Gregg Ward

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
The Secretary
Office of the Managing Director
Federal Communications Commission
445-12th Street, SW – TW-A325
Washington, DC 20554

Dear Ms. Salas:

Siemens Corporation is pleased to submit reply comments in response to the Notice of Proposed Rulemaking (NPRM), ET Docket No. 00-258, that examines which frequency bands are needed to support the introduction of advanced wireless services.

We share the views of the majority of the respondents who propose allocation of the 1710-1755 MHz band paired with 1805-1850 MHz as the best option for achieving the universal goal of global roaming and harmonization. This band is designated by the International Telecommunications Union (ITU) for IMT-2000 and could be made available in Region 2 and in many countries around the world.

Thank you for providing Siemens with the opportunity to participate in this critically important proceeding, and we look forward to working together with the Commission and all involved industry groups to help identify the most effective ways to introduce exciting new wireless services to the marketplace.

Sincerely,

Gregg Ward

Attachment

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Siemens Corporation
Washington, D.C. 20004

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Information and Communication Mobile

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Notice of Proposed Rule Making to Allocate Spectrum Below the 3 GHz for Mobile and Advanced Wireless Services including Third Generation Wireless Systems	)	ET Docket No. 00-258

REPLY COMMENTS OF THE SIEMENS CORPORATION TO THE NOTICE OF PROPOSED RULEMAKING

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March 9, 2001

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EXECUTIVE SUMMARY

Siemens Corporation is pleased to submit reply comments to the Notice of Proposed Rulemaking (NPRM), ET Docket No. 00-258.

There is unanimous support for adopting the following spectrum allocation principles:

1. The U.S. government should allocate at least 160 MHz of new spectrum for 3G services to meet users demand over a 10-15 year period;
2. The U.S. allocations should be harmonized with global allocations to the greatest extent possible to support global roaming and enable the production of low cost terminals; and, finally
3. The Federal Communications Commission (FCC) should move swiftly to identify the required spectrum for 3G usage.

In addition a large majority supports FCC Option 2: 1710 - 1755 paired with 1805 - 1850 MHz and there is respectable demand for TDD allocation and consequently for unpaired spectrum.

We reconfirm our view, shared by the majority of commenters, that the best option for ensuring global roaming and harmonization is the allocation of spectrum in the 1710-1755 MHz band paired with the 1805-1850 MHz. This band is designated by the International Telecommunications Union (ITU) for IMT-2000 and could be made available in Region 2 and in many countries around the world. Cost-effective global roaming will be possible through the introduction of dual-band terminals using this band and the original IMT-2000 core band at 2 GHz. The 1800 MHz band could, therefore, develop into a globally harmonized band comparable to the IMT-2000 core band.

In addition, Siemens supports for the USA the use of the 2110-2150/2160-2165 MHz spectrum band and available parts in the 2500-2690 MHz band for TDD (unpaired). This would enable the achievement of high data rates and an efficient transport of the many highly asymmetric applications in densely populated urban areas.

We are pleased to participate in this critically important proceeding and look forward to working together with the FCC and all involved industry groups to help identify the most effective ways to introduce exciting new wireless services to the marketplace.

REVIEW OF COMMENTS

Siemens Corporation has reviewed the comments provided by over 200 parties and finds a high degree of consensus on principles for spectrum allocation and preferable pairing options. We summarize our understanding of these positions and evaluate the potential consequences of different pairing options. In addition, we provide some detail on traffic symmetry in 3G networks. Finally, Siemens offers its long-term vision of how 3G services and spectrum allocation decisions could evolve over the next decade.

Unanimous support of Principles for Spectrum Allocation

There is a unanimous support for the three principles expressed by PCIA:

- The U.S. government should allocate at least 160 MHz of new spectrum for 3G services to meet users demand over a 10-15 year period;
- The U.S. allocations should be harmonized with global allocations to the greatest extent possible to support global roaming and enable the production of low cost terminals[1], and,
- The Federal Communications Commission (FCC) should move swiftly to identify the required spectrum for 3G usage.

High Majority for 1710 - 1755 paired with 1805 - 1850 MHz

The vast majority of the parties[2] that expressed a pairing option preference support FCC Option 2, which calls for the allocation of 1710-1755 MHz (uplink) paired with 1805-1850 MHz (downlink) or part of this band for 3G services.

Only two manufacturers[3] support instead the allocation of 1710 - 1755 MHz (uplink) paired with 2110 - 2150/2160 - 2165 MHz (downlink) as a global roaming plan, which would destroy the spectrum plans of DCS1800 and IMT2000.

The Pairing Options and their consequences

The two options are supported based on fundamentally different philosophies that will result in radically different outcomes.

(1) The supporters of FCC Option 2 (1710-1755 paired with 1805-1850 MHz) argue that this option provides the greatest harmonization with international agreements. This band is designated by WRC-2000 as an IMT-2000 band. It is being used today for 2G services in more than 60 countries.
Most countries use it only partially and plan a refarming of this band to 3G. Such an allocation would maintain the transmission direction and the duplex distance used internationally. The FCC's option would allow global roaming by dual-bands of operation with the original ITU IMT-2000 2 GHz core-band. This band would develop into a second IMT-2000 core-band. Finally, the option would benefit from commonalties with the structure of the 2GHz core-band and the DCS-1800 band and break the "spectrum isolation" of the U.S.

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1 The strong words of Sprint Corporation against harmonization are meant in regard of the 2.1. and 2.5 GHz band. Sprint wants to continue to use these bands for fixed services. They propose the 1.7/1.8 GHz band as a harmonized 3G band.

2 For example CTIA, PCIA, TIA, AFT, Cingular, Verizon, Voicestream, Sprint, Orange, Qualcomm, Nortel, Motorola, Lucent, Siemens

3 Ericsson and Nokia

(2) The supporters of 1710-1755 paired with 2110 - 2150/2160 - 2165 MHz seek to exploit the commonalty with the IMT-2000 2 GHz core band's down-link. However, this proposal would significantly harm the existing duplex structure of the DCS 1800 allocation and the duplex structure of the WRC-2000 3G designation in the 1700/1800 MHz band. The unintended consequence of this position would be to lead the U.S. into a continued "spectrum isolation" since in most countries the downlink band is part of the IMT-2000 2 GHz core-band.

It should further be noted that this second proposal is meant as the starting point of a grand spectrum revolution, which changes every allocation between 1700 MHz and 2700 MHz. This "grand plan" would abolish not only DCS-1800 and the IMT-2000 2 GHz core band, but also the PCS band within 10 years.
The interests of the U.S. would be significantly harmed by continuing its "spectrum isolation" and it is inconceivable that the international community would support this proposal. Finally, the negative economic consequences of this proposal would be enormous, resulting in a misallocation of resources because of a radical change in allocation principles.

FDD and TDD

Nearly every contributor published its opinion on usage of FDD and TDD. The upcoming traffic asymmetry in future 3G networks was widely confirmed and TDD was supported. However some varying views regarding this subject motivate us to explain Siemens position in further detail (see below).

TRAFFIC ASYMMETRY IN 3G NETWORKS:

Some of the comments on the consultation document indicate doubts, whether there will be location area wide traffic asymmetry in the mobile Internet access. We would therefore explain in more detail, why traffic asymmetry needs to be considered as the most important factor on future spectrum allocations:

It is evident, that the most dominant Internet traffic today – and in the future – comes from the Web. Many investigations in the Internet have confirmed a large asymmetry in transmit/receive (TX/RX) data flows in favour of the TX path (from the network to the user). 3G networks will also have other applications, where e.g. a remote camera would do video streaming into a server.

Since the 3G networks will increasingly be dominated by the Internet, the above mentioned example application and the voice traffic with its symmetric nature will only partly compensate the varying data traffic asymmetry on the up and downlink side. Thus it is crucial, that the high amount of spectrum needed for data traffic will be allocated to the uplink and downlink in a flexible way. Depending on the cellular operators service offerings, there can be far more traffic on the downlink then on the uplink side. In other cases, it can be nearly symmetrical or just the opposite – more uplink then downlink traffic.
In the light of such varying traffic distribution in future 3G networks the choice of radio access schemes is crucial for the radio access network.

Of course every asymmetry ratio can be realized using the symmetrical spectrum. But in such case, one half of that spectrum will be overloaded and the other nearly empty.

Presently TDD is the only one scheme, that fulfils such a requirement of flexible uplink/downlink capacity allocation within one frequency band, which is neutral regarding the direction of traffic.
Due to the fact, that frequency spectrum is a scarce resource, the 3G radio network has to provide the best spectral efficiency possible by taking into account the whole traffic per operator.

LONG-TERM VISION

Siemens Corporation sees the evolution to 3G services in two paths, which complement each other perfectly:

1. All 3G services offered as a basis to cover a country and for global roaming provided by FDD
2. High capacity, high data rates and efficient transport of the vast majority of asymmetric traffic in densely populated urban areas provided by TDD

The U.S. recommended to the ITU an estimate of 390 MHz spectrum which results in a spectrum requirement of 160 MHz additionally, when all available spectrum is deducted.

Siemens views 1710 - 1755 MHz (Up-Link) paired with 1805 - 1850 MHz (Down-Link) as the optimal start for FDD, because of its potential for easy, cost-effective global roaming and economies of scale. This band offers 90 MHz of FDD spectrum.

Siemens proposes to use for TDD the part of the original IMT 2000 core-band which is not in use in the U.S. (2110 - 2170 MHz or available parts thereof). This would secure 45 MHz of spectrum for 3G.
In a very long-term, when the PCS spectrum could come to a refarming, the IMT-2000 2GHz core band could be restored by combining parts of PCS band with the upper part of the IMT-2000 band. Thus, FDD could be introduced and TDD moved to other spectrum ranges. In the same way, the lower part of the PCS band could be combined with spectrum from 1850 MHz upwards.

In order to cover high speed, asymmetric, high volume traffic in the densely populated urban areas in the U.S., a substantial TDD allocation should be made in 2.5 GHz. Like other commentaries, Siemens has the opinion, that TDD is suitable to be deployed in the 2.5 GHz band due to technical and economical reasons.

It is undisputed, that an additional 160 MHz of spectrum is necessary for advanced mobile cellular services.
A balanced approach can be achieved in this manner:

- 90 MHz paired spectrum between 1710 –1850 MHz,
- 45 MHz unpaired spectrum beginning from 2110 MHz,
- 25 MHz unpaired spectrum at 2.5 GHz.

The Siemens position on possible spectrum development and harmonization world-wide is described in the ITU document 8F/217 (also Temp104). Some advantages of this proposal are listed below:

1. **This is a phased approach allowing smooth evolution.**
2. Implementation of IMT-2000 with FDD and TDD can start early and gives sufficient start-up service capability and capacity.
3. The 2.5 GHz band is considered as extension band, thus, a partitioning into duplex spaced, paired bands is not required. A TDD arrangement for the additional band at 2.5 GHz allows to meet best the expected growing demand for IMT-2000 services, especially for increasingly asymmetric traffic capability in high traffic density areas ("hot spots").
4. Application of the TDD mode gives greatest flexibility and is highly future proof, for any expected asymmetry ratio.
5. The allocation of frequencies in the 1.8 GHz band will create in the end a truly globally harmonised usage of this band with world-wide roaming.
6. Global roaming can be based on a dual band approach, the basic RF technology for the required terminals is available today; the risks and penalties of ultra wide-band terminal implementation as it would be necessary with global roaming plan can be avoided.

CONCLUSION

Siemens Corporation appreciates the opportunity to provide its comments on contributions to the FCC.

The FCC should follow the recommendation by the vast majority of the commenting major players and allocate as soon as possible the Option 2: 1710 - 1755 MHz (up-link) paired with 1805 - 1850 MHz (down-link) as the U.S. 3G FDD core-band and initiate the evolution process to a second globally accepted IMT-2000 FDD core-band.

The FCC should also foresee the implementation of FDD in paired spectrum and TDD in unpaired spectrum.

Respectfully submitted,

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