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February 22, 2001

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
12th Street Lobby, TW-A325
Washington, DC 20554

Re: **Comments in ET Docket No. 00-258, *Amendment to 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 Systems, including Third Generation Wireless Systems***

Dear Ms. Salas:

Enclosed please find an original and four copies of Nokia's comments in response to the Commission's Public Notice in the above-captioned proceeding. Also enclosed is a duplicate copy to be date stamped and returned. If you should have any questions or need further information, please do not hesitate to contact me at (202) 887-5210.

Sincerely,

Cecily A. Cohen
Manager, Government and Industry Affairs
Nokia Inc.

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

COMMENTS OF NOKIA INC.

Nokia Inc. ("Nokia") hereby comments on the Commission's *Notice of Proposed Rulemaking* ("Notice") in the above-captioned proceeding concerning the allocation of spectrum for new advanced wireless services, including third generation ("3G") or International Mobile Telecommunications-2000 ("IMT-2000"). Nokia is a global company with over 60,000 employees with key growth areas in wireless and wireline communications. A pioneer in mobile telephony, Nokia is the world's leading mobile phone supplier and a top supplier of mobile, fixed and IP networks, related services such as multimedia terminals.

Nokia believes that it is critical that the Commission identify as much additional spectrum as possible for advanced wireless services including IMT-2000/3G, above and beyond the spectrum currently allocated and used for 1st ("1G") and 2nd generation ("2G") commercial systems. In our view, the demand for spectrum in which to deploy advanced wireless services generally, and 3G in particular, is increasing. Mobile communications and the Internet have seen tremendous success worldwide. Mobile user penetration has already reached 70 percent of the population in some countries and we expect the demand for mobile services to continue increasing, with the total number of mobile users

worldwide reaching 1 billion in 2002. The demand for high bit-rate mobile services is also expected to increase in the same time frame. It is estimated that by 2003, there will be 600 million Internet connections worldwide with the number of mobile connections to the Internet surpassing the number of personal computers connected to the Internet by the end of 2002. By 2005, more than half of all mobile user equipment will have the capability to access the Internet. The United States will be no exception to this trend. According to the Stategis Group, mobile data subscribers in the United States are expected to grow to 78.7 million in 2005 and 171.9 million in 2007 from 10.4 million in 2001.[1] Traditionally, mobile growth rates have far outpaced early predictions and we have no expectation that the third generation will prove to be an exception to this trend.

While it is difficult to know with accuracy what the spectrum requirements will be to meet these demands, we can look at some estimates that seem reasonable in light of the predicted demand. The ITU-R Task Group 8/1 ("TG 8/1") concluded that 160 MHz of additional spectrum would be required by 2010 to meet expected demand---above and beyond both the bands identified at the World Radiocommunication Conference in 1992 (WARC-92) and the bands already allocated for 1G and 2G. It should be noted that this number took into account expected future advances in technology that could contribute to greater spectrum efficiency and assumed that 1G and 2G operators would evolve to 3G within their existing allocations. Already, 2G operators in the United States are upgrading their systems to 3G by the end of 2001. Even with technological advances and evolution, the need for additional spectrum on the order of the estimates reached by ITU-R TG 8/1 will be required if the wireless industry is to continue to grow and meet customer demand.

To maximize the efficient use and value of spectrum for 3G, we believe it is imperative for this spectrum to be globally harmonized to the greatest extent possible. The market for mobile services is no longer national or regional. Vendors and operators are providing equipment and services on a global basis. The extent to which spectrum can be globally harmonized helps reduce the cost and complexity of equipment, particularly end-user terminals, by creating economies of scale. Each additional band supported by a terminal results in an additional duplexer, larger size, increased

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[1] *U.S. Mobile Data Marketplace 2001*, The Strategis Group, January 2001, p.5.

complexity, and higher development and manufacturing costs. Where frequency bands are regional or national, rather than global, products tend to be more complex, more costly, and arrive later to market. The cutting-edge innovative products also tend to arrive later to market, if at all. Consequently, it is more important now than at any other time in the past that the Commission select a band plan with the greatest potential for global harmonization and the resulting economies of scale. We note that the discussion of bands below 1 GHz neglects to take into account the global aspect. As this time, these bands are not planned on being used for 3G globally, particularly the 700 MHz band. These are not recommended as prime bands for introducing advanced wireless services. However, currently, one frequency band---2110-2170 MHz--- is already available globally and planned for use as a globally common downlink for 3G. It is our view that any allocation for 3G should make use of the whole of this band as a downlink band.

Spectrum allocated for 3G should be sufficiently wide and contiguous. Where 3G has been licensed already, such as in Europe and Asia-Pacific, each license has been 2x10 MHz to 2x20 MHz. It is our belief that 2x15 MHz per license as a minimum is required to facilitate cost-effective product implementation and allow for the ubiquitous deployment of "full" 3G services.

In the *Notice*, the FCC outlined three possible pairing options for the optimal use of the potential bands for introducing advanced 3G. Below are Nokia's views on the advantages and disadvantages of each option.

Option 1

One possible option is to allocate the 1710-1755 MHz band paired with the 2110-2150/2160-2165 MHz band, with a variation being to make all of 1710-1790 MHz available in phases paired with 2110-2150/2160-2165 MHz. This option is advantageous in a number of ways.

First, this option uses most of the 2110-2170 MHz frequency band, which is already available globally as a common downlink band in both Region 2 and non-Region 2 countries. As discussed above, globally harmonized bands help facilitate economies of scale, as well as global roaming. Even if uplink bands are ultimately not common globally, use of the 2110-2170 MHz band

reduces the number of bands and maximizes the number of common components incorporated into user terminals, thereby creating economies of scale for the equipment, resulting in less complex and costly phones for the end-user.

It should be noted that making the entire 2110-2170 MHz available for 3G would enhance the value and utility of the 2110-2170 MHz band as a common global downlink. As discussed earlier, large and contiguous bands of spectrum are necessary to deploy 3G, a minimum of 2x15 MHz per operator. The presence of existing fixed services in the 2150-2160/2165-2170 MHz bands creates problems of adjacent channel interference for both incumbent and 3G systems, possibly requiring the use of additional guard bands. Additionally, 2160-2165 MHz is too narrow to support full 3G services and should be contiguous with a larger band of spectrum.

Secondly, this possible option would likely provide regionally common uplink spectrum, facilitating some economies of scale as well as regional roaming. As noted in the *Notice,* this option is consistent with the recent proposal made to ITU-R Working Party 8F by Brazil, Chile, Guatemala, Mexico and Venezuela that Region 2 countries consider the pairing of all or portions of 1710-1850 MHz as uplink spectrum with 2110-2170 MHz as downlink[2]. It is also consistent with the plans announced by Chile, one of only two countries in Region 2 to have announced its spectrum plans for 3G, to allocate 1745-1845 MHz as uplink spectrum with 2110-2170 MHz as the downlink for 3G.

Finally, this option provides the flexibility to make additional spectrum available at a later date consistent with longer-term proposals currently under study within ITU-R Working Party 8F. Additional spectrum could be made available from either the 1755-1850 MHz band or the 2500-2690 MHz band, both bands identified for additional spectrum for IMT-2000 at the World Radiocommunication Conference-2000 ("WRC-2000"). Under one alternative currently under consideration by WP8F[3], administrations would pair all or portions of 1710-1885 MHz as uplink with 2110-2170 MHz and 2500-2690 MHz as downlink in the long-term. This option would have the advantage of meeting projected asymmetrical spectrum needs by providing more downlink than uplink. Under a second long-term

[2] ITU-R Document 8F/148-E, "Possible Frequency Arrangements in the Spectrum Identified by WARC-92 and WRC-2000", October 20, 2000.

alternative, 1755-1850 MHz could be used in the long-term as additional downlink to maintain current GSM-1800 duplex arrangements.

Option 2

A second possible option is to pair within the 1710-1850 MHz band. The 1710-1755 MHz band could be paired with spectrum from 1755-1850 MHz, either 1755-1805 MHz or 1805-1850 MHz. This option has the advantage of increasing the likelihood of global spectrum harmonization in the longer-term. If 1710-1755 MHz were to be paired with 1805-1850 MHz, this option could increase harmonization with GSM1800 duplex arrangements in non-Region 2 countries, contingent upon how these bands are used (i.e. will existing GSM operators be allowed to evolve to 3G within their existing allocations or will the band be reallocated for 3G in the future with similar duplex arrangements?) and in what time frame.

In our view, this option is lacking in that it does not take advantage of the 2110-2170 MHz band, the one globally available downlink band for 3G. A sub-option to consider would be to pair some of the spectrum within 1755-1850 MHz with 2110-2170 MHz (or portions thereof). While it is not clear that there is enough regional or global support for this band pairing to provide sufficient market volumes to create the necessary economies of scale, this option would at least make use of the 2110-2170 MHz band.

Any pairing of spectrum within the 1710-1850 MHz band should avoid small duplex gaps as narrow gaps increase the size, cost and power consumption of duplexers.

Option 3

A third possible option is to pair either 2150-2150/2160-2165 MHz or 1710-1755 MHz with spectrum in the 2500-2690 MHz band. The first variation, pairing 2110-2150/2160-2165 MHz with 2500-2690 MHz, is not an option under consideration outside of the United States. Globally, the 2110-2170

[3] Section 4.1, Document 8F/63 in Annex 3 to Attachment 6.

MHz band is being used as a common downlink band. Using the 2110-2170 MHz band as an uplink would render the band useless from the perspective of globally harmonized spectrum and would create a "spectrum island" in terms of equipment and services that can take advantage of economies of scale. The second variation, pairing spectrum from 1710-1755 MHz with 2500-2690 MHz, alone also fails to make use of the 2110-2170 MHz band and shares similar disadvantages.

However, using the 2500-2690 MHz as either a downlink band paired with all or portions of 1710-1850 MHz or as a "stand-alone" frequency band with pairing within the band should be considered, particularly as a longer-term option. While global plans for use of the 2500-2690 MHz bands for IMT-2000 are not yet clear, WP8F is currently studying the various options---including use of the whole band as downlink and pairing within the band—with the goal of developing a recommendation by June 2002. Region 1, which has shown the greatest interest in using this band for IMT-2000 as additional spectrum, and many Region 3 countries are implementing 3G in the WARC-92 frequency bands first. The Commission should take into account global developments, particularly the work of WP8F, with respect to band plans and timing for this band. It is clear that most countries in Region 1 and many countries in Region 3 plan to use this band for additional spectrum for IMT-2000 by 2010; for this reason, the Commission should consider this band as key for the longer-term development of advanced wireless services, including 3G, as this band will provide additional possibilities for global harmonization. It is essential that the opportunity to develop a single global plan for the 2500-2690 MHz band is taken and supported within WP8F. This single plan is anticipated to take several years to finalize at a global level.

Summary

Nokia recommends that the following elements be incorporated into the Commission's allocation of spectrum for advanced wireless services, including 3G:

1. Sufficient spectrum should be allocated to meet expected demand
2. The spectrum allocated should allow a sufficient number of operators to have a sufficient amount of spectrum per operator

3. Allocated spectrum should be harmonized to the greatest extent possible, taking advantage of bands already known to be globally available and avoiding "unique" band plans
4. Bands allocated need to be sufficiently wide and contiguous to support 3G in a cost-effective manner

We recommend that the three options and their various sub-options proposed by the Commission be weighed for their ability to meet these expectations.

Respectfully Submitted,

Cecily A. Cohen
Manager, Government and Industry Affairs
Nokia Inc.

February 22, 2001