

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
Service Rules for Advanced Wireless Services) WT Docket No. 02-353
In the 1.7 GHz and 2.1 GHz Bands)
)

To: The Commission

REPLY COMMENTS OF ARRAYCOMM, INC.

ArrayComm, Inc. (ArrayComm),¹ submits these reply comments in response to the Federal Communications Commission’s (Commission or FCC) *Notice of Proposed Rulemaking (NPRM)* in the above-captioned proceeding.²

I. INTRODUCTION

In its initial comments in this rulemaking, ArrayComm addressed two primary concerns: whether a technology neutral band plan was likely to emerge from this proceeding and whether the absence of spectrum aggregation limits should compel consideration of incentives to encourage more efficient use of spectrum by licensees. After reviewing the comments of other parties, ArrayComm remains convinced that unpaired spectrum must be allocated, if not here then elsewhere, if mobile broadband services with their attendant efficiencies are to have a chance to enter the marketplace. Likewise, ArrayComm continues to believe that spectral

¹ ArrayComm, Inc. is the world leader in smart antenna technology. ArrayComm’s patented IntelliCell® technology – based on fully adaptive smart antennas – creates dedicated personal cells of voice or data for wireless subscribers. IntelliCell technology is also the key ingredient behind ArrayComm’s innovative i-BURST™ system – the only wireless Internet access system that offers the freedom of mobility with the high-speed of DSL at consumer pricing. The company has more than 200 patents issued or pending worldwide.

² Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Notice of Proposed Rulemaking*, FCC 02-305 (rel. Nov. 22, 2002) (*NPRM*).

efficiency metrics and targets can and should be developed, especially where licensees are not subject to spectrum aggregation limits.

II. BOLD ACTION BY THE COMMISSION IS REQUIRED TO PROMOTE DEPLOYMENT OF EFFICIENT MOBILE BROADBAND SERVICES.

In its initial comments, ArrayComm noted with approval the FCC's query whether it should adopt a band plan consisting of paired spectrum bands, ideal for wireless voice services employing Frequency Division Duplex (FDD), unpaired bands more suitable to asymmetrical data transmission using Time Division Duplex (TDD), or a combination of both.³ ArrayComm, a leading proponent of unpaired allocations before the FCC and throughout the world, believes that TDD-based technologies provided over unpaired spectrum will permit the provision of mobile broadband services that will far exceed the data rate of any third generation mobile service envisioned for the foreseeable future and at a cost competitive with today's fixed dialup data services. A wireless enclave within the 90 MHz under consideration would go a very long way toward jump-starting the mobile broadband market and ArrayComm urges the FCC to take that courageous step.

Ultimately, however, ArrayComm concluded that wireless telecommunications industry politics and recent history of FCC and NTIA efforts regarding spectrum allocation made the likelihood of an AWS band plan containing even a small unpaired portion, let alone a significant one, extremely remote. Given this situation, ArrayComm's alternative request was that the FCC expeditiously identify and allocate appropriate unpaired spectrum specifically for TDD services.

³ *NPRM* at ¶ 31.

The majority of commenting parties in this rulemaking urge the FCC to license the 90 MHz of spectrum at issue for PCS-like services.⁴ Other parties assume that a PCS-like spectrum configuration and conforming technical rules will be the outcome of this proceeding.⁵ Several FDD proponents also specifically oppose the combination of TDD and FDD technologies within the AWS spectrum, asserting concerns over potential interference between the two transmission modes.⁶ These arguments are the basis upon which the FDD proponents insist that the 90 MHz of spectrum must be divided into symmetrical band pairs.

Of course these arguments are advanced routinely where spectrum of any sizable amount is made available for commercial services.⁷ FDD proponents hide behind “flexible allocations” and “technology neutrality” as well as “marketplace forces” to establish a rationale for their concept of the broadest potential use of new spectrum. In essence, of course, it is a charade; they know that political or economic influence will lead to the result they desire: more paired spectrum for more of the same “mostly voice and a little data” service. The Commission, however, has a

⁴ See Comments of Rural Cellular Association, WT Docket No. 02-353 at 2-4 (filed Feb. 7, 2003) (RCA Comments); Comments of United States Cellular Corporation, WT Docket No. 02-353 at 3-7 (filed Feb. 7, 2003) (US Cellular Comments); Comments of Motorola, Inc., WT Docket No. 02-353 at 2-5 (filed Feb. 7, 2003) (Motorola Comments); Comments of Lucent Technologies, WT Docket No. 02-353 at 1-3 (filed Feb. 7, 2003) (Lucent Comments); Comments of Ericsson, Inc., WT Docket No. 02-353 at 2-3 (filed Feb. 7, 2003) (Ericsson Comments); Comments of AT&T Wireless Services, Inc., WT Docket No. 02-353 at 3-7 (filed Feb. 7, 2003) (AT&T Wireless Comments); Comments of Cellular Telecommunication & Internet Association, WT Docket No. 02-353 at 3-5 (filed Feb. 7, 2003) (CTIA Comments); Comments of Nokia, Inc., WT Docket No. 02-353 at 1-3 (filed Feb. 7, 2003) (Nokia Comments); Comments of Verizon Wireless, WT Docket No. 02-353 at 3-5 (filed Feb. 7, 2003) (Comments of Verizon Wireless);

⁵ See Comments of National Telecommunications and Information Administration, WT Docket No. 02-353 at 2 (filed Feb. 7, 2003) (NTIA Comments); Comments of Fred R. Goldstein, WT Docket No. 02-353 at 1-2 (filed Feb. 7, 2003).

⁶ See, e.g., Motorola Comments at 5-8; Lucent Comments at 1-2; AT&T Wireless Comments at 8; Nokia Comments at 1-2.

⁷ Actually, since the advent of cellular service in Docket No. 18262, allocations of spectrum have followed an identical pattern: the spectrum has been uniformly paired for public voice communications. Thirty years ago the Commission was responding to a new, almost revolutionary development in mobile communications. Today, carriers and their suppliers raise the same arguments that were advanced then (and which have been repeated in every subsequent proposal for more spectrum since, most recently with respect to the 700 MHz bands and the MMDS and ITFS bands). Surely the time has come for the Commission to re-examine these arguments and subject their present-day applicability (or lack thereof) to fresh scrutiny.

broad mandate: it has a public interest responsibility and it must not ignore the benefits mobile broadband services offered over unpaired “TDD spectrum” would bring to consumers.⁸ As ArrayComm noted in its initial comments, only TDD-based technologies have demonstrated the ability to meet the cost and performance parameters necessary to offer mobile broadband services to consumers.⁹ ArrayComm reiterates its request that the FCC initiate an inquiry to expeditiously identify and allocate appropriate spectrum for TDD technologies and services, consistent with the “Good Neighbor” Incentive recommendation of the Spectrum Policy Task Force.¹⁰ Such specific action, instead of leaving mobile data technologies to subsist on tiny slivers of spectrum or the uncertain landscape of unlicensed spectrum, is a necessary and important step toward the deployment of competitive mobile broadband services.

III. SPECTRAL EFFICIENCY METRICS AND TARGETS SHOULD BE CONSIDERED WHERE SPECTRUM AGGREGATION ARE ABSENT.

The Commission tentatively concludes that spectrum aggregation limits are unnecessary with respect to AWS. In its comments, ArrayComm urged the Commission to recognize that the adoption of more efficient technologies is driven either by spectrum starvation, *i.e.*, the inability of spectrum users to acquire additional spectrum, or government mandate. Neither of those forces is at work in today’s mobile wireless market. Since the mid-1990s the trend has been as follows: large mobile voice carriers request more spectrum and the FCC and NTIA work diligently to find and provide it to them. If carriers may acquire spectrum without limits, should they not be held to some standard other than the ability to win the spectrum at auction?

⁸ See Comments of ArrayComm, Inc., WT Docket No. 02-353 at 3-4 (filed Feb. 7, 2003) (ArrayComm Comments).

⁹ See “Spectrum: Applications, Trends, and the Crunch for Spectrum,” presented by Nitin Shah, Chief Strategy Officer, ArrayComm, Inc., to the September 18, 2002, meeting of the FCC Technological Advisory Council, http://www.fcc.gov/oet/tac/Nitin_Shah_9.18.02_Tac_Talk_Final.pdf (slide 16).

¹⁰ *Spectrum Policy Task Force Report*, ET Docket No. 02-135, (rel. Nov. 2002) (*SPTF Report*), at 22.

ArrayComm's suggestion that the FCC should impose greater requirements and responsibilities on licensees as they acquire more spectrum may not be a popular one with the dominant mobile carriers and their suppliers. And ArrayComm acknowledges the difficulty of determining where to draw the line between the rules proposed in the *NPRM* and additional, perhaps more stringent, requirements as to spectral efficiency. Should the Commission require greater spectral efficiency of a carrier that amasses, for example, 35 percent of the AWS spectrum in a geographic area? Or is 50 percent the correct trigger? And how should spectral efficiency be defined and measured?

Certainly, these are complex questions. However, can they be any more difficult than the development of interference immunity performance specifications for radio receivers, as the Commission has recently decided to investigate?¹¹ Can development of spectral efficiency metrics be any more complex than the development of techniques and measures to implement the “interference temperature” concept promoted by the Spectrum Policy Task Force?

As ArrayComm explained in its initial comments in this matter:

It is true that a single metric and a single performance level will not be appropriate for all services. One metric may be required for voice systems, *e.g.*, simultaneous calls/Hz/cell. Another may be required for data services, *e.g.*, bits/second/Hz/cell or bits/second/Hertz/km². All two-way commercial and consumer services — which use a significant portion of the spectrum actively managed by the Commission — could certainly be organized into a small number of categories for which meaningful spectral efficiency metrics could be created and used to determine not only the baseline performance of today's systems, but achievable targets for future systems.¹²

In fact, in its inquiry into radio receiver standards the Commission is expected to consider different requirements for different service categories, *i.e.*, public safety, satellite, mobile, fixed

¹¹ FCC News Release, “FCC Begins Inquiry Regarding Interference Immunity Performance Specifications For Receivers” in ET Docket No. 03-65 (rel. March 13, 2003).

¹² ArrayComm Comments at 6.

terrestrial and broadcasting. For these reasons, ArrayComm believes reasonable and appropriate spectral efficiency metrics can and should be developed for AWS, and other mobile services. The Commission must simply develop to will to do so. And then the industry will have to demonstrate that it, too, has the will to address this issue seriously and in depth.

IV. CONCLUSION

Although ArrayComm is skeptical regarding the likelihood of a band plan containing unpaired spectrum conducive to TDD-based technologies emerging from this proceeding, that doubt should not be interpreted as opposition. Inclusion of unpaired bands within the instant AWS spectrum would be a major leap forward for mobile broadband service in the United States. ArrayComm would certainly support such action by the FCC. However, should the Commission conclude that it cannot in this proceeding diverge from the interests of the dominant wireless players, it still must commit to address to needs of mobile broadband soon. Like mobile voice service before it, mobile broadband has great promise and merits policies and actions to promote its success. ArrayComm urges the Commission to embark on such policies and action now.

Spectral efficiency metrics and targets must not be ignored or put off simply because their development will be complex. Particularly as large industry players are permitted to amass spectrum without limit, greater emphasis must be placed on its efficient use. Efficiency metrics and targets will create incentives for service providers to more quickly adopt innovative transmission techniques and technologies. And ultimately, the consumer will reap the benefits of efficient spectrum use. For these reasons, ArrayComm reiterates its request that the Commission

initiate an inquiry toward development of techniques to measure and improve the efficient use of spectrum.

Respectfully submitted,

ARRAYCOMM, INC.



By:

Bradley P. Holmes
Senior Vice President, Regulatory
and Government Affairs

Randall S. Coleman
Vice President, Regulatory Affairs
ARRAYCOMM, INC.
2300 N Street, NW, Suite 700
Washington, DC 20037
(202) 383-3355

Leonard S. Kolsky
LUKAS NACE GUTIERREZ & SACHS
1111 19TH Street, NW, Suite 1200
Washington, DC 20036
Of Counsel

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