

FCC MAIL SECTION

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

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DISPATCH

In the matter of)	
)	
Modification of Parts 2 and 15 of the)	
Commission's Rules for unlicensed devices and)	ET Docket No. 03-201
equipment approval.)	

NOTICE OF PROPOSED RULEMAKING

Adopted: September 10, 2003

Released: September 17, 2003

COMMENT DATE: [30 Days after publication in Federal Register]

REPLY COMMENT DATE: [45 days after publication in Federal Register]

By the Commission: Chairman Powell, Commissioners Copps, Martin and Adelstein issuing separate statements.

INTRODUCTION

1. By this action, we propose to review and update certain rule sections contained in Parts 2 and 15 of our rules.¹ We take this action as part of our ongoing process of updating our rules to promote more efficient sharing of spectrum used by unlicensed devices and remove unnecessary regulations that inhibit such sharing. Specifically, in this Notice, we propose to: 1) modify the rules to permit the use of advanced antenna technologies with spread spectrum devices in the 2.4 GHz band; 2) modify the replacement antenna restriction for Part 15 devices; 3) modify the equipment authorization procedures to provide more flexibility to configure transmission systems without the need to obtain separate authorization for every combination of system components; 4) harmonize the measurement procedures for digital modulation systems authorized pursuant to Section 15.247 of the rules with those for similar U-NII devices authorized under Sections 15.401- 15.407 of the rules;² 5) modify the channel spacing requirements for frequency hopping spread spectrum devices in the 2.4 GHz band in order to remove barriers to the introduction of new technology that uses wider bandwidths; 6) clarify the equipment authorization requirements for modular transmitters; and 7) make other changes to update or correct Parts 2 and 15 of our rules. In addition, we invite comment on ways the Commission might improve spectrum sharing among unlicensed devices.

2. These proposals, if adopted, should prove beneficial to manufacturers and users of unlicensed technology, including those who provide services to rural communities. Specifically, we note that a growing number of service providers are using unlicensed devices within wireless networks to serve the varied needs of industry, government, and general consumers alike. One of the more interesting developments is the emergence of wireless Internet service providers or "WISPs." Using unlicensed devices, WISPs around the country are providing an alternative high-speed connection in areas where

¹ 47 C.F.R. Parts 2 and 15.

² 47 C.F.R. § 15.247

cable or DSL services have been slow to arrive. We believe that the increased flexibility proposed herein will help to foster a viable last mile solution for delivering Internet services, other data applications, or even video and voice services to underserved, rural, or isolated communities.

BACKGROUND

3. Part 15 of the Commission's rules governs the operation of unlicensed radiofrequency devices. As a general condition of operation, Part 15 devices may not cause harmful interference to authorized radio services and must accept any interference that they receive.³ In recent years, there has been a significant increase in the number and types of devices operating under the Part 15 rules. Examples of common Part 15 devices include cordless phones, computers, wireless baby monitors, and garage door openers. Such devices are widely used in everyday consumer functions. Another prominent category of unlicensed technology includes spread spectrum and devices using digital modulation techniques governed by Section 15.247 of the rules.⁴ A wide variety of devices have been introduced under these rules for business and consumer use, including improved cordless telephones and computer local area networks. Moreover, the introduction of industry standards, such as IEEE 802.11 and Bluetooth, promise to increase both the number and variety of devices that will operate on an unlicensed basis.⁵ Overall, the Part 15 rules have been highly successful in fostering the development of new unlicensed devices while protecting authorized users of the radio spectrum from harmful interference. Millions of Part 15 devices operate within the current rules without any significant interference issues.

4. On September 6, 2002, the Commission released a *Public Notice* seeking comments regarding Commission rules which may be outdated and in need of revision.⁶ The *Public Notice* identified a number of rule sections in Parts 2 and 15 as candidates for review, and encouraged interested parties to provide comment on these rules. Subsequently, on September 26, 2002, the Commission released a separate *Public Notice* seeking suggestions as to which rule parts administered by the Commission's Office of Engineering and Technology should be modified or repealed as part of the 2002 biennial review.⁷ Some of the comments filed in response to these *Public Notices* are addressed by this Notice. This Notice also addresses other issues raised as a result of recent changes in technology.

³ 47 C.F.R. § 15.5.

⁴ The term "spread spectrum" devices as used herein also includes digitally modulated intentional radiators that comply with the rules in Section 15.247 of the Commission's rules, 47 C.F.R. § 15.247.

⁵ Unlicensed spread spectrum (digital) devices share spectrum with licensed services and generally operate in the following bands: 902-928 MHz (915 MHz), 2400-2483.5 MHz (2.4 GHz) and 5725-5850 MHz (5.7 GHz) bands. These bands are also referred to as the "ISM" bands because they are designated for industrial, scientific, and medical (ISM) applications in the Table of Frequency allocations in Part 2 of the rules. All services and devices, including spread spectrum devices, operating in the ISM bands must accept any interference received from industrial, scientific and medical equipment.

⁶ See *Public Notice*, "FCC Seeks Comment Regarding Possible Revision or Elimination of Rules Under The Regulatory Flexibility Act, 5 U.S.C. § 610," released September 6, 2002, DA 02-2152.

⁷ See *Public Notice*, "The Commission Seeks Public Comment in the 2002 Biennial Review of Telecommunications Regulations within the Purview of the Office of Engineering and Technology," released September 26, 2002, ET Docket No. 02-312.

DISCUSSION

A. Proposed Revisions to Part 15

1. Advanced Antenna Technologies

5. As unlicensed Part 15 spread spectrum use in the 2.4 GHz band for wireless networking has grown, so has the development of more efficient antenna technologies. The current spread spectrum rules, however, do not contemplate emerging advanced antenna technologies in that they only provide for the use of omnidirectional and point-to-point antennas. Omnidirectional antennas radiate and receive equally in all directions. While a system of this type is adequate for simple RF environments, the omnidirectional approach reaches desired users with only a small percentage of the overall energy sent out into the environment; signals that miss intended users represent wasted energy and could become interference to other users. Omnidirectional antennas can sometimes use spectrum in an inefficient manner by, for example, limiting frequency reuse. Under the current spread spectrum rules, omnidirectional antennas are limited to 1 watt transmitter output power and an antenna gain of 6 dBi, resulting in a transmitted signal of 4 watts E.I.R.P. If an antenna with greater than 6 dBi gain is used, the transmitter output power must be reduced by the amount in dB that the antenna gain exceeds 6 dBi, thereby fixing the maximum E.I.R.P. to 4 watts.⁸

6. The rules also provide for use of directional antennas for point-to-point operations. Directional antennas concentrate their energy to allow the same 1 watt of transmit output power to produce a signal that propagates much further in its intended direction while limiting emissions in all other directions. The resulting radiation pattern resembles an elongated oval extending from the antenna structure. Because these antennas limit RF radiation in any direction other than the desired communication path, the rules allow point-to-point antennas to employ higher gain with less than a one-to-one reduction in power. Fixed point-to-point antennas operating in the 2.4 GHz band are allowed to operate with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the antenna gain exceeds 6 dBi.

7. Systems employing advanced antenna designs such as sectorized antennas and phased array adaptive antennas are now being used, or contemplated for use, as part of wide area network systems operating in the 2.4 GHz band. Sectorized antenna systems take a traditional omnidirectional coverage area and subdivide it into fixed sectors that are each covered using a single beam or antenna element to transmit desired information to all devices in the sector. For example, a sectorized system can be made from two individual antennas, each covering 60° of azimuth around the antenna structure, resulting in 120° of coverage. Operationally, each sector is treated as a different cell, the range of which is greater than that of a system using a single omnidirectional antenna. A phased array antenna system consists of a group of radiating elements arranged and driven in such a way that their radiated fields add in some directions and cancel in others. The combined fields can produce a single beam, or multiple beams pointing in a various directions while minimizing radiation in other areas. Properties of the resultant beams such as intensity, direction, or beamwidth can be adjusted by altering the input signal to each radiating element.

8. Sectorized and phased array antennas are used to create dynamic communication links with associated mobile or fixed devices in any direction around an antenna structure. This enables an application like a broadband local area network to serve a number of spatially separated clients from a single antenna system. These antennas allow systems to use spectrum more efficiently by making it possible to re-use a given frequency to communicate with different devices along non-overlapping paths.

⁸ 47 C.F.R. § 15.247(b)(4).

9. The current rules are unclear regarding the treatment of sectorized and phased array systems. On one hand, if the antenna systems are allowed to operate at the higher point-to-point limits using the same frequency to communicate with a large number of clients located in various positions around the antenna site, the system would mirror the behavior of a point-to-multipoint or omnidirectional system and pose an increased risk of interference to other devices. On the other hand, these antennas, configured correctly, can be used to increase spectral efficiency by assigning spectrum usage on a dynamic basis according to user demand and re-using the same frequency to transmit different information to customers who are in different directions. In such a case, the same frequency may be reused multiple times within a geographical area to serve varied users.

10. We believe that it is in the public interest to accommodate efficiently configured sectorized and phased array antenna technologies. To date, the Commission has not generally authorized the operation of sectorized antennas by spread spectrum systems, but, by individual interpretation of its rules, we have allowed a few phased array systems to operate.⁹ However, we are receiving an increasing number of questions about how to accommodate these multiple beam systems in spread spectrum operations. After taking these requests under consideration, we tentatively conclude that spread spectrum systems using sectorized and/or phased array systems could provide important benefits for providing communications to a local area. We also believe that those benefits would outweigh the concerns for interference, *i.e.*, spectrum overcrowding, if the devices comply with appropriate operating conditions. Therefore, we believe that we should revise the rules to clearly facilitate broader deployment of advanced antenna designs with spread spectrum systems and to provide a stable environment in which to foster the continued development and installation of these spectrum efficient technologies.

11. In order to adopt regulations for sectorized and phased array antenna systems used with spread spectrum systems, we must first provide a clear definition of the types of systems that will be accepted. We seek comment regarding the characteristics that a system would need to exhibit in order to be classified as a sectorized or phased array antenna system. As an initial matter, we propose to clarify that sectorized or phased array antenna systems must be capable of forming at least two discrete beams. Second, we propose to limit the total simultaneous beamwidth radiating from the antenna structure to 120°, regardless of the number of beams formed. The 120° of bandwidth need not be continuous and may be divided among various independent beams pointing in different directions around the antenna structure. In this implementation, a sector system or phased array would be permitted to transmit simultaneously in 2 beams of 60°, 10 beams of 12°, or any other combination not exceeding a total of 120° beamwidth. Such a regulation would prevent abuse of our rules by banning phased array systems which, in an extreme case, may be able to form beams of 1° width simultaneously along 360 radials around an antenna structure. An antenna system of such design would appear identical to an omni-directional antenna. Commenting parties should provide detailed suggestions regarding any additional modes of operation that should be considered acceptable as a definition for sectorized or phased array installations.

12. Sectorized and phased array antenna systems divide the total power from a transmitter among various transmission azimuths and the power may be distributed equally or at varying levels among those azimuths. The radiated emissions are directionalized along each sector or azimuth in order to communicate with an associated receiver. Accordingly, these antenna systems may resemble point-to-point operation at any given moment. Therefore, we propose to allow such systems to operate at the same power levels as point-to-point directional antennas. Specifically, we propose to limit the total power that may be applied to each individual beam to the applicable power level specified in Section 15.247(b), *i.e.*,

⁹ See equipment authorizations for Vivato, Inc., FCC ID Nos. QLN-DP2310P0001 and QLNVLJ24WFSW. See also equipment authorization for Navini Networks, Inc., FCC ID No. PL6-ISM-BTS-R1. Information pertaining to these grants can be accessed via the FCC's database at <https://gulfoss2.fcc.gov/prod/oet/cf/eas/reports/GenericSearch.cfm>.

0.125 watt or 1 watt, depending upon the type of modulation used.¹⁰ This implies that the total operating power, the aggregate power in all beams, could exceed the output power permitted for a single point-to-point system. We propose, therefore, to limit the aggregate power transmitted simultaneously on all beams to 8 dB above the limit for an individual beam. For instance, the 8 dB limit will enable antenna systems to create up to 6 individual beams or sectors, all operating at the point-to-point limit. Such an implementation is based on our understanding of the capabilities of existing technology. Finally, we propose to require that the transmitter output power be reduced by 1 dB for each 3 dB that the directional antenna gain of the complete system exceeds 6 dBi. This requirement is similar to the present rules for point-to-point operation in the 2.4 GHz band. We seek comment on these proposals. Further, we seek comment with regard to whether the Commission should specify a maximum E.I.R.P. limit for each individual beam. If so, what should that limit be?

13. We note that certain antenna designs also employ adaptive properties such as steerability or beamforming characteristics.¹¹ The proposed rules will not require that the individual sectors or beams be adaptive. Therefore, the rules will be technology neutral and able to accommodate various antenna system designs. With this in mind, we seek comment regarding additional restrictions which may be needed. For example, a phased array antenna system may be able to produce dynamic beams which can overlap one another. In such a case, should there be an additional power reduction required whenever two or more beams overlap?

14. The proposed rules will accommodate the phased array antenna systems which the Commission has previously allowed by interpretation of the rules. These systems are now either in advanced stages of development or already deployed in the field. We seek comment with regard to the treatment of existing systems in light of any rules adopted as a result of this proceeding. We propose the following compliance schedule: all newly certificated systems must comply upon the effective date of the new rules; certificated systems marketed six months after the effective date must comply with any new rules. We do not propose to require any modifications to existing certificated equipment that is deployed in the field.

15. We ask if there is any need to modify the compliance testing requirements for systems that employ multiple antennas or radiating elements. Section 15.31(h) of the rules requires that compliance measurements for systems with multiple antennas must be taken with all radiating sources emitting.¹² Should this requirement be applicable to the special case of sector or phased array antennas? Sector antenna systems in particular typically complete a communications link by utilizing specific radiating elements to form a beam. Therefore, testing these systems with all elements radiating simultaneously will not replicate real-world operation. Is the same true for phased array systems? Is it necessary for all radiating elements of sector or phased array antennas to be emitting in order to determine potential out-of-band and spurious emission levels?

2. Replacement Antennas for Unlicensed Devices

16. Section 15.203 requires that intentional radiators be designed such that no antenna other

¹⁰ 47 C.F.R. § 15.247(b).

¹¹ Steerability refers to a system's capability to complete an RF link with a given client and to subsequently maintain that link while the client is mobile by steering the beam to track the client's movements. Beamforming refers the ability to create static beams of various widths and power levels along different azimuths around the antenna structure.

¹² 47 C.F.R. § 15.31(h).

than that supplied can be used with the device.¹³ The rules state that the device can be designed such that a broken antenna can be replaced by the user; however, the use of a standard antenna jack or electrical connector is prohibited. These rules are intended to prevent intentional circumvention of the Part 15 emission limits by replacing a device's authorized antenna with an antenna having higher gain characteristics.

17. We wish to develop more flexible antenna requirements for unlicensed devices. We propose to provide that flexibility by requiring testing only with the highest gain antenna of each type that would be used with the transmitter at the maximum output power of that transmitter. Any antenna of a similar type that does not exceed the antenna gain of tested antennas may be used without retesting. Use of an antenna of a different type than the tested antenna (*i.e.* yagi antenna vs. a horn antenna)¹⁴ or one that exceeds the gain of a tested antenna would require retesting and new approval by either a Telecommunication Certification Body or the Commission. Manufacturers would be expected to supply a list of acceptable antenna types with applications for equipment authorization.

3. Flexible Equipment Authorization for Radio Transmission Systems

18. Wireless internet service providers (WISPs) have expressed a desire for more flexibility in the Part 15 equipment authorization rules so that they can mix and match the components of a radio transmission system without the need to obtain an equipment authorization for every combination.¹⁵ The rules generally require equipment authorization for a complete device, including the radio transmitter and a specific antenna. Further, Section 15.205 prohibits marketing of external radio frequency amplifiers, except as part of a complete transmission system consisting of an intentional radiator, external radio frequency amplifier and antenna.¹⁶ The system may only be used in the configuration that was authorized. WISPs assert that they often experience difficulty in tailoring their radio transmission systems to meet particular needs due to the lack of flexibility in equipment authorization. For example, WISPs may be unable to change antennas to suit a particular application, even though such a change does not alter the operating parameters of the system. They assert that increased flexibility would foster competition in the supply of equipment and allow for greater innovation in the design of systems appropriate to the particular engineering challenges each WISP faces.

19. We are proposing a number of rule changes to enable WISPs to customize their transmission systems without the need to obtain a new equipment authorization for every combination of components. Specifically, we will allow professional radio system installers and parties that offer a commercial radio service under the unlicensed rules to substitute technically equivalent components in systems that have been granted equipment authorization.¹⁷ We believe such parties have the technical competence to ensure that the systems they deploy continue to comply with the FCC rules.¹⁸ We invite

¹³ 47 C.F.R. § 15.203.

¹⁴ A yagi antenna, similar to the common rooftop TV antenna, has different transmit and receive properties than a horn type antenna used on microwave towers. Therefore, simply replacing one with the other would result in a change in the radiated signal pattern.

¹⁵ *Spectrum Policy Task Force Report*, ET Docket No. 02-135, November 2002, at 54 and Recommendation 35 at 67: WISPs and point-to-point microwave systems the Commission should facilitate greater flexibility by making it easier for operators to better tailor their equipment for particular applications.

¹⁶ 47 C.F.R. § 15.204.

¹⁷ Organizations such as WISPs or colleges and universities that provide radio services for a fee will be eligible to make use of the flexibility we propose herein.

¹⁸ We believe that this recommendation is consistent with prior recommendations for professional installation. For example, we note that the Commission has recommended use of professional installers for certain two-way fixed

(continued...)

comment as to whether specific criteria are necessary to qualify as a professional radio system installer or commercial service provider, and if so, what those criteria should be. We also request views as to whether any other parties should be afforded similar flexibility. We will require the professional installer or commercial service provider to place a label on the transmission system that lists the FCC Identification Number of the system that was granted equipment authorization, identifies any components that were substituted, and designates a point of contact for the party that installed the system.

20. We also propose to allow marketing of separate radio frequency power amplifiers on a limited basis. We will restrict such marketing to amplifiers that are only capable of operation under the spread spectrum rules in Section 15.247 and under the U-NII rules for the 5750 – 5850 MHz band. These are the rules under which WISPs currently offer most service and under which most unlicensed wireless broadband devices operate.¹⁹ Further, we propose to require that such amplifiers obtain an equipment authorization (certification) and demonstrate that they cannot operate with an output power of more than 1 Watt, which is the maximum permitted under the rules. We believe that this rule change would be of benefit not only for WISPs, but also for consumers and businesses generally. For example, consumers and businesses would have the ability to obtain a separate amplifier if they find the device they have purchased has insufficient operating range to meet their needs. We invite comment as to whether we should instead provide only a more narrow relaxation to allow separate marketing of power amplifiers that are designed in a way such that they can only be used with a specific system that is covered by an equipment authorization, such as through use of a unique connector or via an electronic handshake with a host device. We also recognize that frequency hopping systems that employ fewer than 75 hops are limited to an output power of 125 mW and invite comment as to whether the unique connector requirement may be necessary to ensure that 1 Watt amplifiers are not used with devices that are limited to 125 mW. We invite comment on these proposals and solicit views on other ways the equipment authorization rules might be modified to provide added flexibility without creating undue risk of interference to radio services or unlicensed devices.

4. Measurement Procedures for Digital Modulation Systems

21. The current rules permit digitally modulated systems to operate in the 5.7 GHz band under either the Part 15 U-NII rules or the Section 15.247 spread spectrum rules. Under either set of rules, the devices are limited to a maximum output power of 1 watt.²⁰ However, the method used to determine the maximum power varies for U-NII use and spread spectrum use. Specifically, the output power measurement made in accordance with the Commission's U-NII device test procedure is an average measurement, while the output power measurement made in accordance with the Commission's digitally-modulated spread spectrum device test procedure is a measurement of the overall peak emission. In adopting the U-NII rules, the Commission recognized that digital modulation techniques often display short duration peaks that do not cause increased interference to other operations. Measuring the peak

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wireless subscriber equipment. The Commission stated that professional installation will minimize the possibility that an antenna will be placed in a location that is likely to expose persons to the transmit signal at close proximity and for an extended period of time. See *First Report and Order and Further Notice of Proposed Rulemaking in WT Docket No. 99-217*, *Fifth Report and Order and Memorandum Opinion and Order and Memorandum Opinion and Order in CC Docket No. 96-98*, and *Fourth Report and Order and Memorandum Opinion and Order in CC Docket No. 88-57*, 15 FCC Rcd. 22983, ¶ 119 (2000).

¹⁹ We are not proposing to allow radio frequency amplifiers in the 5150 – 5350 MHz U-NII band. We note that the 5150-5250 MHz band is restricted to indoor operation only. Further, we understand that some WISPs offer service using the 5250 – 5350 MHz U-NII band, however, because the output power is limited to only 200 mW there is little need to use external radio frequency amplifiers in this spectrum.

²⁰ See 47 C.F.R. §§ 15.247(b)(3) and 15.407(a)(3).

level of short duration spikes overestimates interference potential. Accordingly, the Commission established measurement procedures for digital U-NII devices which allow for averaging output power in order to disregard these insignificant spikes.²¹

22. The Commission recently amended Section 15.247 in the *Second Report and Order* in ET Docket No. 99-231 to accommodate advanced digital modulation techniques similar to U-NII devices.²² However, no changes were made to the measurement methods for devices authorized pursuant to Section 15.247. As a result, the current rules may lead to inconsistent treatment of similar devices. For example, a Wi-Fi 802.11g device certified pursuant to Section 15.247 uses orthogonal frequency division multiplexing (OFDM); likewise, a Wi-Fi 802.11a device certified pursuant to the U-NII specifications also uses OFDM. However, compliance testing for these similar devices is different. We believe that the measurement procedures for digital modulation devices should be consistent, regardless of the rule section under which the devices are authorized. Since the rule modifications adopted in ET Docket No. 99-231 were intended to permit operation of devices using digital modulation similar to those authorized by the U-NII rules for the 5.7 GHz band to operate in the 2.4 GHz and 915 MHz bands, it is logical to require such devices to meet similar standards.

23. Accordingly, we propose to harmonize the measurement procedures for digital modulation devices authorized under Section 15.247 with the digital U-NII devices authorized under Section 15.407. Specifically, we propose to allow entities performing compliance testing for Section 15.247 devices to use an average, rather than overall peak, emission as provided by Section 15.407, paragraphs (a)(4) and (a)(5) when measuring transmit power. We propose this change for devices using digital modulation that operate in the 915 MHz, 2.4 GHz and 5.7 GHz bands. We seek comment on whether a change in measurement procedure for such devices would have any detrimental impact on the installed base of products.

24. Aside from the differences in measurement procedures, Section 15.247 and U-NII devices also differ in spectrum occupancy characteristics. For example, a Section 15.247 device operating in the 5.7 GHz band is required to limit peak power spectral density to 8 dBm in any 3 kHz band, which equates to 33 dBm in any 1 MHz band.²³ Unwanted emissions from such a device are not required to be attenuated to the general emission limits of Section 15.209.²⁴ Conversely, the same device, if authorized pursuant to the U-NII rules, would be required to limit its power spectral density to 17 dBm in any 1 MHz band and to limit unwanted emissions to the levels specified in Section 15.209.²⁵ Realizing that a device may occupy the same spectrum band differently depending upon the rule section under which it is authorized, would a common procedure for measuring output power be appropriate and provide an accurate assessment of device performance? Should we amend the spectrum occupancy rules for Section 15.247 and U-NII devices to apply the same limits to both types of devices, and if so, which limits should be applied?

²¹ See 47 C.F.R. §§ 15.407(a)(4) – (a)(6).

²² *Second Report and Order* in ET Docket No. 99-231, 17 FCC Rcd. 10755 (2002).

²³ See 47 C.F.R. § 15.247(d).

²⁴ See 47 C.F.R. § 15.247(c). Only those radiated emission that fall into the restricted bands as defined in 47 C.F.R. § 15.205(a) must comply with the radiated emission limits specified in 47 C.F.R. § 15.209(a).

²⁵ See 47 C.F.R. §§ 15.407(a)(3) and 15.407(b)(3); respectively.

5. Frequency Hopping Channel Spacing Requirements

25. In its comments filed in response to the 2002 Regulatory Flexibility Act Review,²⁶ the Bluetooth Special Interest Group (Bluetooth SIG) suggests a modification of the channel separation requirement for frequency hopping spread spectrum systems.²⁷ Section 15.247(a)(1) of the rules requires that frequency hopping systems have hopping channel center frequencies separated by either a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.²⁸ The Bluetooth SIG requests that this channel spacing requirement be modified to allow hopping channel carrier frequencies to be more closely spaced. In particular, it seeks to modify the requirement to allow a separation of a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater. Although the request did not specify the operating band to which the changes should apply, we interpret the request as being applicable to devices operating in the 2.4 GHz band because the Bluetooth product line operates in the 2.4 GHz band.

26. The Bluetooth SIG is requesting this modification to accommodate next generation Bluetooth technology which will use advanced modulation schemes capable of higher data rates than existing Bluetooth devices.²⁹ Specifically, Bluetooth devices conforming to the present rules operate at a data rate of up to 1 Mbps. Second generation Bluetooth devices employing new modulation techniques will be capable of data rates of up to 3 Mbps. This improvement will enable future Bluetooth devices to be used for more data intensive applications like wireless local area networks.

27. The Bluetooth SIG states that the current-channel spacing requirements are met using modulation techniques such as frequency shift keying, which is characterized by signals with relatively high signal peaks and steep drop-offs. However, its new modulation technique has a relatively low signal peak with more gradual signal drop-off. The resulting hopping channel bandwidths are slightly wider than the channel bandwidths of systems using older modulation techniques. The Bluetooth SIG selected the new modulation technique for its second generation product because the technique is backward compatible with existing modulation schemes.³⁰

28. The Commission supports introducing more spectrally efficient technologies, and we seek to ensure that unnecessary regulations do not hinder industry efforts. For example, in 1999, the Commission initiated ET Docket 99-231 to re-examine the regulations for spread spectrum devices operating pursuant to Section 15.247. In subsequent actions in that docket, the Commission modified its rules to permit a wider array of modulation schemes to improve system performance, yet not increase interference potential.³¹

29. Accordingly, we propose to modify the frequency hopping spacing requirement to permit certain systems in the 2.4 GHz band to utilize hopping channels separated by either 25 KHz or two-thirds

²⁶ See Comment of the Bluetooth SIG, DA 02-2152, November 8, 2002.

²⁷ Frequency hopping spread spectrum systems spread their energy by changing, or "hopping," the center frequency of the modulated signal in accordance with a pseudorandomly generated list of channels.

²⁸ See 47 C.F.R. § 15.247(a)(1). The bandwidth of a hopping channel is determined by measuring the bandwidth between points on both sides of the maximum power frequency at which the power drops to 20 dB below the maximum power.

²⁹ See Comments of the Bluetooth SIG, filed in DA 02-2152.

³⁰ See Bluetooth SIG comments at 4.

³¹ See *First Report and Order* in ET Docket 99-231, 15 FCC Red. 16244 (2000). See also *Second Report and Order* in ET Docket 99-231, 17 FCC Red. 10755 (2002).

of the 20 dB bandwidth, whichever is greater. We recognize that although a single device's channels will not overlap in time, the use of multiple devices simultaneously in a given area may cause the spectral occupancy and power density to increase, leading to an increased risk of interference. Therefore, we seek comment on the interference potential of new waveforms with more gradual roll-off and potentially higher spectral power densities at the channel band edges.

30. We note that the current rules place output power limitations on frequency hopping systems based upon the number of hopping channels used. Specifically, systems in the 2.4 GHz band that use at least 75 hopping channels are allowed 1 watt output power.³² However, systems that use fewer than 75 hopping channels are limited to 125 mW output power.³³ In general, many systems that employ fewer than 75 hopping channels use hopping channels that are wider than those that use 75 or more channels. In allowing these wider hopping channels, the Commission recognized that a reduction in the maximum permitted output power was needed in order to minimize any potential interference risk.³⁴ We tentatively conclude that an output power limit of no more than 125 mW is also appropriate for those systems that use more narrowly spaced channels than currently permitted. In line with previous Commission findings, we believe that this restriction will ensure that systems using the narrow-spaced, slightly wider hopping channels will not overcrowd the 2.4 GHz band with relatively high-power emissions. We seek comment on this proposal.

6. Part 15 Unlicensed Modular Transmitter Approvals

31. In recent years, manufacturers have developed radio modules that can be incorporated into many different devices. The modules generally consist of a completely self-contained radiofrequency transmitter missing only an input and a power source to make it functional. Once the modules are authorized by the Commission under our certification procedure, they may be incorporated into a number of host devices such as, PCs or PDAs, which have been separately authorized.³⁵ The completed product generally is not subject to requirements for further certification by the FCC. Therefore, modular transmitters save manufacturers the time and any related expenses that would be incurred if a new equipment authorization were needed for the same transmitter when it is installed in a new device.

32. In response to manufacturers' request for guidance about the conditions under which approvals for modular transmitters may be granted, the Commission released a *Public Notice* in 2000 entitled "Part 15 Unlicensed Modular Transmitter Approval."³⁶ The *Public Notice* detailed eight criteria which must be met in order for the Commission to grant certification for modular transmitters. The *Public Notice* only contemplated a device where all of the radio frequency components were contained completely within the module itself.

33. A new class of "partitioned" modular devices is now under development. These transmitters consist of two basic components: the "radio front end," or radio elements and the "firmware" or specific hardware on which the software that controls the radio operation resides. The radio front end and firmware can each be self-contained units. The radio front end is generally a stand-alone unit while

³² 47 C.F.R. § 15.247(b)(1).

³³ *Id.*

³⁴ See *First Report and Order* in ET Docket 99-231, 15 FCC Rcd 16244 (2000) at paragraph 15.

³⁵ The Commission's equipment certification authorization procedure is set forth in Section 2.907 and 2.1031 – 2.1060, 47 C.F.R. §§ 2.907 and 2.1031 – 2.1060.

³⁶ See *Public Notice*, Part 15 Unlicensed Modular Transmitter Approval, DA 00-1407, released June 26, 2000.

the firmware may either be a stand-alone unit or may be collocated within a device on a host system. A further partitioning is also possible by removing the local oscillator and tuning capacitors the antenna from the radio front end. The separation of modular units into these even smaller components will provide manufacturers the flexibility to design a larger variety of modular systems by mixing and matching individual components.

34. We believe that it is appropriate to update the Commission's practices for approving modular transmitters to accommodate both existing modular devices and emerging partitioned modular architectures (consisting of the firmware, radio front end, local oscillator and tuning capacitors, and antenna), so long as they meet certain guidelines. Accordingly, we are proposing to codify the eight criteria for approving modular transmitters contained in the 2000 *Public Notice*.

35. The eight requirements for obtaining modular transmitter approvals as documented in the 2000 *Public Notice* are re-printed below:

1. The modular transmitter must have its own RF shielding. This is intended to ensure that the module does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed. Such coupling may result in non-compliant operation.
2. The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation.
3. The modular transmitter must have its own power supply regulation. This is intended to ensure that the module will comply with Part 15 requirements regardless of the design of the power supplying circuitry in the device into which the module is installed.
4. The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a "unique" antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The "professional installation" provision of Section 15.203 may not be applied to modules.
5. The modular transmitter must be tested for electromagnetic compatibility in a stand-alone configuration, *i.e.*, the module must not be inside another device during testing. This is intended to demonstrate that the module is capable of complying with Part 15 emission limits regardless of the device into which it is eventually installed. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines used during testing shall be a length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting test equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).
6. The modular transmitter must be labeled with its own FCC ID number, and, if the FCC

ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions to parties that may include the module in their product that such a label must be placed on the outside of the device. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

7. The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements. A copy of these instructions must be included in the application for equipment authorization. For example, there are very strict operational and timing requirements that must be met before a transmitter is authorized for operation under Section 15.231. For instance, data transmission is prohibited, except for operation under Section 15.231(e), in which case there are separate field strength level and timing requirements. Compliance with these requirements must be assured.
8. The modular transmitter must comply with any applicable RF exposure requirements. For example, FCC Rules in Sections 2.1091, 2.1093 and specific Sections of Part 15, including 15.319(i), 15.407(f), 15.253(f) and 15.255(g), require that applicants for equipment authorization of Unlicensed PCS, U-NII and millimeter wave devices perform routine environmental evaluation for RF Exposure to demonstrate compliance. In addition, spread spectrum transmitters operating under Section 15.247 are required to address RF Exposure compliance in accordance with Section 15.247(b)(4). Modular transmitters approved under other Sections of Part 15, when necessary, may also need to address certain RF Exposure concerns, typically by providing specific installation and operating instructions for users, installers and other interested parties to ensure compliance.

36. We re-iterate that the requirements above are particular to modular transmitters in which all components are housed within a single enclosure. We propose to modify requirements 1, 2, and 5 in order to accommodate the special case of new partitioned modules in which the antenna, radio front end, and firmware are independent of one another.

37. *Requirement #1.* We propose to clarify that only the radio front end of a partitioned modular unit must be shielded. All components that require shielding would be required to be inside this unit. The other sections of the modular unit, the firmware that will be either part of another device or sit "stand-alone" on a platform and an antenna to complete the system, would not required to be shielded. We would also provide that the physical crystal and tuning capacitors can be located external of the shielded radio front end.

38. In addition, we are proposing that the interface between the sections of the modular system must be digital with a minimum signaling amplitude of 150 mV peak-to-peak. Using this signaling level definition, interfering signals can be injected into this interface and the output can be tested for compliance with the regulations. We seek comment regarding alternative methods of demonstrating compliance with the FCC rules, including: a) impulse interference testing similar to that

used in EN61000-4-4;³⁷ b) using a two-tone interference test and coupling the interferers into the cabling; and c) looking at interference levels required to degrade the bit error rate of the interference to an unacceptable level, (i.e., typical interface bit error rates of 10^{-11} , degraded to 10^{-6}).

39. *Requirement #2.* This requirement deals with buffered modulation input to prevent over modulation. In self-contained modules, only data that is to be transmitted is presented as input. However for partitioned modules, control information (frequency, power, and radio operation) needs to be shared between the radio front end and firmware. Accordingly, we propose to update this requirement to allow control information and other data to cross the interface between the firmware and the radio front end.

40. *Requirement #5.* For the purpose of testing partitioned modules, we propose to define a “reference platform” that the radio manufacturer would build and submit for testing. At the minimum, a reference platform would consist of the radio front end, antenna, and an “environment” such as a PDA or laptop on which the firmware will operate. Any future changes to the radio front end or firmware would require re-testing on the pre-approved reference platform. The signal injection testing would be done on the implementation with a maximum length of cabling connecting the modular components. We seek suggestions regarding both the design of a reference platform and the length and type of cable used to connect the components.

41. In addition to the changes proposed above, we also propose to add a ninth requirement specific to partitioned modular transmitters to ensure that only a radio front end and firmware that have been certified together as a pair may operate with one another. This requirement will make certain that consumers or third parties do not mix and match radio front ends and firmware in combinations that may result in unauthorized operation. We propose to require that manufacturers implement a unique digital key or “Type Number” which allows approved radio front ends and firmware to recognize each other. We tentatively propose that the Type number will consist of a digital word 4 bytes in length with the following bit definition: 16 Bits for the Company information, 16 Bits for the Device Number. We seek comment on the practicality of implementing such a requirement. We encourage commenting parties to suggest appropriate methods for implementing this form of encryption for modular transmitters.

42. Finally, in order to comply with The National Environmental Policy Act of 1969 (NEPA) the Commission is required to evaluate the effects of our actions on the quality of the human environment.³⁸ One of several environmental factors addressed by these requirements is human exposure to RF energy emitted by FCC-regulated transmitters and facilities.³⁹ We realize that RF exposure compliance procedures for modular transmitters are not described in the 2000 *Public Notice*, and we have received numerous inquiries regarding the requirements for determining compliance with our RF exposure guidelines for these devices. Although we are not proposing, in this Notice, recommendations for determining compliance with our RF exposure rules, we direct interested parties to the recently adopted *Notice of Proposed Rule Making* in ET Docket 03-137.⁴⁰ We encourage those parties who are interested in filing comments with regard to RF exposure limits applicable to modular transmitters to file such comments in that proceeding.

³⁷ See, “IEC 61000-4-4, Electromagnetic Compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test,” published by the International Electrotechnical Commission.

³⁸ National Environmental Policy Act of 1969, as amended, 42 U.S.C. §§ 4321-4335.

³⁹ See 47 CFR § 1.1307(b).

⁴⁰ *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*, Notice of Proposed Rule Making in ET Docket No. 03-137, 18 FCC Rcd 13187 (2003).

7. Improving Sharing in the Unlicensed Bands

43. The current rules for unlicensed devices specify limitations on such parameters as power and out of band emissions while still providing flexibility to accommodate various technologies. We observe that industry has developed standards such as Bluetooth and the 802.11 family of standards, which fit within the framework of our rules and provide some measure of assurance that multiple devices can co-exist. The Commission continues to develop and implement regulations that it believes will both support the demand for wireless operation and provide an environment that promotes efficient spectrum sharing. For that purpose, the Commission recently proposed rules to open new spectrum in the 5.8 GHz band for unlicensed operation under the condition that certain performance characteristics are met.⁴¹ Furthermore, the Commission has initiated an inquiry asking questions regarding the possibility of allowing unlicensed devices to operate in spectrum reserved for television broadcast applications and in the 3560 - 3700 MHz band.

44. We invite comment on whether the Commission should consider any other methods to ensure efficient spectrum usage by unlicensed devices. For example, we note that the industry developed and the Commission adopted a "spectrum etiquette", or sharing conditions, for the operation of Unlicensed PCS devices operating under Part 15 of its rules.⁴² The etiquette establishes a set of steps a device must follow before it may access the spectrum.⁴³ The etiquette requires, that devices monitor the spectrum in which they intend to operate. The device may begin transmission only if no signal above a specified threshold is detected.⁴⁴

45. We invite comment on whether a spectrum sharing etiquette should be considered for devices that operate on an unlicensed basis, in addition to Unlicensed PCS devices. If so, should the Commission or the industry develop the criteria establishing access conditions? What characteristics need to be considered (*e.g.* spectrum monitoring requirements, bandwidth limits, variable output power levels)? Could an etiquette be implemented in such a way as to ensure continued flexibility for technological development, which has been the cornerstone of unlicensed operation? If a spectrum sharing etiquette is feasible, we seek comment regarding the bands to which the etiquette should apply. Finally, given the number of unlicensed devices currently in operation without a sharing etiquette, how effective will such an etiquette imposed on new entrants be in improving spectrum sharing?

8. Special Temporary Authority

46. We are proposing to delete the provisions in Section 15.7 of the rules for obtaining a Special Temporary Authority (STA).⁴⁵ The Office of Engineering and Technology has not granted any STAs under Part 15 nor had any formal requests for an STA under these rules in the last 10 years. We believe that this need is being met through the allowances for STAs under the provisions in Part 5 for experimental licenses. We invite comment as to whether there is any need to maintain the Part 15 provisions for STAs.

⁴¹ See *Notice of Proposed Rule Making* in ET Docket 03-122, 18 FCC Rcd. 11581 (2003).

⁴² See 47 C.F.R. Part 15, Subpart D – Unlicensed Personal Communications Service Devices.

⁴³ See 47 C.F.R. §§ 15.319, 15.321 and 15.323.

⁴⁴ 47 C.F.R. § 15.321(c)(1) – (7).

⁴⁵ 47 C.F.R. § 15.7.

B. Proposed Revisions to Part 2

1. Import Conditions

47. Section 2.1204 of the rules limits the importation of radio frequency devices that have not yet received equipment authorization and are not intended for operation within one of the Commission's licensed services to 200 or fewer units for testing and evaluation, and 10 or fewer units for demonstration at industry trade shows, provided the devices will not be offered for sale or marketed.⁴⁶ Devices intended for use in a licensed service can be imported in greater numbers; 2000 or fewer for testing and evaluation and 200 or fewer for demonstration purposes.⁴⁷ The Commission maintains that devices used in licensed services are easier to track and therefore need not be as tightly restricted.

48. Hewlett-Packard Company ("HP") contends that the importation restrictions do not reflect current manufacturing, design, and marketing techniques. For example, HP notes that in the past it was common practice to perform design and initial prototype manufacturing in the U.S. with final production occurring offshore. HP contends that today it is often more cost-effective to build prototype devices at the same offshore factories that will build the final product. In order to complete evaluation of a finished product, multiple prototype manufacturing phases are often required. Hundreds or thousands of units may be required for each phase of testing. Accordingly, HP states that the importation limit of 200 units is far too restrictive.

49. HP also points to changes in marketing practices as further evidence that the import limits are outdated. According to HP, manufacturers must promote awareness of new products far in advance of introduction into the market. In addition to trade shows, awareness can be heightened by distributing "press kits" that include working product samples. The intent is that writers of newspaper and magazine technical articles will assess the products and write favorable reviews. These press kits must be distributed well in advance of product introduction so that publication of the related articles can coincide with product marketing efforts. HP notes that, although the prototypes contained in press kits will not likely have received FCC approval, manufacturers are not in violation of the rules because there is no intent to sell the prototypes. The devices are returned to the manufacturer once the evaluation is completed.

50. Accordingly, HP asks that the Commission increase the number of devices, not intended for use in a licensed service, that may be imported to 2000 or fewer for testing and evaluation and 100 or fewer for demonstration purposes. Furthermore, HP requests that the modified rules be expanded to permit demonstration prototypes to be used, in addition to trade shows, for any other purpose designed to build market awareness. As an alternative to the suggested rule changes, HP states that the Commission could consider combining Sections 2.1204(a)(3) and 2.1204(a)(4) to create a limit of 2100 devices for all pre-authorized units to be used for, "design refinement, software development, marketing and customer support program development, or any other needed product development purpose, including promoting market awareness."⁴⁸

51. In 1998, the Commission re-examined its rules regarding importation of devices. In the *Memorandum Opinion and Order* in ET Docket No. 94-45, the Commission recognized that, in some authorized radio services, for example the Personal Communications Services, there are several hundred licensees, each of which may be interested in evaluating small quantities of sample base and mobile units

⁴⁶ See 47 C.F.R. §§ 2.1204(3)(ii) and 2.1204(4)(ii).

⁴⁷ *Id.*

⁴⁸ HP comments at footnote 7.

before making larger purchases.⁴⁹ This could result in frequent requests for permission to import a higher number of such units. In order to reduce this administrative burden, the Commission amended the rules to allow the routine importation of up to 2000 units for test and evaluation and up to 200 units for display at trade shows. The relaxed rules apply only for equipment intended to be operated in an authorized radio service and under a Commission-issued license. The Commission noted that there is little risk that equipment intended for use in a licensed service will be marketed or placed into permanent operation before it has been authorized as required because the equipment will remain within the control of either the manufacturer or a licensee. Further, such equipment normally is labeled with the name of the manufacturer, facilitating identification of the responsible party.

52. We believe that a relaxation of the import restrictions may be appropriate for devices not intended for use in licensed services. However, we seek comment on the potential for abuse of a revised importation rule. We note that the Commission has routinely received requests to import products in greater numbers than provided for in the current rules. Such requests are generally processed quickly with little delay. We are concerned that increasing the limit as HP requests might encourage some manufacturers to import far more devices than necessary and to request an exception to import an even greater number of devices, without sufficient cause. We seek comment on both the necessity of increasing the importation limit and the possibility of abuse of a revised rule.

53. Further, we seek comment on HP's proposal to modify our rules to permit demonstration prototype to be used "for any purpose designed to build market awareness." Initially, we believe that such a relaxation is too vague and could lead to uncontrolled distribution of unauthorized devices. However, we seek comment as to whether manufacturers would be able to track all products imported prior to the Commission completing the applicable equipment authorization requirements and to ensure that these devices are returned after the testing and evaluation period is over. Manufacturers should be able to show that implementation of tracking methods are possible in order to justify Commission modification of this requirement.

2. Electronic Filing

54. *Section 2.913(c) Submittal of equipment authorization application or information to the Commission.* Currently, the Commission requires applications for equipment certification to be filed electronically, but provides a waiver process for manual filing. In the five years that this rule has been in place, we have not received any waivers requests. Thus we propose to delete the provisions for a paper filing of an application for Certification.

55. *Section 2.926(c) FCC Identifier, Grantee Code.* The FCC Identifier listed on equipment authorizations issued by the Commission consists of a grantee code assigned by the Commission and an equipment product code assigned by the grantee. Section 2.926(c) permits applicants to submit a written request for assignment of a grantee code. We propose to modify this section of the rules to require electronic filing for all grantee code assignment requests. This proposed rule change will also further our efforts to comply with the E-Government initiative.⁵⁰

⁴⁹ See *Revision of Part 2 of the Commission's Rules Relating to the Marketing and Authorization of Radio Frequency Devices, Memorandum Opinion and Order* in ET Docket No. 94-45, 13 FCC Rcd. 12928 (1998).

⁵⁰ See the E-Government Act of 2002, Public Law No: 107-347. The law aims to enhance the management and promotion of electronic Government services and processes by, among other things, establishing a broad framework of measures that require using Internet-based information technology to enhance citizen access to Government information and services. E-Government uses improved Internet-based technology to make it easy for citizens and businesses to interact with the government, save taxpayer dollars, and streamline citizen-to-government communications.

56. *Section 2.929(c) and (d) Changes in name, address, ownership or control of grantee.* The current rules require the grantee of an equipment authorization to supply the Commission with a written notification whenever a change in name, address, ownership, or control of grantee occurs. We believe that notification can be accomplished faster and more efficiently electronically. Therefore, we propose to modify these sections of the Rules to require electronic filing for all changes in address, company name, contact person, and control/sale of the grantee. This process will provide the Commission with an electronic record of all transactions which will save both time and resources. Electronic filing will also support the E-Government initiative.

3. Accreditation of Test Laboratories

57. *Section 2.948 Description of Measurement Facilities.* Currently the Commission's rules do not address re-evaluation intervals for laboratories that submit Part 15 and Part 18 test data for certification. Accrediting bodies that evaluate the laboratories generally determine these intervals themselves. While domestic laboratories are generally re-evaluated at two-year intervals, some Accrediting Bodies reassess foreign laboratories only every 7 years. We believe that it is important that all laboratories, both foreign and domestic, be re-certified on a common interval. Accordingly, we propose to clarify that all test sites, both foreign and domestic, must be reassessed by their Accrediting Body every two years. More frequent re-certification will provide assurances that all laboratories remain in compliance with industry standards and procedures as they continue to evolve.

58. *Section 2.962 Requirements for a Telecommunication Certification Body.* Section 2.962(e)(1) states that the Commission will designate as a Telecommunications Certification Body any organization that meets the qualification criteria and is accredited by NIST or its recognized accreditor.⁵¹ The rule section does not place requirements on re-accreditation periods. We believe that it is important that Telecommunications Certification Bodies are routinely re-accredited to ensure continued compliance with applicable standards. Accordingly, in this section, we propose to clarify that every Telecommunications Certification Body must be re-accredited every 2 years for continued accreditation.

PROCEDURAL MATTERS

A. Initial Regulatory Flexibility Analysis

59. As required by the Regulatory Flexibility Act, 5 U.S.C. § 603, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in this document. The IRFA is set forth in Appendix C. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments filed in response to this Notice of Proposed Rule Making as set forth in paragraph 62, and have a separate and distinct heading designating them as responses to the IRFA.

B. Initial Paperwork Reduction Act of 1995 Analysis

60. This NPRM contains either a proposed or modified information collection. As part of its continuing effort to reduce paperwork burdens, we invite the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on the information collections contained in this NPRM, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. Public

⁵¹ 47 C.F.R. § 2.962(e)(1).

and agency comments are due at the same time as other comments on this NPRM; OMB comments are due 60 days from date of publication of this NPRM in the Federal Register. Comments should address: (a) whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

C. *Ex Parte* Rules - - Permit-But-Disclose Proceeding

61. This is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in the Commission's rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.2306(a).

D. Comments

62. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before [30 days from date of publication in the Federal Register] and reply comments on or before [45 days from date of publication in the Federal Register]. Comments may be filed using the Commission's Electronic Comment Filing System ("ECFS"), <http://www.fcc.gov/e-file/ecfs.html>, or by filing paper copies. See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 23,121 (1998).

63. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address.>" A sample form and directions will be sent in reply. Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

64. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Vistrionix, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, N.E., Suite 110, Washington, D.C. 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, SW, Washington, D.C. 20554. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

65. Parties who choose to file by paper should also submit their comments on diskette. Such a submission should be on a 3.5-inch diskette formatted in an IBM compatible format using Microsoft Word or compatible software. The diskette should be accompanied by a cover letter and should be

submitted in "read only" mode. The diskette should be clearly labeled with the commenter's name, proceeding (including the lead docket number, type of pleading (comment or reply comment), date of submission, and the name of the electronic file on the diskette. The label should also include the following phrase "Disk Copy - Not an Original." Each diskette should contain only party's pleading, preferably in a single electronic file. In addition, commenters must send diskette copies to the Commission's copy contractor, Qualex International, Portals II, 445 12th Street, SW, Room CY-B402, Washington, DC, 20554.

66. Alternative formats (computer diskette, large print, audio cassette and Braille) are available to persons with disabilities by contacting Brian Millin at (202) 418-7426, TTY (202) 418-2555, or via e-mail to Brian.Millin@fcc.gov. This Notice can also be downloaded at <http://www.fcc.gov/oet>.

E. Contact Person

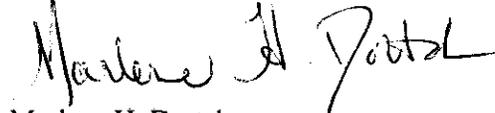
67. For further information concerning this rule making proceeding contact Neal McNeil at (202) 418-2408, Neal.McNeil@fcc.gov, Office of Engineering and Technology.

ORDERING CLAUSES

1. Accordingly, IT IS ORDERED that pursuant to the authority contained in Sections 4(i), 301, 302, 303(e), 303(f), 303(r), 304 and 307 of the Communications Act of 1934, as amended, 47 USC Sections 154(i), 301, 302, 303(e), 303(f), 303(r), 304, and 307, this Notice of Proposed Rule Making IS ADOPTED.

68. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this NPRM, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX A: PROPOSED RULE CHANGES

Part 2 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303 and 336, unless otherwise noted.

2. Section 2.913 is proposed to be amended by revising paragraphs (a), (b), and (c) to read as follows:

§ 2.913 Submittal of equipment authorization application or information to the Commission.

(a) All applications for equipment authorization must be filed electronically via the Internet. Information on the procedures for electronically filing equipment authorization applications can be obtained from the address in paragraph (c) of this section and from the Internet.

(b) Unless otherwise directed, fees for applications for the equipment authorization, pursuant to section 1.1103 of this chapter, must be submitted either electronically via the Internet or by following the procedures described in section 0.401(b) of this chapter. The address for fees submitted by mail is: Federal Communications Commission, Equipment Approval Services, P.O. Box 358315, Pittsburgh, PA 15251-5315. If the applicant chooses to make use of an air courier/package delivery service, the following address must appear on the outside of the package/envelope: Federal Communications Commission, c/o Mellon Bank, Mellon Client, Service Center, 500 Ross Street - Room 670, Pittsburgh, PA 15262-0001.

(c) Any equipment samples requested by the Commission pursuant to the provisions of subpart J of this part shall, unless otherwise directed, be submitted to the Federal Communications Commission Laboratory, 7435 Oakland Mills Road, Columbia, Maryland, 21046.

3. Section 2.926 is proposed to be amended by revising paragraph (c) to read as follows:

§ 2.926 FCC identifier.

* * * * *

(c) A grantee code will have three characters consisting of Arabic numerals, capital letters, or combination thereof. A prospective grantee or his authorized representative may receive a grantee code electronically via the Internet. The code may be obtained at any time prior to submittal of the application for equipment authorization. However, the fee required by section 1.1103 of this chapter must be submitted and validated within 30 days of the issuance of the grantee code, or the code will be removed from the Commission's records and a new grantee code will have to be obtained.

* * * * *

4. Section 2.929 is proposed to be amended by revising paragraphs (c) and (d) to read as follows:

§ 2.929 Changes in name, address, ownership or control of grantee.

* * * * *

(c) Whenever there is a change in the name and/or address of the grantee of an equipment authorization, notice of such change(s) shall be submitted to the Commission via the Internet within

30 days after the grantee starts using the new name and/or address.

(d) In the case of transactions affecting the grantee, such as a transfer of control or sale to another company, mergers, or transfer of manufacturing rights, notice must be given to the Commission via the Internet within 60 days after the consummation of the transaction. Depending on the circumstances in each case, the Commission may require new applications for equipment authorization. In reaching a decision the Commission will consider whether the acquiring party can adequately ensure and accept responsibility for continued compliance with the regulations. In general, new applications for each device will not be required. A single application for equipment authorization may be filed covering all the affected equipment.

5. Section 2.948 is proposed to be amended by revising paragraphs (a)(2) and (d) and deleting paragraph (d)(3) as follows:

§ 2.948 Description of measurement facilities.

(a) * * *

(2) If the equipment is to be authorized by the Commission under the certification procedure, the party performing the measurements shall be accredited for performing such measurements by an authorized accreditation body based on the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Guide 25, "General Requirements for the Competence of Calibration and Testing Laboratories." Accreditation bodies must be approved by the FCC's Office of Engineering and Technology, as indicated in Sec. 0.241 of this chapter, to perform such accreditation based on ISO/IEC 58, "Calibration and Testing Laboratory Accreditation Systems--General Requirements for Operation and Recognition." The frequency for revalidation of the test site and the information required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site revalidation shall occur on an interval not to exceed two years.

* * * * *

(d) If the equipment is to be authorized under a Declaration of Conformity, the party performing the measurements shall be accredited for performing such measurements by an authorized accreditation body based on the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Guide 25, "General Requirements for the Competence of Calibration and Testing Laboratories." Accreditation bodies must be approved by the FCC's Office of Engineering and Technology, as indicated in Sec. 0.241 of this chapter, to perform such accreditation based on ISO/IEC 58, "Calibration and Testing Laboratory Accreditation Systems--General Requirements for Operation and Recognition." The frequency for revalidation of the test site and the information required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site revalidation shall occur on an interval not to exceed two years.

(1) * * *

(2) * * *

6. Section 2.962 is proposed to be amended by revising paragraphs (c)(4), (e), (f)(1), (f)(3), and (g)(3) to read as follows:

§ 2.962 Requirements for a Telecommunications Certification Body.

* * * * *

(c) * * *

(4) The TCB shall demonstrate an ability to recognize situations where interpretations of the regulations or test procedures may be necessary. The appropriate key certification and laboratory personnel shall demonstrate a knowledge of how to obtain current and correct technical regulation interpretations. The competence of the Telecommunication Certification Body shall be demonstrated by assessment. The general competence, efficiency, experience, familiarity with technical regulations and products included in those technical regulations, as well as compliance with applicable parts of the ISO/IEC Guides 25 and 65, shall be taken into consideration.

* * * * *

(7) A Telecommunication Certification Body shall be reassessed for continued accreditation on intervals not exceeding two years.

(e) *Designation of a TCB.*

(f) * * *

(1) A TCB shall certify equipment in accordance with the Commission's rules and policies.

(2) * * *

(3) A TCB may establish and assess fees for processing certification applications and other tasks as required by the Commission.

* * * * *

(g) * * *

(3) If during post market surveillance of a certified product, a Telecommunication Certification Body determines that a product fails to comply with the applicable technical regulations, the Telecommunication Certification Body shall immediately notify the grantee and the Commission. A follow-up report shall also be provided within thirty days of the action taken by the grantee to correct the situation

* * *

* * * * *

Part 15 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

7. The authority citation of Part 15 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302, 303, 304, 307, 336, and 544A.

8. Section 15.7 is proposed to be deleted.

9. Section 15.203 is proposed to be amended as follows:

§ 15.203 Antenna requirement.

(a) An intentional radiator shall be designed to ensure that no antenna other than that certificated with the device may be used. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

(b) Intentional radiators may be certificated with multiple antenna types. Manufacturers must supply a list of acceptable antenna types with applications for equipment authorization. Compliance testing must be performed using the highest gain antenna of each type of antenna to be certified and with the transmitter operating at its maximum output power. Any antenna meeting the specifications of tested antennas can be used with the device without retesting. Use of an antenna of a different type than the tested antenna, one that exceeds the gain of a tested antenna, or one that does not meet the tested antenna specifications will require retesting and new approval by either a TCB or the Commission.

10. Section 15.204 is proposed to be amended as follows:

§ 15.204 External radio frequency power amplifiers and antenna modifications.

(a) * * *

(b)

(i) A transmission system consisting of an intentional radiator, an external radio frequency power amplifier, and an antenna, may be authorized, marketed and used under this part. However, when a transmission system is authorized as a system, it must always be marketed as a complete system and must always be used in the configuration in which it was authorized. Except as described in paragraph (b)(iii), an external radio frequency power amplifier shall be marketed only in the system configuration with which the amplifier is authorized and shall not be marketed as a separate product.

(ii) Professional radio system installers and parties that offer commercial radio services may substitute technically equivalent components, including external radio frequency power amplifiers and/or antennas, in systems that have been granted prior equipment authorization. The professional installer or commercial service provider must place a label on the transmission system that lists the FCC Identification Number of the system that was granted equipment authorization, identifies any components that were substituted, and designates a point of contact for the party that installed the system.

(iii) An external radio frequency power amplifiers may be marketed for individual sale provided it is intended for use in conjunction with a transmitter that operates in the 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz bands pursuant to § 15.247 or a transmitter that operates in the 5.725 – 5.825 GHz band pursuant to § 15.407. The output power of such an amplifier must not exceed the maximum permitted output power of its associated transmitter.

(c) Except as otherwise described in paragraph (b) of this section, only the antenna with which an intentional radiator is authorized may be used with the intentional radiator.

11. A new Section 15.212 is proposed to be added to read as follows:

§ 15.212 Modular transmitters.

- (a) The radio elements of the modular transmitter must have its own shielding. If the modular transmitter consists of two or more partitioned sections, the interface between the sections of the modular system must be digital with a minimum signaling amplitude of 150 mV peak-to-peak. The physical crystal and tuning capacitors for partitioned modules can be located external to the shielded radio elements.
- (b) The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation. For partitioned modules, control information and other data may be exchanged between the firmware and radio front end.
- (c) The modular transmitter must have its own power supply regulation.
- (d) The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a “unique” antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The “professional installation” provision of Section 15.203 may not be applied to modules.
- (e) (1) The modular transmitter must be tested in a stand-alone configuration, i.e., the module must not be inside another device during testing. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines used during testing shall be a length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting test equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).
- (2) A module comprised of two or more sections shall be tested installed on a reference platform or final host device. Signal injection testing shall be performed on the implementation with a length of cable not exceeding ten centimeters connecting the module components and platform.
- (f) The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: XYZMODEL1” or “Contains FCC ID: XYZMODEL1.” Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions to parties that may include the module in their product that such a label must be placed on the outside of the device. In the latter case, a copy of these instructions must be included in the application for equipment authorization.
- (g) The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to

explain any such requirements. A copy of these instructions must be included in the application for equipment authorization.

- (h) The modular transmitter must comply with any applicable RF exposure requirements.
- (i) The type number of a partitioned module will consist of a digital word 4 bytes in length with the following bit definition: 16 bits for the company information, 16 bits for the Device Number.

12. Section 15.247 is proposed to be amended by modifying paragraphs (a)(1), adding a new paragraph (b)(6), and modifying paragraph (e) as follows:

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

(a) * * *

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Frequency hopping systems in the 2.4 GHz band may have hopping channel carrier frequencies separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems employ fewer than 75 hopping channels and operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

* * * * *

(6)

(i) A device that that operates in the 2.4 GHz band and transmits to multiple receivers (simultaneously or sequentially) will be permitted to operate at point-to-point power levels if it satisfies both of the following conditions:

(A) It must form multiple directional beams (simultaneously or sequentially) for the purpose of focusing energy on different receivers or groups of receivers.

(B) It must transmit different information to each receiver.

(ii) For devices qualifying as point-to-point under this interpretation, total RF power supplied to the array or arrays that comprise the device (i.e., sum of power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels) is limited as follows:

(A) Total power is limited to the applicable power level as specified in paragraph (b)(1) or (b)(3) above.

(B) Total power must be reduced by 1 dB for each 3 dB of directional gain of the antenna/array device, as defined in paragraph (iv) below.

(iii) The power limits specified above will be applied to the aggregate power of all simultaneously operated frequency channels and directional beams, except that, for devices that

transmit on multiple beams simultaneously (on the same or different frequency channels), a higher total power level may be allowed. For such devices, both of the following power limits must be satisfied:

(A) The power supplied to each beam will be subject to the power limit as specified in paragraph (ii)(A).

(B) Aggregate power transmitted simultaneously on all beams must not exceed the power limit determined in paragraph (ii)(A) by more than 8 dB.

(iv) Directional gain shall be computed as follows:

(A) Directional gain will be assumed to be equal to the sum of $10 \log$ (# of array elements or staves) and the directional gain of the individual elements or staves (or of the element or staff having the highest gain if all are not the same).

(B) A value for directional gain less than that given by (iv)(A) will be accepted only if sufficient evidence is presented that the directional gain cannot exceed the proposed value (for example due to shading of the array, or coherence loss in the beamforming).

(v) If a device transmits in only single sector (single directional beam), then it does not satisfy the conditions of paragraph (i) and must be evaluated under point-to-multipoint rules

(iv) If a device transmits in multiple sectors (multiple beams pointed in different directions) and satisfies the conditions of paragraph (i), then the device may operate at point-to-point power levels computed according to paragraphs (ii) and (iii) above. Power in each sector must satisfy the limit on paragraph (ii)(A), and total RF power supplied to all antennas (all sectors) simultaneously must satisfy the limit in (iii)(B).

* * * * *

(e) The peak output power and peak power spectral density for digitally modulated system may be determined in accordance with the provisions specified in §§ 15.407(a)(4) and 15.407(a)(5).

APPENDIX B: INITIAL REGULATORY FLEXIBILITY ANALYSIS

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁵² the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this Notice of Proposed Rule Making (NPRM). Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the NPRM provided in paragraph 62 of the item. The Commission will send a copy of the NPRM, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).⁵³ In addition, the NPRM and IRFA (or summaries thereof) will be published in the Federal Register.⁵⁴

A. Need for, and Objectives of, the Proposed Rules

Section 11 of the Communications Act of 1934, as amended, and Section 202(h) of the Telecommunications Act of 1996 require the Commission (1) to review biennially its regulations pertaining to telecommunications service providers and broadcast ownership; and (2) to determine whether economic competition has made those regulations no longer necessary in the public interest. The Commission is directed to modify or repeal any such regulations that it finds are no longer in the public interest.

On September 6, 2002, the Commission released a *Public Notice* seeking comments regarding Commission rules which may be outdated and in need of revision.⁵⁵ The *Public Notice* identified a number of rule sections in Parts 2 and 15 as candidates for review, and encouraged interested parties to provide comment on these rules. Subsequently, on September 26, 2002, the Commission released a separate *Public Notice* seeking suggestions as to which rule parts administered by the Commission's Office of Engineering and Technology should be modified or repealed as part of the 2002 biennial review.⁵⁶ Some of the comments filed in response to these *Public Notices* are addressed by this Notice. This Notice also addresses other issues raised as a result of recent changes in technology.

The NPRM proposes several changes to Parts 2, 15 and other Parts of the rules. Specifically, it proposes to:

- 1) modify the rules to permit the use of advanced antenna technologies with spread spectrum devices in the 2.4 GHz band;
- 2) modify the replacement antenna restriction for Part 15 devices;

⁵² See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-112, 110 Stat. 847 (1996) ("CWAAA"). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA").

⁵³ See 5 U.S.C. § 603(a).

⁵⁴ See *id.*

⁵⁵ See *Public Notice*, "FCC Seeks Comment Regarding Possible Revision or Elimination of Rules Under The Regulatory Flexibility Act, 5 U.S.C. § 610," released September 6, 2002, DA 02-2152.

⁵⁶ See *Public Notice*, "The Commission Seeks Public Comment in the 2002 Biennial Review of Telecommunications Regulations within the Purview of the Office of Engineering and Technology," released September 26, 2002, ET Docket No. 02-312.

- 3) modify the equipment authorization procedures to provide more flexibility to configure transmission systems without the need to obtain separate authorization for every combination of system components;
- 4) harmonize the measurement procedures for digital modulation systems authorized pursuant to Section 15.247 of the rules with those for similar U-NII devices authorized under Sections 15.401- 15.407 of the rules;⁵⁷
- 5) modify the channel spacing requirements for frequency hopping spread spectrum devices in the 2.4 GHz band in order to remove barriers to the introduction of new technology that uses wider bandwidths;
- 6) clarify the equipment authorization requirements for modular transmitters; and
- 7) make other changes to update or correct Parts 2 and 15 of our rules.

These proposals, if adopted, will prove beneficial to manufacturers and users of unlicensed technology, including those who provide services to rural communities. Specifically, we note that a growing number of service providers are using unlicensed devices within wireless networks to serve the varied needs of industry, government, and general consumers alike. One of the more interesting developments is the emergence of wireless Internet service providers or "WISPs." Using unlicensed devices, WISPs around the country are providing an alternative high-speed connection in areas where cable or DSL services have been slow to arrive. We believe that the increased flexibility proposed herein will help to foster a viable last mile solution for delivering Internet services, other data applications, or even video and voice services to underserved, rural, or isolated communities.

B. Legal Basis

The proposed action is authorized under Sections 4(i), 301, 302, 303(e), 303(f), 303(r), 304 and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 301, 302, 303(e), 303(f), 303(r), 304 and 307.

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

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.⁵⁸ The RFA defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small business concern" under Section 3 of the Small Business Act.⁵⁹ Under the Small Business Act, a "small business concern" is one that: (1) is independently owned and operated; (2) is not dominant in its field of operations; and (3) meets any additional criteria established by the Small Business Administration (SBA).⁶⁰

A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."⁶¹ Nationwide, as of 1992, there were approximately 275,801 small organizations.⁶² The term "small governmental jurisdiction" is defined as "governments of

⁵⁷ 47 C.F.R. § 15.247

⁵⁸ See U.S.C. § 603(b)(3).

⁵⁹ *Id.* § 601(3).

⁶⁰ *Id.* § 632.

⁶¹ 5 U.S.C. § 601(4).

⁶² 1992 Economic Census, U.S. Bureau of the Census, , Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.⁶³ As of 1997, there were approximately 87,453 governmental jurisdictions in the United States.⁶⁴ This number includes 39,044 counties, municipal governments, and townships, of which 27,546 have populations of fewer than 50,000 and 11,498 counties, municipal governments, and townships have populations of 50,000 or more. Thus, we estimate that the number of small governmental jurisdictions is approximately 75,955 or fewer.

The Commission has not developed a definition of small entities applicable to unlicensed communications devices manufacturers. Therefore, we will utilize the SBA definition application to manufacturers of Radio and Television Broadcasting and Communications Equipment. Under the SBA's regulations, a radio and television broadcasting and wireless communications equipment manufacturer must have 750 or fewer employees in order to qualify as a small business concern.⁶⁵ Census Bureau data indicates that there are 1,215 U.S. establishments that manufacture radio and television broadcasting and wireless communications equipment, and that 1,150 of these establishments have fewer than 500 employees and would be classified as small entities.⁶⁶ The remaining 65 establishments have 500 or more employees; however, we are unable to determine how many of those have fewer than 750 employees and therefore, also qualify as small entities under the SBA definition. We therefore conclude that there are no more than 1,150 small manufacturers of radio and television broadcasting and wireless communications equipment.

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

Part 15 transmitters are already required to be authorized under the Commission's certification procedure as a prerequisite to marketing and importation. *See* 47 C.F.R. §§ 15.101, 15.201, 15.305, and 15.405. The changes proposed in this proceeding would not change any of the current reporting or recordkeeping requirements. Further, the proposed regulations add permissible measurement techniques and methods of operation. The proposals would not require the modification of any existing products.

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

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

⁶³ 5 U.S.C. § 601(5).

⁶⁴ 1995 Census of Governments, U.S. Census Bureau, United States Department of Commerce, Statistical Abstract of the United States (2000).

⁶⁵ 13 C.F.R. § 121.201, NAICS code 334220.

⁶⁶ Economics and Statistics Administration, Bureau of Census, U.S. Department of Commerce, 1997 Economic Census, Industry Series - Manufacturing, Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing, Table 4 at 9 (1999). The amount of 500 employees was used to estimate the number of small business firms because the relevant Census categories stopped at 499 employees and began at 500 employees. No category for 750 employees existed. Thus, the number is as accurate as it is possible to calculate with the available information.

At this time, the Commission does not believe the proposals contained in this Notice will have a significant economic impact on small entities. The Notice does not propose new device design standards. Instead, it relaxes the rules with respect to the types of devices which are allowed to operate pursuant to the Commission's regulations. There is no burden of compliance with the proposed changes. Manufacturers may continue to produce devices which comply with the former rules and, if desired, design devices to comply with the new regulations. The proposed rules will apply equally to large and small entities. Therefore, there is no inequitable impact on small entities. Finally, this Notice does not recommend a deadline for implementation. We believe that the proposals are relatively simple and do not require a transition period to implement. An entity desiring to take advantage of the relaxed regulations may do so at any time.

For the reasons stated above, unless our views are altered by comments, we find that the proposed rule changes contained in this Notice will not present a significant economic burden to small entities. Therefore it is not necessary at this time to propose alternative rules. Notwithstanding our finding, we request comment on alternatives that might minimize the amount of adverse economic impact, if any, on small entities.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rule

None.

**STATEMENT OF
CHAIRMAN MICHAEL K. POWELL**

Re: Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval; Notice of Proposed Rulemaking; ET Docket No. 03-201.

One of the Commission's most important goals is to provide the opportunity for innovative communications technologies to take hold and take off. Wireless broadband services using unlicensed devices are doing just that.

Earlier this week, I had the opportunity to see first-hand a rural wireless broadband network in Bluemont, Virginia. Using a network made up of entirely unlicensed devices, Roadstar Internet provides wireless broadband services to both commercial and residential customers. Roadstar is literally a mom and pop operation, run by Marty and Rose Dougherty, and headquartered in a barn behind their home. Many of Roadstar's subscribers previously had no broadband option. Now in Bluemont, a local company can market its products over the Internet, students can benefit from distance learning, and local workers can telecommute.

What's exciting about all of this is that wireless internet service providers (WISPs), like Roadstar, are springing up all over the country – from Bluemont, Virginia to Coffman Cove, Alaska. It's the dawn of a new facilities-based broadband industry; a new industry spawned in part by the Commission's unlicensed rules.

Wireless networking is also a critical component for enterprise communications. And, indeed, this market segment accounts for most of the total sales of wireless equipment. It is estimated that by the year 2005, sales will exceed \$5 billion. Clearly, wireless networking is one of the strongest engines in the current communications economy.

The Notice we adopt today is a significant step in providing even more opportunities for the wireless networking industry, including WISPs, to continue to grow. We are clearing the way for deployment of advanced antenna technologies. At the same time, we are providing manufacturers and operators more flexibility in our equipment authorization process.

So that progress in this direction can continue, next Thursday we are holding a rural WISP showcase and workshop. Participants will be discussing many of the technical, regulatory, and business "how-tos" associated with starting and running a WISP. One of the highlights of the workshop will be a session focusing on the varied services made available through wireless broadband provided by WISPs – from telemedicine to distance learning to community networking.

And there is more progress on the way. This fall we plan to examine the potential innovation available through the use of cognitive radios – including reviewing the possibility of permitting unlicensed devices to operate at higher powers under certain circumstances, which may be especially important for rural communities. We also plan to issue a Report and Order making an additional 255 MHz of unlicensed spectrum available at 5 GHz – this is one area of the spectrum currently being used by WISPs, including Roadstar, and the additional spectrum will provide them with even more opportunities for growth. We continue to explore the possibilities for additional unlicensed spectrum use at 3.6 GHz and in the television bands.

**SEPARATE STATEMENT OF
COMMISSIONER MICHAEL J. COPPS**

RE: Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval, Notice of Proposed Rulemaking; ET Docket No. 03-201.

Spectrum is becoming more expensive. Desirable spectrum bands are densely populated. And in many areas there is inadequate competition to incumbent carriers. The Commission has a statutory duty under the Communications Act to promote the efficient and intensive use of the public's spectrum resource and to spur competition for the benefit of consumers.

One way of doing this is to give new wireless technologies the ability to compete with incumbent carriers. We're all excited about the chance that innovators ranging from CLECs to wireless Internet service providers will give us new competition and new service in rural areas. To make this a reality we should have two goals. First, we need to allow innovators to use the tools available to them to squeeze the most out of the resources available to them. Second, we need to give new competitors FCC rules that preclude incumbents from acting to slow innovation or to injure competition.

This good item is part of the struggle to achieve the first of these goals. We propose allowing the use of new antenna technologies, to modify equipment authorization procedures, to harmonize measurement procedures, and to take a long list of other actions that we hope will make innovators using unlicensed technologies better able to turn great ideas into consumer benefit.

I congratulate OET on this item and gladly support it.

**SEPARATE STATEMENT OF
COMMISSIONER KEVIN J. MARTIN**

Re: Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval; Notice of Proposed Rulemaking; ET Docket No. 03-201.

I am pleased to see the Commission is seeking comment on modifications to Parts 2 and 15 of its rules. It is always a challenge to ensure that our rules keep pace with, and at the very least, do not hinder, the advancement of new technologies and the opportunities they provide. This NPRM proposes modifications allowing for advanced antenna technologies and new spread spectrum devices, as well as increased flexibility in systems designed to operate in these bands. I am hopeful that unlicensed operations will, as some have suggested, eventually provide a last-mile application to connect people's homes to the Internet, offering a real alternative to telephone wires, cable, and satellite connections, particularly for rural America.

**SEPARATE STATEMENT OF
COMMISSIONER JONATHAN S. ADELSTEIN**

Re: Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval; Notice of Proposed Rule Making; ET Docket No. 03-201.

The development of wireless ISPs and the advent of so-called hotspots using unlicensed spectrum has been one of the Commission's great success stories over the last several years. I support this item because it continues our efforts to promote the development of unlicensed devices and services. The tremendous growth of WiFi in the 2.4 GHz band was facilitated by the licensing (or more appropriately the "unlicensing") approach initially adopted by the Commission for this band. Part 15 of our rules allows manufacturers to develop technologies for the unlicensed bands that anyone can use without a license. We must continue this policy approach so that we encourage as many avenues or technologies as possible for broadband and other important services to reach consumers, no matter where they live.

My goal as a policymaker is to maximize the services and information that flow over our airwaves. A regulatory framework for innovation can provide the necessary conditions that support the growth and development of spectrum-based services, including continued use of the unlicensed bands. Such a framework functions in a manner akin to a greenhouse, in which plants are protected from the elements by a structure and are nurtured so that they can thrive on their own within it.

I believe that in the NPRM adopted today, the Commission properly strives for such an approach to spectrum management. We want to maintain our existing Part 15 structure so that it continues to encourage the growth of the unlicensed industries, but also controls the elements, like harmful interference that may impact existing operators. Just as a greenhouse can support different types of plant forms, our framework for innovation does the same – it must be flexible enough to accommodate all different kinds of technologies, such as those used with the latest antennas. Our framework does not choose which technology will survive, and which will not, but it must create an environment that allows the different seeds of technology to truly have an opportunity to grow and develop on their own. I believe that we have such an approach here, and I am optimistic that our framework for innovation will enable new technologies in the unlicensed space to continue to meet the public's demand for broadband more efficiently.