

Before the  
Federal Communications Commission  
Washington, D.C. 20554

In the Matter of	)	
	)	ET Docket No. 00-258
Amendment of Part 2 of the Commission's Rules	)	
To Allocate Spectrum Below 3 GHz for Mobile and	)	
Fixed Services to Support the Introduction of New	)	
Advanced Wireless Services, including Third	)	
Generation Wireless Systems	)	
	)	
Petition for Rulemaking of the Cellular	)	
Telecommunications Industry Association	)	RM-9920
Concerning Implementation of WRC-2000:	)	
Review of Spectrum and Regulatory Requirements	)	
For IMT-2000	)	
	)	
Amendment of the U.S. Table of Frequency	)	RM-9911
Allocations to Designate the 2500-2520/2670-	)	
2690 MHz Frequency Bands for the Mobile-	)	
Satellite Service	)	

**COMMENTS OF ERICSSON**

**EXECUTIVE SUMMARY**

Ericsson fully supports the FCC's efforts to manage spectrum allocations to allow for the introduction of 3G and advanced wireless services. While Ericsson concurs with the FCC that it need not allocate spectrum specifically for 3G, it believes that the FCC should optimize the opportunities for 3G as much as possible. The FCC must allocate a sufficient amount of spectrum to each operator *and* a sufficient amount of total spectrum to achieve its policy goals,

including encouraging effective competition, innovation in advanced services, greater efficiency in spectrum utilization, and global harmonization.

Ericsson recommends that the FCC allocate a larger amount of spectrum initially, achieved by combining elements of Options One and Three, and phase-in additional spectrum over ten years. 3G operators must be able to license 2 x 15 MHz, with sufficient duplex gap, to offer customers optimal performance, including smaller, more economical handsets; high speed data transmission capability for full 3G services as well as high-speed mobility. Further, by allocating at least 120 MHz of bandwidth initially, the FCC will create a competitive and innovative marketplace where four operators can provide service to customers. Ericsson recommends the following band allocations, consistent with its Global Roaming Plan:

PHASE (AVAILABILITY)	SPECTRUM BANDS	CHARACTERISTICS
Phase 1 (2003)	1710-1770 MHz as UL and 2110-2170 MHz as DL	Allocate new spectrum for advanced services, incl. 3G
Phase 2 (2005-2008)	1770-1850 MHz (or parts thereof) as UL and 2500-2690 MHz (or parts thereof) as DL	Add capacity for incumbents and/or add new entrants Add asymmetric allocation if required by market
Phase 3 (2009)	1990-2025 MHz as UL and 2170-2200 MHz as DL	Depending on market conditions, consider adding 3G mobile allocation in MSS bands
Phase 4 (beyond 2010)	1850-1990 MHz as UL	Market-based transition of PCS band-plan

By designating 1710-1770 MHz as uplink and 2110-2170 MHz as downlink, the FCC will immediately create the potential for a regional uplink and a common global downlink, permitting a higher degree of spectrum harmonization and economies of scale. In years 2005-

2008, by adding all or part of 1770-1850 MHz as uplink and all or part of 2500-2690 MHz as downlink, the FCC will enable existing 3G operators to increase offerings and new competitors to enter the market, in a manner that complements the initial allocations and segments the bands most efficiently. Finally, by planning for further allocations in the year 2009 now, such as by considering bands 1990-2025 MHz as future uplink and 2170-2200 MHz as future downlink, the FCC will ensure it is able to meet projected spectrum need.

Ericsson's proposed allocations also minimize relocation issues and create a win-win situation for current licensees. Ericsson's Phase 1 allocations have largely been already identified for reallocation, and this spectrum is in the process of becoming available for mixed commercial use. In the Phase 2 allocations, incumbent operators can be transitioned from current spectrum and should be compensated from auction proceeds for relocation costs.

Alternatively, incumbents who give up part of their spectrum can be given the ability to expand their service offerings to provide 3G services.

By adopting a spectrum management plan like Ericsson's Global Roaming Plan, the FCC will proactively ensure that the U.S. remains a world leader in the development of new advanced services. The FCC will take important steps toward remedying existing global spectrum fragmentation problems and creating greater global spectrum harmonization. It will also ensure that it meets industry and customers' needs over the longer term so that 3G services can evolve to their highest efficiency, capability and availability.

## TABLE OF CONTENTS

I.	ERICSSON'S GLOBAL AND U.S. QUALIFICATIONS.....	1
II.	SUMMARY .....	1
	A. The Global Movement .....	2
	B. The FCC Must Maximize 3G Opportunities.....	2
	C. The FCC Must Refine Its Proposal To Achieve Its Policy Objectives .....	3
	D. The Ericsson Global Roaming Plan .....	5
III.	THE FCC MUST SATISFY BOTH SERVICE REQUIREMENTS AND SPECTRUM NEEDS IN ITS ALLOCATION OF SPECTRUM.....	6
	A. The FCC Must Immediately Allocate A Sufficient Amount Of Spectrum Which Is Compatible With IMT-2000 Standards And Permits Global Roaming And Economies Of Scale .....	6
	1. New allocations to support 3G services must be implemented now; Cellular and PCS spectrum is insufficient for 3G services .....	7
	2. Increasingly more spectrum will be needed to meet market demand for 3G services .....	7
	3. Appropriate allocations will increase spectrum and equipment efficiency.....	8
	4. Appropriate allocations are imperative to the commercial availability of 3G services.....	9
	5. All spectrum allocations must be compatible with IMT-2000 standards.....	10
	B. A global downlink will facilitate global roaming of 3G services and improve the quality and cost of equipment	11
	C. The FCC Must Provide Adequate Blocks Of Spectrum To Initial Operators And Sufficient Spectrum Over Time.....	13
	1. Appropriate spectrum blocks per licensee .....	13

2.	Initially, 1710-1770 MHz as uplink should be paired with 2110-2170 MHz as downlink to increase commonality, availability of services and competition.....	14
3.	In the mid-term, the FCC should utilize all or part of 1770-1850 MHz as uplink and all or part of 2500-2690 MHz as downlink to increase spectrum .....	15
4.	The FCC should consider further spectrum allocations by the year 2009 to meet further market demand.....	17
IV.	CONCLUSION.....	18

## **I. ERICSSON'S GLOBAL AND U.S. QUALIFICATIONS**

Ericsson hereby submits comments in response to the above-referenced Notice of Proposed Rulemaking (“NPRM”) issued by the Federal Communications Commission (“FCC”) on January 5, 2001. Ericsson is a major supplier of Third Generation (“3G”) advanced wireless technologies and has been selected to supply 3G systems in more 3G agreements than any other company to date. Ericsson occupies a strong position as a global mobile systems provider – more than 33% of all mobile subscribers in the world are connected by Ericsson systems. In addition, Ericsson’s supplier agreements are based on a variety of globally accepted 3G standards. As a result, Ericsson has first hand, “technology-neutral” global experience with 3G systems, and is committed to supporting research and development in 3G technologies.<sup>1</sup>

At the same time, Ericsson is a major participant in the U.S. market, its largest national market. Roughly 10% of Ericsson’s employees are in the U.S. and 12% of its revenues are in the U.S. Thus, Ericsson is uniquely well-positioned to offer its comments regarding current and future needs for 3G technologies and spectrum planning.

## **II. SUMMARY**

The instant NPRM arises from the FCC’s efforts to designate radio frequency spectrum to address current and future needs for mobile voice, high-speed data and Internet-accessible wireless capability, as well as other needs.<sup>2</sup> The demand for spectrum that can support these services has increased dramatically as a result of explosive growth in the communications

---

<sup>1</sup> Ericsson has the world’s highest R&D ratio, equivalent to 15% of Ericsson’s sales. During the past five years, Ericsson’s research and development has increased an average of 21% annually.

<sup>2</sup> On October 13, 2000, President William Clinton issued an Executive Memorandum encouraging the FCC to identify 3G systems by July 2001 and auction licenses by September 2002.

industry.<sup>3</sup> The FCC seeks to promote the availability of new advanced wireless services and increase competition among terrestrial services in a manner which allows markets to evolve efficiently to meet the needs of industry.<sup>4</sup>

#### **A. The Global Movement**

The FCC takes these actions within a broader global context. The International Telecommunications Union (“ITU”) and other international initiatives have recognized the need for additional spectrum to foster the development of advanced wireless or International Mobile Telecommunications–2000 (“IMT-2000”)/3G systems.<sup>5</sup> The ITU has identified a number of frequency bands and developed radio interface standards to be used to implement 3G services.<sup>6</sup> In other Regions, regulatory bodies have already allocated spectrum and instituted policies and procedures designed to facilitate the wide deployment of IMT-2000/3G or comparable services.<sup>7</sup>

#### **B. The FCC Must Maximize 3G Opportunities**

Ericsson fully supports the efforts of the FCC to allocate and manage spectrum use in order to allow the introduction of 3G and advanced wireless services. The FCC’s delineation of Options for spectrum allocation is a positive and important step toward fulfilling the immediate needs of industry<sup>8</sup> and consumers for additional spectrum consistent with its obligations under § 706 of the 1996 Telecommunications Act.<sup>9</sup> However, in order to meet the growing need for spectrum that can support 3G services, the FCC must allocate more spectrum initially and plan

---

<sup>3</sup> See NPRM ¶ 2.

<sup>4</sup> *Id.*

<sup>5</sup> See NPRM ¶ 3.

<sup>6</sup> ITU World Radio Conference 2000, Resolution 223 [COM5/24].

<sup>7</sup> See, e.g., NPRM ¶ 24, fn. 47.

<sup>8</sup> Industry refers to telecommunications operators and manufacturers.

<sup>9</sup> See NPRM ¶ 1.

for mid-term and long-term spectrum needs. A long-term spectrum management approach will minimize the need for future relocations.

In addition, although the FCC does not wish to define “advanced wireless services” or “3G services” in this proceeding, Ericsson believes that 3G Mobile will emerge as the dominant advanced wireless service because it presents the most compelling business case.<sup>10</sup> Very simply, 3G Mobile services maximize the use of spectrum to improve the efficiency and availability of services and thus make spectrum, which can support these services, more valuable. Therefore, while the FCC need not make allocations specifically for 3G, it should optimize opportunities for 3G Mobile services to the highest extent possible. For these reasons, Ericsson’s comments focus on spectrum needs for 3G services.

### **C. The FCC Must Refine Its Proposal To Achieve Its Policy Objectives**

To ensure that the FCC’s spectrum allocation initiative more fully achieves its own long-range policy objectives,<sup>11</sup> Ericsson recommends the following general refinements in the FCC’s allocation proposals, which are reflected in Ericsson’s Global Roaming Plan:<sup>12</sup>

---

<sup>10</sup> The FCC does not want to limit or restrain the development of new technologies and services that will benefit consumers by defining “3G” or “advanced wireless services.” *See* NPRM ¶ 18.

<sup>11</sup> *See* Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, FCC 99-354, *Policy Statement*, 14 FCC Rcd 19868 (1999). The FCC has identified the following guiding principles regarding spectrum management: (1) promote competition; (2) encourage the development of new, more efficient technologies; (3) promote greater efficiency in spectrum markets; (4) work aggressively to increase the amount of spectrum available to lower its price and reduce radio services’ cost; (5) encourage new service implementation through sharing and reallocation of spectrum to new services and technologies; (6) reallocate spectrum to increase the amount of spectrum available for higher-valued, new uses; (7) provide incentives for existing users to relocate; and (8) consider spectrum management approaches in use in other parts of the world.

<sup>12</sup> Ericsson presented its Global Roaming Plan in ET Docket No. 00-232 in response to the FCC’s Interim Report. *See In the Matter of NTIA Interim Report, November 15, 2000 Federal Operations in the 1755-1850 MHz Band – The Potential for Accommodating Third Generation Mobile Systems, FCC Interim Report, November 15, 2000, Spectrum Study of the 2500-2690 MHz Band - The Potential for Accommodating Third Generation Mobile Systems.*

- Merge elements of the proposed spectrum allocations in FCC Options One and Three to provide more bandwidth for advanced wireless services and to promote competition;
- Implement a phased approach for additional spectrum allocations that will meet expected strong growth in customer demand and allow new service offerings over time; and
- Ensure that its final allocations:
  - Harmonize spectrum use to the maximum extent possible with global spectrum allocations;
  - Facilitate efficient use of spectrum to permit the highest value and best use of spectrum;
  - Provide pairings with an appropriate FDD duplex gap and sufficient spectrum blocks to limit interference, permit high quality services, and encourage competition;<sup>13</sup>
  - Maximize economies of scale for manufacturers and operators to yield lower costs for consumers; and
  - Achieve mutually beneficial relocation plans for incumbent users.

---

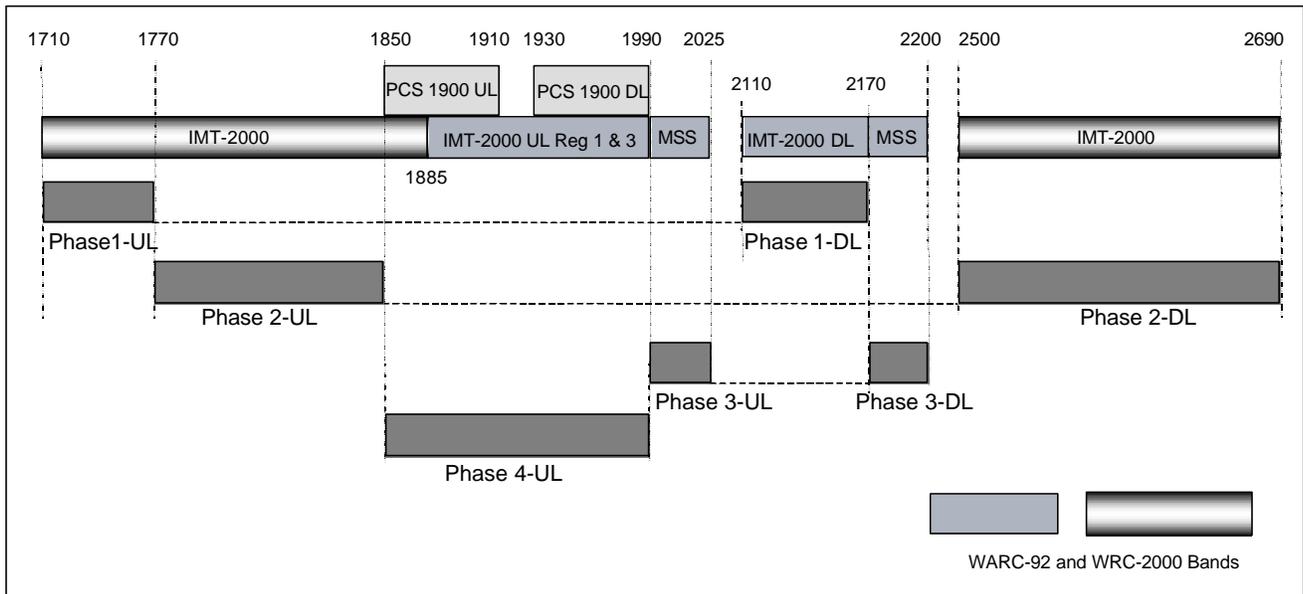
<sup>13</sup> FDD, Frequency Division Duplex, refers to a radio system where forward and reverse links are separated by using different frequencies. A duplex gap is the frequency gap between the uppermost up-link and the lower-most down-link in an FDD system having its up-link at a lower frequency than its down-link.

**D. The Ericsson Global Roaming Plan**

As to the specific band selections, Ericsson recommends certain modifications to the FCC’s Options One and Three. Ericsson’s Global Roaming Plan proposes a phased approach to spectrum allocation as follows:

PHASE (AVAILABILITY)	SPECTRUM BANDS	CHARACTERISTICS
Phase 1 (2003)	1710-1770 MHz as UL and 2110-2170 MHz as DL	Allocate new spectrum for advanced services, incl. 3G
Phase 2 (2005-2008)	1770-1850 MHz (or parts thereof) as UL and 2500-2690 MHz (or parts thereof) as DL	Add capacity for incumbents and/or add new entrants Add asymmetric allocation if required by market
Phase 3 (2009)	1990-2025 MHz as UL and 2170-2200 MHz as DL	Depending on market conditions, consider adding 3G mobile allocation in MSS bands
Phase 4 (beyond 2010)	1850-1990 MHz as UL	Market-based transition of PCS band-plan

A schematic representation of the foregoing Ericsson Global Roaming Plan is set forth below:



Ericsson’s recommendations are designed to ensure that the FCC truly achieves a more efficient “best” use of spectrum, which maximizes opportunities for increased competition and

innovation. Ericsson's plan identifies sufficient spectrum that can support 3G and other services over the longer term. In addition, Ericsson's multi-phase approach to spectrum allocation recognizes current uses of identified frequencies, permits a greater opportunity for global roaming and spectrum harmonization, and achieves economies of scale, while easing transitions and relocations when such changes are necessary.<sup>14</sup> Ericsson's proposed modifications to FCC Options One and Three are designed to permit a frequency arrangement that avoids undue fragmentation of the spectrum and satisfies the long-term regulatory, technological and industry needs for spectrum.

### **III. THE FCC MUST SATISFY BOTH SERVICE REQUIREMENTS AND SPECTRUM NEEDS IN ITS ALLOCATION OF SPECTRUM**

The FCC describes three options for spectrum allocation, seeks comment on these and other proposals, and poses specific questions on service and spectrum requirements. In these comments, Ericsson offers a preferred spectrum allocation plan, its Global Roaming Plan, which builds on elements of FCC Options One and Three.

#### **A. The FCC Must Immediately Allocate A Sufficient Amount Of Spectrum Which Is Compatible With IMT-2000 Standards And Permits Global Roaming And Economies Of Scale**

Ericsson concurs with the conclusions of commercial market studies and trends demonstrating that the demand for 3G services will explode over the next ten years.<sup>15</sup> Ericsson also concurs with ITU's determination, based on input from all global markets, that 160 MHz

---

<sup>14</sup> The value of and support from analysts for a phased approach has been previously noted by the FCC in the Annual Report and Analysis of Competitive Market Conditions With Respect To Commercial Mobile Services, *Fifth Report*, FCC 00-289, rel. Aug. 18, 2000 (hereinafter "*Fifth Competition Report*") at ¶ 37-38.

<sup>15</sup> See, e.g., UMTS Forum Report 9, 2000, The UMTS Third Generation Market – Structuring the Service Revenues Opportunities.

will be needed in all three Regions by the year 2010 for 3G services.<sup>16</sup> But, much of that spectrum will be needed in the U.S. before that date. Therefore, the FCC should ensure that the amount of spectrum it provides is consistent with the ITU's findings. In addition, as the FCC clearly understands, it must act comprehensively and now in order to ensure that the U.S. remains at the forefront of 3G technology and service development.<sup>17</sup>

**1. New allocations to support 3G service must be implemented now; Cellular and PCS spectrum is insufficient for 3G services**

Initially, the FCC must make new spectrum allocations to secure the immediate deployment of 3G services. Implementing 3G services in Cellular and PCS spectrum is not a sufficient option to satisfy the spectrum need for full 3G services in the U.S. This spectrum will continue to be used primarily to provide PCS services to the expanding number of subscribers for these services. The 2G technologies utilized to provide these services will develop new capabilities (sometimes referred to as 2.5G) *e.g.* facilitating improved data rates. However, they will not be able to support full 3G services, which require a substantial spectrum band to be commercially viable, as discussed further below. Moreover, the Cellular and PCS spectrum band segmentations are not used in other world regions for 3G services. Therefore, equipment availability will be scant.

**2. Increasingly more spectrum will be needed to meet market demand for 3G services**

The amount of spectrum needed for 3G services is of course related to the number of subscribers/terminals and the traffic generated by their demand for services. As the number of

---

<sup>16</sup> See NPRM ¶ 26 and ITU World Radio Conference 2000, Resolution 223 [COM5/24]. The 160 MHz forecasted by the ITU is in addition to the WARC-92 identification in S.388 of 230 MHz of spectrum for IMT-2000 in the bands 1 885-2 025 MHz and 2 110-2 200 MHz, including the bands 1 980-2 010 MHz and 2 170-2 200 MHz for the satellite component of IMT-2000, and in addition to the spectrum used for first- and second-generation mobile systems.

3G subscribers increases and the 3G spectrum experiences higher levels of use, additional spectrum must be allocated in later phases to meet this need.<sup>18</sup> U.S. operators will likely need additional spectrum resources in the year 2005-2008 time frame to meet this market demand. While technological advances will improve spectrum efficiencies for the delivery of 3G services, they will not keep up with increased market needs. Looking toward year 2010, the FCC will need to allocate all of the spectrum currently studied to fulfill market requirements. Additional spectrum will also be needed beyond 2010 to support increased demand.

### **3. Appropriate allocations will increase spectrum and equipment efficiency**

To address these needs, the FCC needs a long-term plan to avoid sub-optimization. In the longer term, the FCC will achieve the most efficient use of spectrum by minimizing the need for guard bands at up/downlink borders. Therefore, Ericsson's spectrum plan is designed to minimize the number of such borders and the associated need for guard bands which would use up spectrum that could otherwise be allocated to 3G services.<sup>19</sup> Furthermore, Ericsson recommends that the FCC's long-term spectrum plan consider eventually allocating the lower part of the spectrum starting at 1710 MHz for uplink use (including market-based transition of the current PCS spectrum) and all of the upper bands for downlink use. This will also ensure a sufficient gap between the duplex directions of FDD type systems.

One of the major benefits that customers expect from 3G devices is the ability to use a small, hand-held, low-power terminal to access 3G services including the Internet. One spectrum

---

<sup>17</sup> See NPRM ¶ 15.

<sup>18</sup> UMTS Forum Report 9, 2000, The UMTS Third Generation Market - Structuring the Service Revenues Opportunities.

<sup>19</sup> The spectrum allocation for new advanced services including 3G mobile needs to take into consideration not only guard bands to other services, but also guard bands needed between

parameter affecting terminal size and performance in a FDD system is the gap between the up- and downlinks. A small duplex gap of 40 MHz may increase the volume of the filters needed by four times compared to a larger gap of 80 MHz.<sup>20</sup> Consequently, setting a smaller duplex gap will significantly increase the size and cost of the customer's handset. The performance of the filters also improves with a larger duplex gap.

#### **4. Appropriate allocations are imperative to the commercial availability of 3G services**

In considering the optimal use of spectrum, the importance of a viable business case for industry cannot be understated. The FCC must ensure that both a sufficient amount of spectrum is allocated and that licenses are flexible enough to support the services for which the spectrum is needed. Experience shows that when these considerations are not taken into account, the result is an auction that does not raise substantial revenue and does not meet the spectrum needs of industry and consumers.

For example, on April 15-27, 1997, the Commission auctioned 30 MHz of spectrum for the Wireless Communications Service Auction at 2.3 GHz ("WCS"). The WCS auction included 2305-2310 MHz paired with 2350-2355 MHz and 2310-2315 MHz paired with 2355-2360 MHz. The total net revenues for this auction were only \$13 million, one of the lowest amounts grossed in any FCC auction.<sup>21</sup>

At the same time, the license flexibility envisioned by the FCC was limited. The WCS spectrum was not suitable for mobile use because it was located on both sides of the spectrum

---

different transmission directions within the 3G service as well as between 3G services in new spectrum allocations and in the PCS band.

<sup>20</sup> This estimation is based on current commercial technology.

<sup>21</sup> In comparison, the recent PCS C Block auctions raised nearly \$17 billion in revenues. *See* FCC NEWS Release: *C and F Block Broadband PCS Spectrum Auction Raises Nearly \$17 Billion for U.S. Treasury*, released January 26, 2001.

allocated for satellite Digital Audio Radio Service. The need to protect adjacent services and the imposition of stringent out-of-band emission limits effectively made mobile operations in these bands technically infeasible.<sup>22</sup> Thus, the experience of the WCS auction reveals that simply making a small amount of more spectrum available without true license flexibility may not optimize the value or efficiency of spectrum in practice.

##### **5. All spectrum allocations must be compatible with IMT-2000 standards**

Ericsson concurs with the FCC that action with respect to 3G services should be technology neutral, and that the FCC need not set aside a certain amount of spectrum restricted to a given technology.<sup>23</sup> However, to better accomplish its goals and objectives, the FCC should build on the developments in the global market that are leading toward the widespread deployment of IMT-2000 radio interface standards. IMT-2000 radio interface standards were developed in a global effort, including the U.S., to be sufficient for the advanced wireless services projected to be required over the next decade.<sup>24</sup> They offer spectrum efficiency and capabilities superior to 2G technologies, *e.g.*, flexible high data rates in different mobility scenarios, support for packet-based data services and support for asymmetric services on a per user basis. These higher data rates are necessary to meet the needs of projected advanced wireless service demands.<sup>25</sup>

---

<sup>22</sup> The FCC required that all emissions from fixed transmitters be attenuated below the maximum spectral power density (p) by at least  $80 + 10 \log(p)$  dBW, and that all emissions from mobile transmitters be attenuated below p by at least  $110 + 10 \log(p)$  dBW within the 2320-2345 MHz band.

<sup>23</sup> See NPRM ¶¶ 18, 33.

<sup>24</sup> ITU Recommendation ITU-R M.1457, IMT-2000 Radio Interfaces.

<sup>25</sup> On the other hand, 2G technologies are insufficient to meet the projected need for data-based services. 2G technologies only offer low data rates, they are not packet based and they offer limited IP addressing support.

While all IMT-2000 radio interface standards are being developed to support higher spectrum efficiencies and data rates, Ericsson does not foresee developments that would make an allocation of new spectrum for 3G services unnecessary. Accordingly, the spectrum arrangement implemented by the FCC should be at least compatible with the technical requirements of all of the IMT-2000 standards. Ericsson's Global Roaming Plan accomplishes this goal. The Ericsson Global Roaming Plan is technology neutral, it does not favor any one standard in the IMT-2000 family of standards, but it is compatible with all IMT-2000 standards.

**B. A global downlink will facilitate global roaming of 3G services and improve the quality and cost of equipment**

The FCC has recognized both the incredible transformation of the communications market toward more global enterprises and the significance of global influences.<sup>26</sup> A consumer's ability to use advanced wireless services globally has long been a primary objective for 3G and IMT-2000 systems.<sup>27</sup> With the rapid emergence of global operators and global alliances, the need for an allocation arrangement that supports global roaming and minimizes variation in both terminal and network equipment is even more critical. Ericsson concurs with the FCC that it needs to take definitive steps to facilitate global roaming.<sup>28</sup>

Operators worldwide will want to offer the same application and services across markets to support the needs of their customers. If spectrum use is not harmonized around certain bands globally, the world equipment market will become more fragmented, leading to a more complex product map and more product segments. Fragmentation leads to the delayed availability of new products and services across markets.

---

<sup>26</sup> See, e.g., NPRM ¶ 11. Likewise, other regulatory bodies have recognized the need for and allocated frequency bands that enable Global Roaming. See NPRM ¶ 24, fn. 47. See also FCC Interim Report Appendix 2.3.

<sup>27</sup> See NPRM ¶ 24.

While technical solutions, such as multi-band devices, can be tools to achieve global roaming, they introduce unnecessary terminal and system complexity.<sup>29</sup> Multi-band devices have higher development costs and are less desirable to consumers because they are generally more expensive, larger, and consume more power than single-band devices. They also introduce an element of market confusion. If multi-band devices are needed to support global roaming to a sub-set of the global market, they become niche products with higher costs compared to less complex products addressing the larger market.

In addition, if manufacturers are required to support a number of multi-band product lines in order to meet the needs of various sub-markets, the resources available to make products for each market and for product enhancement and innovation are reduced. As a result, consumers, regardless of which market they are in, experience unreasonable delay in the introduction of new products and services.

Alternatively, when there are at least some common bands globally, a larger portion of consumers can be served with similar products, allowing manufacturers to maximize economies of scale. Since global roaming capabilities are interlinked with issues relating to the deployment of common applications and economies of scale concerns, a spectrum designation that supports global roaming is preferable for the U.S. To address this problem, Ericsson proposes that the band 2110-2170 MHz be designated as downlink.<sup>30</sup> This band would permit the immediate implementation of 3G services in the U.S. with global roaming capabilities to the best extent possible given 3G spectrum allocations already made in other countries. Any allocation that

---

<sup>28</sup> *Id.*

<sup>29</sup> In a longer term perspective, the implementation of multi-band terminal devices may be facilitated by implementation technologies such as Soft-ware Defined Radios.

only seeks commonality with 2G allocations in other countries will not facilitate global roaming of 3G services.<sup>31</sup>

**C. The FCC Must Provide Adequate Blocks Of Spectrum To Initial Operators And Sufficient Spectrum Over Time**

To adequately address the need for 3G services and create a competitive market, the FCC must allocate both a sufficient amount of spectrum to each operator and a sufficient amount of total spectrum. The FCC must also implement a phased approach to spectrum allocation that provides for further allocations in the mid- and long term.

**1. Appropriate spectrum blocks per licensee**

Ericsson advocates a larger initial amount of spectrum than the FCC proposes in any of its pairing options in order to allocate a sufficient amount of spectrum to support a viable business case for at least four operators. To facilitate the implementation of any of the IMT-2000 3G technologies, an operator must be able to license 15 MHz of spectrum in each duplex direction. Technically, the minimum is less than this amount and varies with the technology selected. However, for a commercially viable service, an operator needs several channels per cell (*e.g.*, for wide-band FDD systems, several 5 MHz channels). This is necessitated by the need to simultaneously serve multiple users in each cell with different data rates up to the current 2 Mbps maximum of 3G services and maintain support for very high-speed mobility.

The FCC must allocate sufficient spectrum not only to support the total market demand, but also to create sufficient competition in the marketplace. Allocating the 1710-1770 MHz band as Ericsson proposes will support four competing operators with up to 2 x 15 MHz per

---

<sup>30</sup> The FCC sets forth most of this designation in Option One. Once this downlink designation is made, it becomes a global downlink because it has already been so designated in Regions 1 and 3, consistent with ITU plans.

<sup>31</sup> See NPRM ¶ 68.

licensee. Four competitors in this band will ensure that consumers have a reasonable choice among providers and enjoy a reasonable degree of confidence in the quality of services. Furthermore, spectrum should be made available for nationwide licenses. This will support fast build-out of 3G services to the largest population, and is a necessary prerequisite for a viable business operation.

**2. Initially, 1710-1770 MHz as uplink should be paired with 2110-2170 MHz as downlink to increase commonality, availability of services and competition**

As set forth *supra*, Ericsson recommends an initial allocation which pairs the 1710-1770 MHz band as uplink with the 2110-2170 MHz band as downlink. Ericsson proposes a larger amount of spectrum than the FCC to provide a sufficient amount of bandwidth for competition and viable 3G systems. The uplink band 1710-1770 MHz has the potential to become the Region 2 (the Americas) uplink since most countries in the Americas can allocate all or part of this band for advanced wireless services. Allocating 2110-2170 MHz as downlink creates the immediate opportunity for global roaming since, as an IMT-2000 core band, this band is already the allocated downlink in many countries. Thus, these allocations allow for regional and global commonality to the best extent possible at this time.

Shared use of the 1710-1770 MHz spectrum between current incumbent users and 3G services is not deemed feasible due to the always-on characteristics of 3G services. A commercial service is greatly disturbed by service interruptions or temporary limitations in capacity. Therefore, all of the incumbent users in this band must be offered reimbursement for relocation. However, when compared with other spectrum options initially requiring a larger part of the 1710–1850 MHz band, this allocation requires minimal disruption to the incumbent Federal users. A large part of the spectrum proposed by Ericsson as an initial advanced wireless

services uplink has already been identified for reallocation, and is in the process of becoming available for mixed commercial use.<sup>32</sup>

To facilitate a competitive market that provides a viable business opportunity for four competing operators, the proposed downlink at 2110-2170 MHz must be made available in its entirety. As noted above, Ericsson does not expect sharing between current incumbent users and 3G systems to be feasible. Therefore, the FCC should adopt a transition schedule to permit it to clear the 2150-2160 MHz and 2165-2170 MHz bands. This will allow all of the 2110-2170 MHz band to be made available from the outset. The FCC should cover relocation costs by the new licensees' auction proceeds in order to create a predictable level of total spectrum license costs.

In sum, pairing the 1710-1770 MHz and 2110-2170 MHz bands has multiple benefits. It will create the opportunity for minimizing equipment complexity and cost since the 2110-2170 MHz band can become a global downlink, while the 1710-1770 MHz band can become a common Region 2 uplink. At the same time, it will lead to improved availability of services. To achieve these goals, however, the FCC needs to make these bands available in their entirety to accommodate enough operators and encourage competition.

**3. In the mid-term, the FCC should utilize all or part of 1770-1850 MHz as uplink and all or part of 2500-2690 MHz as downlink to increase spectrum**

To supplement the initial phase allocations, Ericsson proposes that the FCC allocate part or all of the 1770-1850 MHz band as additional uplink and part or all of 2500-2690 MHz as additional downlink to become available in the year 2005-2008 time frame. This spectrum designation will

---

<sup>32</sup> See NPRM ¶ 32; Omnibus Budget Reconciliation Act of 1993, (OBRA-93), Pub. L. No. 103-66, 107 Stat. 312 (1993); the Balanced Budget Act of 1997 (BBA-97), Pub. L. No. 105-33, 111 Stat. 251 (1997); and Redevelopment of Spectrum To Encourage In The Use of New Telecommunications Technologies, ET Docket No. 92-9, *Notice of Proposed Rulemaking*, 7 FCC Rcd. 1542 (1992).

allow either existing 3G operators to increase their offerings to the market or new operators to enter the market and thereby increase competition in the marketplace.

As with the initial phase allocations, all current users should be transitioned from this spectrum through a relocation-reimbursement process.<sup>33</sup> Moreover, due to the medium-term timing of this second phase allocation, it provides for considerable additional time for relocation of incumbent Federal users compared with the spectrum pairing described in FCC's Option Two,<sup>34</sup> which relies on access to a major part of the 1710-1850 MHz Federal band to offer any new spectrum for 3G Mobile use.<sup>35</sup>

These supplemental allocations are attractive because they complement initial spectrum designations to meet the increasing spectrum needs of operators.<sup>36</sup> Allocating additional downlink above 2500 MHz is particularly important because this spectrum can be paired with previous uplink designations to support asymmetric services that are expected to be required in this time frame. This allocation is also in line with the FCC policy of striving for market determination of the highest value and best use of spectrum.

In addition, the FCC can combine a new mobile allocation in the 2500 MHz band with a new band segmentation plan, where it offers spectrum both to incumbent users in the band and to new licensees. Depending on market needs, incumbents may implement both their existing services and new advanced wireless services. From a 3G Mobile viewpoint, a band

---

<sup>33</sup> Licensees in the band 2500-2690 MHz could be transitioned to 3.5 GHz and reimbursed with auction proceeds.

<sup>34</sup> See NPRM ¶ 68.

<sup>35</sup> As noted in the NPRM at ¶ 68, even if spectrum needed for Option Two would be reallocated for non-federal use, some federal systems might still need to continue to operate in the band for a number of years.

<sup>36</sup> By the year 2005, 56 million people in the U.S. -- or 20% of the U.S. population -- will be regular users of the wireless Internet over a voice-enabled device." See Yankee Group Report, Wireless/Mobile Services, Report Vol. 1, No. 17-November 2000, Adam Zawat.

segmentation where new licenses are in the lower part of the band and incumbent users are concentrated in the upper part of the band is preferred.<sup>37</sup>

A flexible designation of this band could create a win-win situation for incumbents and new entrants, and ensure use and valuation of the spectrum based on market needs, consistent with the FCC's spectrum policy principles.<sup>38</sup> By planning this spectrum allocation now in conjunction with an initial allocation to advanced wireless services in the 1710 MHz and 2110 MHz bands, the FCC will allow 3G operators to plan for increased spectrum capacity. In addition, the FCC will provide ample time to implement relocation plans for current users.

#### **4. The FCC should consider further spectrum allocations by the year 2009 to meet future market demand**

As outlined above, the FCC should contemplate additional future spectrum allocations now to meet the projected need of 3G systems in a timely and appropriate manner. Planning for future spectrum allocations allows for more control over spectrum management and spectrum use. While Ericsson recognizes that further allocations must be analyzed based on the market conditions at that time, Ericsson recommends that the FCC consider the bands 1990-2025 MHz as uplink and 2170-2200 MHz as downlink for possible allocation by the year 2009. At that time, the FCC can examine the MSS market to determine whether this spectrum is fully and efficiently utilized or sparsely populated.

---

<sup>37</sup> This type of segmentation was outlined in the FCC's Interim Report.

<sup>38</sup> See Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, FCC 99-354, *Policy Statement*, 14 FCC Rcd 19868 (1999) at ¶ 9 and fn. 10, *supra*.

#### **IV. CONCLUSION**

The FCC must act immediately and proactively to ensure that the U.S. maintains its place as a world leader in the development and implementation of new, advanced telecommunications technologies. By implementing a plan that builds on and incorporates aspects of FCC Options One and Three similar to the Ericsson Global Roaming Plan, the FCC will make a lasting contribution toward a forward-looking spectrum management plan. Moreover, the FCC will plan now for future spectrum needs which will allow ample time to formulate and implement relocation procedures as necessary. The FCC will also be taking important steps toward remedying existing global spectrum fragmentation problems and achieving greater spectrum harmonization. Further, the FCC will enhance the opportunities of U.S. market participants, increase their competitiveness worldwide, and ensure that the advanced services and capabilities of 3G systems become a reality for American consumers.

Respectfully submitted on February 22, 2001.

Tom Lindström  
Director, Telecom Policies and Regulations  
Ericsson Inc  
Office of Public Affairs  
1634 I Street, N.W., Suite 600  
Washington, D.C. 20006-4083  
(202)783-2200  
(202)824-0117 Fax

Elisabeth H. Ross  
Allison M. Ellis  
Birch Horton Bittner & Cherot  
1155 Connecticut Avenue, N.W.,  
Suite 1200  
Washington, D.C. 20036  
(202)659-5800  
(202)659-1027 Fax