed wireless data service, the channels are 200 KHz wide, over 23 times wider than the channels required by § 22.857 (a) (2) (ii). No digital communications network would have sufficient capacity to provide high speed wireless data service to a growing customer base with 4 MHz of spectrum and channels that are only 6 KHz wide.

Consequently, the current allocation of 4 MHz in the 800 MHz band, governed by FCC rules which mandate that the channels be only 6 KHz wide, is simply insufficient to permit the

provision of high speed wireless data and voice services to the large number of wireless customers who would be interested in such services. To improve the existing options available to airline passengers who want air-ground telecommunications services, the FCC must allocate a much greater amount of dedicated, paired spectrum below 6 GHz and put in place a set of technical rules which are sufficiently flexible to permit the deployment of state-of-the-art wireless technology.

**C. The Commission Should Allocate At Least 60 MHz of Dedicated, Paired Spectrum Below 6 GHz for Next Generation Air-Ground Service**

As we have shown, an allocation of substantially more paired, dedicated spectrum below 6 GHz is required to enable the provision of 3G-type broadband data and voice service with sufficient capacity to serve a growing base of subscribers in airplanes all over the country. QUALCOMM believes that the Commission should allocate at least 60 MHz of such dedicated, paired spectrum for this purpose. Such an allocation would foster competition by allowing multiple licensees to provide new enhanced air-ground data and voice services. Such an allocation would also ensure that each licensee has sufficient spectrum for current needs and future growth.

It is important that this allocation be of a sufficient amount of paired, dedicated spectrum. As already noted, no terrestrial carrier provides 3G-type services in any single market with a license for less than 10 MHz, and the Commission should certainly allocate enough spectrum for multiple carriers to compete in the market for enhanced air-ground services. Given the expected demand for these services, and the concomitant need by the carriers for capacity, the public interest favors the Commission allocating 60 MHz so that three licensees would each have 20 MHz.

It is equally important that this allocation be of dedicated spectrum. These type of services cannot be provided on any kind of widespread basis as either an underlay or an overlay within spectrum used for any other purpose. There would be harmful interference to any other service using the same spectrum as these new enhanced air-ground services. No carrier provides 3G services here in the United States or anywhere else on an unlicensed or secondary basis or as an underlay or overlay. American airline passengers deserve ubiquitous broadband data service, not coverage with a limited capacity that cannot cover all flights or that cannot provide service to meet the growth in subscribers that can be expected over time for this kind of innovative service.

Likewise, it is also important that this allocation be below 6 GHz. Spectrum above 6 GHz does not have sufficient propagation to permit the provision of these services. Again, no one provides a non-satellite based 3G-type service here in the United States or elsewhere by using spectrum above 6 GHz, and, similarly, QUALCOMM believes that spectrum below 6 GHz is required for the economic provision of 3G-type services to airline passengers. In particular, the absorption by water in the atmosphere makes the use of frequencies above 6 GHz for air-ground service impractical.

For all of these reasons, QUALCOMM urges the Commission to allocate 60 MHz of dedicated, paired spectrum below 6 GHz to enable the American public to enjoy competitive, next generation, state-of-the-art air-ground telecommunications services.

**III. The Commission Should Divide the New Allocation Into Three Blocks of 20 MHz of Paired Spectrum and Establish Flexible Technical Rules to Govern Use of the Spectrum**

If the Commission does allocate 60 MHz of paired, dedicated spectrum as QUALCOMM believes the public interest warrants, the Commission should ensure that the new spectrum is divided into blocks of sufficient bandwidth to permit multiple licensees to provide service, as

already discussed, and the Commission should not burden the licensees of the new spectrum with the type of overly rigid technical rules which have plagued the licensees in the 849-851 and 894-896 MHz bands. QUALCOMM believes that, as to the first issue, the Commission should provide for three equally sized blocks of 20 MHz of paired, dedicated spectrum. That will ensure that the American public benefits from competition in the provision of these new services.

As to the second issue, the technical rules to govern this new spectrum, given that the new technology is still on the drawing board and given further that use of the existing 4 MHz of 800 MHz spectrum is limited due to the rigid channelization and other technical rules, as already shown, QUALCOMM believes that the Commission should allow the licensees of the new spectrum allocation with the greatest possible flexibility in designing their networks.

In devising technical rules for this new spectrum allocation, the Commission should apply its firmly established policy of technology neutrality, a policy that has enabled CDMA as well as competing wireless air interfaces to develop and flourish, to this new allocation and not impose a particular technical scheme on the licensees. The marketplace, not government fiat, should decide which technologies become viable for the provision of next generation air-ground telecommunications services. The public interest lies in the establishment of a flexible set of technical rules, using the Part 27 model, to govern the new allocation of spectrum for air-ground services.

#### **IV. The Commission Should Retain Section 22.925 to Protect Terrestrial Cellular Networks From Harmful Interference to Their Operations on Their Licensed Spectrum**

The NPRM initiates a reexamination of the Commission's rule prohibiting the airborne use of cellular phones, 47 C.F.R. § 22.925, in light of technological developments. NPRM at ¶22. In conducting the reexamination, the Commission should maintain the overriding public

interest goal of protecting terrestrial cellular networks from harmful interference because many millions of Americans rely on these networks every day and because the carriers have invested billions of dollars in these networks.<sup>2</sup>

QUALCOMM believes that the airborne use of cellular phones would cause harmful interference to terrestrial cellular networks. The Commission's original rationale for adopting § 22.925 continues to be valid today. The use of off-the-shelf cellular phones in aircraft would cause harmful interference to terrestrial cellular base stations operating in licensed spectrum and thus impair the ability of Americans on the ground to use their cellular phones. For this reason, the public interest strongly warrants continuation of the general prohibition on the airborne use of cellular phones.

Moreover, as the NPRM notes, there is no corresponding ban on the airborne use of PCS phones, and QUALCOMM believes that the Commission should remedy that omission in the Commission's rules. See NPRM at ¶11. The Commission's rules for PCS should contain the same protection against harmful interference to PCS terrestrial base stations from the airborne use of PCS phones as is provided in the FCC's cellular rules to protect cellular base stations against harmful interference from the airborne use of cellular phones. The American public relies both on terrestrial cellular and PCS networks, and the carriers have made and continue to invest billions of dollars to construct and operate these networks. There is no sound reason to protect cellular networks, but not PCS networks, from this harmful interference.

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<sup>2</sup> As the NPRM recognizes, the issue within the Commission's purview, whether the use of cellular phones causes harmful interference to terrestrial cellular networks, is not the only issue relating to the possible use of cellular phones in airplanes. The FAA must separately consider whether such use would cause harmful interference to navigation systems, an issue which the RTCA is now studying.

