(c) *Tolerances with regional registrations.* [Reserved]

(d) *Indirect or inadvertant residues.* [Reserved]

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FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 15

[ET Docket 99–231; FCC 00–312]

Spread Spectrum Devices

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: This document amends the Commission's rules for frequency hopping spread spectrum devices in the 2.4 GHz band (2400–2483.5 MHz). The rules were amended to allow frequency hopping spread spectrum transmitters operating in the band to use a minimum of 15 hopping channels, spanning a total of 75 MHz. The new rules will allow for hopping channels up to 5 MHz wide. The wider bandwidths will permit these systems to provide higher data speeds, thereby enabling the development of new and improved consumer products such as wireless computer local area networks and wireless cable modems.

DATES: Effective September 25, 2000.

FOR FURTHER INFORMATION CONTACT: Neal L. McNeil, Office of Engineering and Technology, (202) 418–2408, TTY (202) 418–2989, e-mail: nmcneil@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *First Report and Order,* ET Docket 99–231, FCC 00–312 adopted August 24, 2000 and released August 31, 2000. The full text of this document is available for inspection and copying during regular business hours in the FCC Reference Center, (Room CY–A257) 445 12th Street SW., Washington, DC. The complete text of this document also may be purchased from the Commission's duplication contractor, International Transcription Service, Inc., (202) 857–3800, 1231 20th Street, NW, Washington, DC 20036.

Summary of Report and Order

1. The First Report and Order (''R&O'') amends the Commission's rules for frequency hopping spread spectrum devices in the 2.4 GHz band (2400–2483.5 MHz). The rules were amended to allow frequency hopping spread spectrum transmitters operating in the band to use a minimum of 15 hopping channels, spanning a total of 75 MHz. The new rules will allow for hopping channels up to 5 MHz wide. The wider bandwidths will permit these systems to provide higher data speeds, thereby enabling the development of new and improved consumer products such as wireless computer local area networks and wireless cable modems.

2. The Commission initiated a Notice of Proposed Rule Making (''Notice''), 64 FR 38877, July 20, 1999, in this proceeding in response to a letter filed by the Home RF Working Group (''Home RF'') requesting that part 15 spread spectrum systems operating in the 2.4 GHz band be permitted to use bandwidths of up to 5 MHz. The Notice proposed rule changes consistent with the request of the Home RF Working Group. Specifically, the Notice proposed to allow systems to operate with bandwidths of up to 3 MHz or 5 MHz in the 2.4 GHz band. Under the proposal, the systems would utilize 75 hopping channels. Output power would be reduced in proportion to the increase in bandwidth over 1 MHz. For example, systems with 3 MHz bandwidths would operate with output power of no more than 320 mW and channel occupancy time no greater than 0.05 second per hop. Each of the 75 channels would be used at least once during a 3.75 second period. Like existing 1 MHz systems, the average time of occupancy on any channel would not be greater than 0.4 second within a 30 second period. Under the proposal, systems using 5 MHz bandwidths would operate with output power of no more than 200 mW and channel occupancy time of no greater than 0.02 second per hop. Each of the 75 hopping channels would be used at least once during a 1.5 second period. Again, the average occupancy time on any channel would remain 0.4 second or less per 30 second period.

3. Opponents of the proposed rules expressed a number of concerns. For example, the Wireless Ethernet Compatibility Alliance (''WECA'') filed comments October 14, 1999, asserting that devices operating under the proposed new rules will not be able to achieve the claimed higher data rates because they will be more prone to multipath and interference problems. The opponents therefore assert the Home RF proposal will have little or no public benefit. The opponents are concerned that, under the Notice, wide band frequency hopping systems could use overlapping hopping channels. Intersil and Lucent submitted technical analyses and test data claiming to show that interference from partially overlapping channels is more detrimental to frequency hopping systems than the first-adjacent or co-channel interference. According to Intersil, wide band frequency hopping systems employing overlapping channels will experience a greater level of mutual interference than existing systems that use 1 MHz bandwidths. To compensate, they assert that the systems would likely resort to multiple retransmissions, with the net effect that wide bandwidth systems will transmit continuously and totally occupy the 2400–2483 MHz band to the exclusion of other devices. Silicon Wave supports Intersil's findings. Several parties state that the Home RF proposal will cause interference to devices under development by Bluetooth, a cross-industry group formed to establish industry-wide specifications for unlicensed wireless voice and data communications devices operating in the 2.4 GHz band

4. WECA and other opponents of the Home RF proposal offer several proposals as a compromise to reduce the potential for interference to other part 15 devices. They maintain that the output power should be reduced much further than the proposed 200 milliwatts. Several members of WECA offer a compromise that would limit the bandwidth of wide band frequency hopping spread spectrum systems to 4 MHz, establish a minimum of 20 hopping channels, and restrict the output power to 65 milliwatts. WECA asserts that this proposal would be consistent with European standard ETS 300 328. The ETS 300 328 standard permits frequency hopping systems in the 2.4 GHz band to use at least 20 non-overlapping hopping channels, each with up to 4 MHz bandwidth, and up to 100 mW effective radiated power, or 61 mW transmitter output power based on an assumed antenna gain of 1.64. WECA notes that, in a previous proceeding where the Commission reduced the number of required hops for spread spectrum devices operating in the 915 MHz band, the output power was reduced in proportion to the square in the number of hopping frequencies. For a system using a 4 MHz bandwidth the number of hopping channels would be reduced by a factor of approximately 4 (from 75 to 20 channels), and the output power would need to be reduced by a factor of 16 (from 1 watt to 60 mW). WECA also suggests two additional requirements. First, WECA proposes to require interference rejection tests for receivers in frequency hopping systems having channel widths greater than 1 MHz. WECA states that the test is necessary to ensure that receiver performance is adequate to minimize the need to retransmit packets, which,

in turn, will minimize interference to other devices. Second, WECA suggests that the Commission place a maximum limit of 100 hops/sec for frequency hopping systems using bandwidths greater than 1 MHz.

As justification, WECA argues that parties on both sides of the debate have acknowledged that increasing the hopping rate also increases interference. However, WECA concedes that in some cases faster hopping is necessary and desirable for 1 MHz systems. Therefore, WECA does not propose maximum hopping rate restrictions for systems using 1 MHz channels.

5. In response to the opposition, supporters of the Notice offer suggestions for accommodating wider bandwidths without overlapping channels. In an *ex parte* filing received March 23, 2000, Proxim Inc. proposes to allow manufacturers to use 3 MHz or 5 MHz wide, non-overlapping hopping channels. The total number of channels used would span at least 75 MHz. Output power for systems using 3 MHz and 5 MHz wide channels would remain 320 mW and 200 mW, respectively, as originally proposed in the Notice. Under the Proxim proposal, the average time of occupancy on any hopping channel would be limited to 0.4 seconds within a 30 second period or a period of 30 seconds divided by the 20 dB channel bandwidth, whichever is less.

6. We find that the record supports rule changes that will permit wider bandwidths for frequency hopping spread spectrum systems. We reject the argument that such rule changes will have little or no benefit. We note that numerous parties filed comments indicating that the proposed rule changes would permit the introduction of a wide array of new and improved devices. We have no reason to doubt these claims. We anticipate that any technical constraints to higher data speeds using wider bandwidths can be overcome by appropriate equipment design. We also agree that rule changes to permit wide band frequency hopping systems will encourage competition with direct sequence technology, to the benefit of consumers.

7. We believe it is appropriate to adopt rules that represent a reasonable engineering compromise between the risks of increased interference and the desire to accommodate new technologies. We are concerned about the comments submitted by the opponents regarding the interference potential of overlapping frequency hopping channels. Intersil's technical analysis presents compelling arguments why overlapping channels should not be allowed. Supporters of the Notice submitted modified proposals which would eliminate the use of overlapping channels. In light of this concession, we will amend our rules to allow frequency hopping systems in the 2.4 GHz band to operate with at least 15 channels. The channels must be separated by at least their 20 dB bandwidths and may never overlap. The total span of channels shall be at least 75 MHz. We will also require that systems have a greater output power reduction than that proposed in the Notice. In order to reduce any potential impact on existing unlicensed devices, we will limit transmitter output power to 125 mW for any frequency hopping system that operates with fewer than 75 hopping channels. This power level is consistent with that used by many frequency hopping systems today and is only 3 dB more than opponents of the Home RF proposal. We are concerned that any further power reduction will constrain the useful operating range to such an extent that the devices will not be useful. The provision for 15 non-overlapping channels will accommodate up to 5 MHz bandwidths, which will allow faster data speeds and enable backward compatibility with existing devices.

8. In the Notice, we proposed minimum hopping rates of 20 hops/s (0.05 s/hop channel dwell time) and 50 hops/s (0.02 s/hop channel dwell time) for systems using 3 MHz and 5 MHz channels, respectively. However, in order to remain consistent with former regulations, we will leave the minimum hopping rate unchanged at 2.5 hops/s. Furthermore, we will not specify a maximum hopping rate for wide band frequency hopping systems, as WECA suggested. We realize that choosing the hopping rate for a system involves trade-offs. For example, the Committee for Unlicensed Broadband Enablement (''CUBE'') noted that faster hopping may be beneficial in some instances because the result is less time spent, on an instantaneous basis, on a channel that may be experiencing interference. On the other hand, faster hopping may also decrease system efficiency due to the greater amount of non-transmitting transition phases. The Commission has previously given manufacturers latitude in choosing the hopping rate which best suits their particular application. We are confident that manufacturers will continue to use good engineering practices in order to achieve their desired results without increasing the risk of harmful interference.

9. We will not specify receiver standards, as proposed in WECA's April 10, 2000 letter. We find that § 15.247(a)(1), which requires receiver input bandwidth to match hopping channel bandwidth, provides ample assurance that receivers are indeed functioning as part of a spread spectrum system. That is the intent of the rule section. Additionally, we agree with the Proxim letter dated April 14, 2000, stating that this issue is not appropriate for resolution in this First R&O since it was neither proposed by the Commission nor discussed by other parties.

10. The *Notice* in this proceeding, also proposed to modify the method for measuring processing gain for certain direct sequence spread spectrum systems. Because of the large volume of comments the Commission has received in this proceeding, we have decided to address the topics individually. Accordingly, we are postponing adoption of final rules for measuring processing gain. We will address the issue in a future Report and Order. The action we take here is not dependent on resolution of the processing gain issue.

Final Regulatory Flexibility Analysis

11. As required by the Regulatory Flexibility Act (''RFA''),[1] an Initial Regulatory Flexibility Analysis (''IRFA'') was incorporated in the *Notice of Proposed Rule Making* (''NPRM'') in this docket, ET Docket 99–231.[2] The Commission sought written public comment on the proposals in the NPRM, including comment on the IRFA. As described more fully below, we find that the rules we adopt in the *First Report and Order* will not have a significant economic impact on a substantial number of small entities.[3] We have nonetheless provided this Final Regulatory Flexibility Analysis (''FRFA'') to provide a fuller record in this proceeding. This IRFA conforms to the RFA.[4]

A. Need for and Objective of the Rules

12. The rules adopted in this First Report and Order are intended to facilitate the development of spread spectrum technology, particularly for high data-rate wireless applications. The rules will permit frequency hopping spread spectrum systems in the 2.4 GHz band (2400–2483.5 MHz) to operate with wider hopping channels. This action is taken in response to a request

[1] *See* 5 U.S.C. 603. The RFA, *see* 5 U.S.C. 601 *et seq.,* has been amended by the Contract With America Advancement Act of 1996, Public Law 104–121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[2] *See* ET Docket 99–231, FCC 99–149, 64 FR 38877, July 20, 1999.

[3] Thus, we could certify that an analysis is not required. *See* 5 U.S.C. 605(b).

[4] *See* 5 U.S.C. 604.

filed by the Home RF Working Group (''Home RF''). The Home RF request stated that the increased bandwidth is needed to meet business and consumer demand for high-speed data applications.

13. In the NPRM in this proceeding, the Commission also proposed to modify the method for measuring processing gain for certain direct sequence spread spectrum systems. Because of the large volume of comments the Commission has received in this proceeding, we have decided to address this second issue separately. Accordingly, we are postponing adoption of final rules for measuring processing gain, and will address the issue in a future Report and Order. The action we take here is not dependent on resolution of the processing gain issue.

B. Summary of Significant Issues Raised by Comments in Response to the IRFA

14. We received six comments in response to the IRFA in this proceeding. Three were submitted by the Office of Advocacy of the U.S. Small Business Administration (SBA), one by Proxim, Inc. (Proxim), which is a small business, and one comment apiece by the U.S. Senate and House Small Business Committees.

15. In its comment dated October 4, 1999, SBA stated that the IRFA did not comply with the RFA. Specifically, SBA stated that the IRFA did not fully consider the impact that the Commission's proposal would have on small entities. Furthermore, SBA stated that the IRFA failed to estimate the number of small businesses affected, describe the objectives of the proposed rules, propose alternatives, and properly state the paperwork burden the rules would place on equipment manufacturers. Accordingly, SBA stated that the Commission should not adopt final rules in this proceeding until the Commission conducted a fuller, superseding IRFA.

16. Subsequently, in the first of the remaining five, *ex parte* comments filed in response to the IRFA, Proxim filed a comment dated January 11, 2000. Proxim stated that approximately 80 small businesses filed comments in this proceeding, constituting over 66 percent of the almost 120 comments filed in total. Proxim noted that small business participated during both the comment and reply comment periods, and filed comments on both sides of the proposals. Last, Proxim argued that the proposal to permit frequency hopping spread spectrum systems would benefit small business by permitting ''a low cost means for home-based business to create a low-cost network capable of supporting high-capacity communications''—a network capability that, currently, ''likely is beyond the financial and/or technical reach of many small businesses and most very small home-based businesses.''

17. SBA's second comment was dated February 29, 2000. SBA clarified its position in light of Proxim's filing, stating that even if the significant economic effect of a proposal will be beneficial for small business, the proposal must be described and analyzed in an adequate IRFA. SBA stated that it did not wish to delay the issuance of final rules, and that, in light of the information provided by Proxim, the Commission should rectify its IRFA by conducting an adequate FRFA in conjunction with the adoption of final rules.

18. The Senate Committee on Small Business, in its comment dated August 8, 2000, stated that the IRFA did not sufficiently describe why the proposed action was being taken, did not discuss the reporting or recordkeeping requirements or skills necessary to satisfy the requirements of the rules, and did not offer alternatives to the proposed rules that would minimize the impact on small business. The Committee asked that the Commission revise the IRFA. The House Committee on Small Business, in its comment dated August 15, 2000, concurred with the Senate Committee's position.

19. SBA, in its third comment, dated August 18, 2000, stated that, in filing its second comment, SBA ''did not intend to withdraw its critical comments or relieve the FCC of its duty under RFA.''

20. In response to these comments, we have conducted this present, full FRFA. We also take this opportunity to discuss the previous analysis or IRFA, which, although not exhaustive, was sufficient to generate comments from the small business community. We believe that the record indicates that the IRFA met the objectives of the RFA. Delaying issuance of final rules at this time would not, therefore, advance those objectives.

21. First, concerning whether the IRFA sufficiently described why the proposed action was being taken, we note that the reason for action is clearly stated in the first paragraph of the Notice. The paragraph reads in part, ''We take this action to facilitate the continued development and deployment of spread spectrum technology, particularly for high data rate wireless applications.'' Therefore, interested parties who read the document were notified in the beginning of the item why the action was being taken. While the IRFA did not specifically mention the purpose of the proposed action, we believe that the Notice adequately informed interested parties of the reason for the proposed action, as required by the Regulatory Flexibility Act.

22. Concerning whether the IRFA adequately discussed the reporting or recordkeeping requirements or skills necessary to satisfy the rule requirements, we note that the IRFA stated that the proposed rule changes would not alter any current reporting or recordkeeping requirements. We emphasize that part 15 transmitters must be authorized under the Commission's certification procedure prior to marketing. The certification procedure requires that the device in question be tested to ensure that it is in compliance with Commission regulations. An application for certification must contain a report describing the test procedure as well as the test results. The proposal in the NPRM would permit alternative modes of operation for frequency hopping systems. However, the new operating modes would not alter the reporting or recordkeeping requirements for manufacturers of these devices.

23. The NPRM also proposed a modified test procedure for certain direct sequence spread spectrum systems. The Notice proposed that, ''manufacturers of direct sequence spread spectrum systems that use a spreading rate less than 10 chips per symbol to submit the results of the jamming margin test as well as a calculation of processing gain to verify compliance.'' This statement may have created the impression that the Commission was intending to impose new reporting requirements. However, as stated above, the certification procedure already requires the submission of test results and a report showing compliance with the rules. Our proposal only sought to clarify the specific information to include in this report.

24. Concerning whether the IRFA should have offered and discussed alternatives to the proposed rules that would have minimized the impact on small businesses, we believe that a positive benefit will result to small business as a result of this proceeding. Thus, we did not offer alternatives. Again, we should emphasize that the proposals would not require manufacturers to modify existing products. Instead, the rules would allow introduction of new devices into the marketplace. We expect that the rules will benefit small manufacturers by allowing them to distribute more diverse products. In turn, the more

diverse product selection will provide greater flexibility in designing wireless networks, thereby benefiting small businesses that use these types of devices.

25. Concerning whether the IRFA provided sufficient information so that the public could react in an informed manner, we note that, pursuant to the Administrative Procedure Act, *see* 5 U.S.C. 553, the Commission must provide ample opportunity for the public to comment on proposed rules. In this proceeding, the Commission provided a 75-day filing window for initial comments, followed by a 122-day period for reply comments. In total, the public had over six months to provide comments. More than 200 comments and other submissions were filed in this proceeding. Many of the commenters, including small businesses and educational institutions, enthusiastically endorsed the proposed changes. With the exception of the Small Business Administration, which subsequently clarified its comments, and Congress, no commenters raised adverse concerns regarding the IRFA. The Commission relies upon the public record to develop its rules. The rules changes in this proceeding were initiated at the urging and support of the small business community.

26. In addition, for existing manufacturers to take advantage of the revised rule and begin to supply frequency-hopping equipment, the manufacturer will need only to slightly modify frequency control components in their products. Such modification appears to us, given common understanding of the equipment, to be achievable with minimal effort and cost. In fact, as stated previously, many manufacturers, including small businesses, enthusiastically supported this rule change.

27. Last, we note that, in light of comments in response to the NPRM, we have altered our equipment usage parameters to eliminate the interference potential that might have resulted under the proposed rule. The changes have included eliminating the use of overlapping channels and reducing the maximum permitted power output.

C. Description and Estimate of the Number of Small Entities to Which the Rules Will Apply

28. The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.[5] The RFA generally defines the term ''small entity'' as having the same meaning as the terms ''small business,'' ''small organization,'' and ''small governmental jurisdictions.'' In addition, the term ''small business'' has the same meaning as the term ''small business concern'' under the Small Business Act, 15 U.S.C. 632, unless the Commission has developed one or more definitions that are appropriate to its activities.[6] A ''small business concern'' is one that: (1) Is independently owned and operated; (2) is not dominant in its field of operation; and (3) meets any additional criteria established by the Small Business Administration (''SBA'').[7]

29. The Commission has not developed a definition of small entities specifically directed toward manufacturers of unlicensed communications devices. Therefore, we will utilize the SBA definition applicable to manufacturers of Radio and Television Broadcasting and Communications Equipment. According to the SBA regulations, unlicensed transmitter manufacturers must have 750 or fewer employees in order to qualify as a small business concern.[8] Census Bureau data indicates that there are 858 U.S. companies that manufacture radio and television broadcasting and communications equipment, and that 778 of these firms have fewer than 750 employees and would be classified as small entities.[9] This action will not have a negative impact on small entities that manufacture unlicensed spread spectrum devices.

30. According to SBA regulations, an electronic computer manufacturer must have 1,000 or fewer employees in order to qualify as a small entity.[10] Census Bureau data indicates that there are 716 firms that manufacture electronic computers. Of those, 659 have fewer than 500 employees and qualify as small entities.[11] The remaining 57 firms have 500 or more employees; however, we unable to determine how many of those have 1,000 or fewer employees and therefore also qualify as small entities under the SBA definition.

31. According to SBA regulations, a computer terminal manufacturer must have 1,000 or fewer employees in order to qualify as a small entity.[12] Census Bureau data indicates that there are 757 firms that manufacture computer terminals. Of those, 162 have fewer than 500 employees and qualify as small entities.[13] The remaining 11 firms have 500 or more employees; however, we unable to determine how many of those have 1,000 or fewer employees and therefore also qualify as small entities under the SBA definition.

32. According to SBA regulations, a computer peripheral equipment manufacturer must have 1,000 or fewer employees in order to qualify as a small entity.[14] Census Bureau data indicates that there are 757 firms that manufacture computer terminal equipment. Of those, 701 have fewer than 500 employees and qualify as small entities.[15] The remaining 56 firms have 500 or more employees; however, we unable to determine how many of those have 1,000 or fewer employees and therefore also qualify as small entities under the SBA definition.

33. According to SBA regulations, a manufacturer of household appliances must have 500 or fewer employees in order to qualify as a small entity.[16] Census bureau indicates that there are 55 firms that manufacture household equipment in the ''catch all'' category for such data. Of those, 42 have fewer than 500 employees and qualify as small entities.[17] The remaining 13 firms have 500 or more employees, and therefore, unless one or more has exactly 500 employees do not qualify as small entities under the SBA definition.

D. Description of Projected Reporting, Recordkeeping and Other Compliance Requirements

34. Part 15 transmitters are already required to be authorized under the Commission's certification procedure as a prerequisite to marketing and importation. See 47 CFR 15.101, 15.201, 15.305, and 15.405. The new regulations will add permissible methods of operation for frequency hopping spread

[5] 5 U.S.C. 603(b)(3).

[6] *See* 5 U.S.C. 601(3).

[7] 15 U.S.C. 632.

[8] *See* 13 CFR 121.201, (SIC) Code 3663.

[9] *See* U.S. Dept. of Commerce, 1992 Census of Transportation, Communications and Utilities (Issued May 1995), SIC category 3663.

[10] 13 CFR 121.201, SIC code 3571.

[11] U.S. Small Business Administration 1995 Economic CEnsus Industry and Enterprise Report, Table 3, SIC Code 3571. (Burau of the Census data adapted by the Office of Advocacy of the U.S. Small Business Administration).

[12] 13 CFR 121.201, SIC code 3575.

[13] U.S. Small Business Administration 1995 Economic Census Industry and Enterprise Report, Table 3, SIC Code 3575. (Bureau of the Census data adapted by the Office of Advocacy of the U.S. Small Business Administration).

[14] 13 CFR 121.201, SIC code 3577.

[15] U.S. Small Business Administration 1995 Economic Census Industry and Enterprise Report, Table 3, SIC Code 3639. (Bureau of the Census data adapted by the Office of Advocacy of the U.S. Small Business Administration).

[16] 13 CFR 121.201, SIC code 3639 (Household Appliances, Not Elsewhere Classified).

[17] U.S. Small Business Administration 1995 Economic Census Industry and Enterprise Report, Table 3, SIC Code 3639. (Bureau of the Census data adapted by the Office of Advocacy of the U.S. Small Business Administration).

spectrum systems. No new reporting or recordkeeping requirements will be required for the manufacturers of frequency hopping spread spectrum devices.

35. As previously noted, in the NPRM in this proceeding, the Commission also proposed a modified test procedure for certain direct sequence spread spectrum devices. Although this *First Report and Order* does not address this second issue, we emphasize that the proposed processing gain measurement procedure would not alter reporting or recordkeeping requirements. As stated above, the certification procedure already requires the submission of test results and a report showing compliance with Commission rules. The proposal would clarify the specific information to include in this report.

E. Steps Taken To Minimize Significant Economic Impact on Small Entities and Significant Alternatives Considered

36. The rule changes adopted in this *First Report and Order* are intended to support the development of improved frequency hopping spread spectrum systems. These actions will benefit frequency hopping spread spectrum manufacturers, including small entities.

37. In the NPRM, we proposed to allow frequency hopping systems in the 2400–2483.5 MHz band to operate with bandwidths of up to 5 MHz. The increase in bandwidth over 1 MHz would be accompanied by a proportionate decrease in output power. The minimum number of hopping channels would remain the same.

38. Supporters of the NPRM argued that the rule changes were needed to accommodate high-speed data transmissions for home and business applications. The opponents argued that the proposed changes would cause unacceptable interference to other part 15 devices already operating in this spectrum. While they recognized that part 15 devices have no interference protection under the rules, opponents asserted that the Commission should act on public interest grounds to avoid increasing interference to existing consumer devices. They suggested several modifications to the proposal which, they claimed, would reduce the interference threat. Proponents of the NPRM also filed modified proposals in an effort to reach a compromise.

39. In response to the comments filed by interested parties, including small businesses, the Commission modified the proposal contained in the NPRM by requiring frequency hopping systems to use at least 15 non-overlapping channels. We have also reduced the maximum transmitter output power from that which was proposed in the NPRM. The new rules will accomplish the objectives stated in the NPRM while creating less of an interference threat to other systems currently operating in the 2400—2483.5 MHz band. The changes we adopt in this *First Report and Order* will result in increased maximum data rates for frequency hopping spread spectrum devices operating in the 2.4 GHz band. The rules will benefit manufacturers of home electronic equipment, including small businesses, by enabling them to offer customers a greater variety of products that meet their customers' networking needs.

40. As noted, we received numerous comments in this proceeding, and one alternative would have been to deny the request of Home RF and other proponents. That alternative, which we rejected, would not have resulted in the introduction of high-speed data applications that we believe will result as a consequence of the rules we are adopting.

41. *Report to Congress.* The Commission will send a copy of the First Report and Order, including this FRFA, in a report to Congress pursuant to SBREFA.[18] In addition, the Commission will send a copy of the First Report and Order, including the FRFA, to the Chief Counsel for Advocacy of the SBA.

[18] *See* 5 U.S.C. 801(a)(1)(A).

List of Subjects in 47 CFR Part 15

Communications equipment.

Federal Communications Commission.

Magalie Roman Salas,

Secretary.

Rule Changes

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR part 15 as follows:

PART 15—RADIO FREQUENCY DEVICES

1. The authority citation for part 15 continues to read as follows:

Authority: 47 U.S.C. 154, 302, 303, 304, 307, 544A.

2. Section 15.247 is amended by adding a new paragraph (a)(1)(iii) and revising paragraph (b)(1) to read as follows:

§ 15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

(a) * * *

(1) * * *

(iii) Frequency hopping systems in the 2400—2483.5 MHz band may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provided the systems use at least 15 non-overlapping channels. The total span of hopping channels shall be at least 75 MHz. The average time of occupancy on any one channel shall not be greater than 0.4 seconds within the time period required to hop through all channels.

(b) * * *

(1) For frequency hopping systems in the 2400–2483.5 MHz band employing at least 75 hopping channels, all frequency hopping systems in the 5725–5850 MHz band, and all direct sequence systems: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

* * * * *

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