under this subpart applicable to air curtain incinerators burning commercial or industrial waste. While not all CISWI units will include all of the following components, a CISWI unit includes, but is not limited to, the commercial or industrial solid waste feed system, grate system, flue gas system, waste heat recovery equipment, if any, and bottom ash system. The CISWI unit does not include air pollution control equipment or the stack. The CISWI unit boundary starts at the commercial or industrial waste hopper (if applicable) and extends through two areas: (1) The combustion unit flue gas system, which ends immediately after the last combustion chamber or after the waste heat recovery equipment, if any; and (2) the combustion unit bottom ash system, which ends at the truck loading station or similar equipment that transfers the ash to final disposal. The CISWI unit includes all ash handling systems connected to the bottom ash handling system. A CISWI unit does not include any of the fifteen types of units described in section 60.2555 of this subpart, nor does it include any combustion turbine or reciprocating internal combustion engine.

Waste heat recovery means the process of recovering heat from the combustion flue gases by convective heat transfer only.

IV. Future Action

Our expectation is that we will take final action on the definitions discussed and issues addressed in today's notice when we take final action in response to the voluntary remand of the final CISWI rule.

Dated: February 10, 2004.

Jeffrey R. Holmstead,

Assistant Administrator, Office of Air & Radiation.

[FR Doc. 04–3366 Filed 2–13–04; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[SC–112L–2004–1–FRL–7623–9]

Approval of Section 112(l) Authority for Hazardous Air Pollutants; Equivalency by Permit Provisions; National Emission Standards for Hazardous Air Pollutants From the Pulp and Paper Industry; State of South Carolina

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: Pursuant to section 112(l) of the Clean Air Act (CAA), South Carolina Department of Health and Environmental Control (SC DHEC) requested approval to implement and enforce State permit terms and conditions that substitute for the National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry. In the Rules section of this **Federal Register**, EPA is granting SC DHEC the authority to implement and enforce alternative requirements in the form of title V permit terms and conditions after EPA has approved the state's alternative requirements. A detailed rationale for this approval is set forth in the direct final rule. If no significant, material, and adverse comments are received in response to this rule, no further activity is contemplated. If EPA receives adverse comments, the direct final rule will be withdrawn and all public comments received will be addressed in a subsequent final rule based on this rule. The EPA will not institute a second comment period on this document. Any parties interested in commenting on this document should do so at this time.

DATES: Written comments must be received on or before March 18, 2004.

ADDRESSES: Comments may be submitted by mail to: Lee Page, Air Toxics Assessment and Implementation Section, Air Toxics and Monitoring Branch, Air, Pesticides and Toxics Management Division; U.S. Environmental Protection Agency Region 4; 61 Forsyth Street, SW., Atlanta, Georgia 30303–8960. Comments may also be submitted electronically, or through hand delivery/courier. Please follow the detailed instructions described in the direct final rule, **SUPPLEMENTARY INFORMATION** section [Part (I)(B)(1)(i) through (iii)] which is published in the Rules Section of this **Federal Register**.

FOR FURTHER INFORMATION CONTACT: Lee Page, Air Toxics Assessment and Implementation Section, Air Toxics and Monitoring Branch, Air, Pesticides and Toxics Management Division, Region 4, U.S. Environmental Protection Agency, 61 Forsyth Street, SW., Atlanta, Georgia 30303–8960. The telephone number is (404) 562–9141. Mr. Page can also be reached via electronic mail at *page.lee@epa.gov.*

SUPPLEMENTARY INFORMATION: For additional information see the direct final rule which is published in the Rules section of this **Federal Register**.

Dated: February 5, 2004.

J.I. Palmer, Jr.,

Regional Administrator, Region 4.

[FR Doc. 04–3369 Filed 2–13–04; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 2, 15 and 90

[ET Docket No. 03–108 and ET Docket No. 00–47; FCC 03–322]

Cognitive Radio Technologies and Software Defined Radios

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document we are seeking to facilitate opportunities for flexible, efficient, and reliable spectrum use employing cognitive radio technologies. We are seeking comment generally on how we should modify our rules to enable more effective use of cognitive radio technologies, including potential applications across a variety of scenarios involving both licensed spectrum and unlicensed devices. By initiating this proceeding, we recognize the importance of new cognitive radio technologies, which are likely to become more prevalent over the next few years and which hold tremendous promise in helping to facilitate more effective and efficient access to spectrum. We seek to ensure that our rules and policies do not inadvertently hinder development and deployment of such technologies, but instead enable a full realization of their potential benefits.

DATES: Comments must be filed on or before May 3, 2004, and reply comments must be filed on or before June 1, 2004.

FOR FURTHER INFORMATION CONTACT: Hugh Van Tuyl, Office of Engineering and Technology, (202) 418–7506, e-mail: *HughVanTuyl@fcc.gov*, or James Miller, (202) 418–7351 TTY (202) 418–2989, e-mail: *jjmiller@fcc.gov*.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Notice of Proposed Rule Making and Order*, ET Docket No. 03–108 and ET Docket No. 00–47, FCC 03–322, adopted December 17, 2003 and released December 30, 2003. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Center (Room CY–A257), 445 12th Street, SW., Washington, DC 20554. The complete text of this document also may be purchased from the Commission's copy contractor,

Qualex International, 445 12th Street, SW., Room, CY–B402, Washington, DC 20554. The full text may also be downloaded at: *http://www.fcc.gov*. Alternate formats are available to persons with disabilities by contacting Brian Millin at (202) 418–7426 or TTY (202) 418–7365.

Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments on or before May 3, 2004, and reply comments on or before June 1, 2004. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies. *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121, May 1, 1998. 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.

All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. 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, Natek, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE., Suite 110, Washington, DC 20002. The filing hours at this location are 8 a.m. to 7 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, DC 20554.

Summary of Notice of Proposed Rulemaking and Order

1. The growth of wireless services over the past several years demonstrates the vast and growing demand of American businesses, consumers, and government for spectrum-based communication links. Spectrum access, efficiency, and reliability have become critical public policy issues. Advances in technology are creating the potential for radio systems to use spectrum more intensively and more efficiently than in the past. Among these advances are cognitive radio technologies that can make possible more intensive and efficient spectrum use by licensees within their own networks, and by spectrum users sharing spectrum access on a negotiated or an opportunistic basis. These technologies include, among other things, the ability of devices to determine their location, sense spectrum use by neighboring devices, change frequency, adjust output power, and even alter transmission parameters and characteristics. Cognitive radio technologies open spectrum for use in space, time, and frequency dimensions that until now have been unavailable. Such technologies are employed today in applications such as wireless LANs and mobile wireless service networks, and promise greater future benefits.

2. The ability of cognitive radio technologies to adapt a radio's use of spectrum to the real-time conditions of its operating environment offers regulators, licensees, and the public the potential for more flexible, efficient, and comprehensive use of available spectrum while reducing the risk of harmful interference. The important potential of these technologies emerges at a crucial time, as the Commission addresses increasingly more complex questions of improving access to and increasing usage of the finite spectrum available, while also seeking to maintain efficiency and reliability in spectrum use. The Spectrum Policy Task Force (''SPTF''), in its 2002 Report, concluded, among other things, that smart radio technologies can enable better and more intensive access to spectrum and recommended that the Commission strive to remove regulatory barriers to their use.

3. We undertake this proceeding to explore all the uses of cognitive radio technology to facilitate the improved spectrum use made possible by the emergence of the powerful real-time processing capabilities of cognitive radio technologies. We also seek comment on how our rules and enforcement policies should address possible regulatory concerns posed by authorizing spectrum access based on a radio frequency (RF) device's ability to reliably gather and process real-time information about its RF environment or on the ability of device and/or users to cooperatively negotiate for spectrum access. We propose and seek comment on rules intended to allow a full realization of the potential of these technologies under all our regulatory models for spectrum based services.

4. In the *NPRM* we first consider in some detail the technical capabilities that are or could be incorporated into cognitive radio systems and seek comment on possible additional capabilities. We then address several specific applications of these technologies. Among the various areas in which cognitive radio technologies may provide potential benefits are: permitting the use of higher power by unlicensed devices in rural or other areas of limited spectrum use, facilitating secondary markets in spectrum, enabling possible real-time frequency coordination (such as between NGSO satellite and other services), facilitating interoperability among different radio systems, and allowing for more extensive deployment of mesh networks. We finally consider our equipment authorization rules, and whether changes should be made to these rules to reflect the growing importance of cognitive radio technologies.

5. In a number of areas, we propose specific rule changes to help enable devices using cognitive radio technologies. For instance, we set out a proposal under which unlicensed devices employing certain cognitive radio capabilities would be permitted to transmit at higher power levels in rural areas and other areas of limited spectrum use. We also include a detailed technical model for spectrum leasing based on cognitive radio capabilities that would assure a licensee that it would be able to interrupt a lessee's use and reclaim spectrum in real time when the need arises. Such a model would appear to be most directly applicable to leasing by public safety entities if we decide to permit such leasing, but also important to other

licensees interested in leasing spectrum. We also set out proposals: to streamline our rules that require that a copy of certain devices' radio software be supplied to the Commission, to clarify when devices must be certified under the software defined radio rules, and to allow unlicensed devices to automatically select their transmit frequency band based upon the country of operation. Finally, in light of the initiation of this proceeding, we are closing the Software Defined Radio proceeding in ET Docket No. 00–47.

6. In the NPRM, we first explore the benefits of cognitive radio technology use for spectrum management and regulation and the broad capabilities that such technology could encompass. We intend to use this framework for further analysis of specific applications of this technology. We also seek comment and set forth proposals regarding specific applications: rural markets and unlicensed devices, public sector spectrum leasing, dynamically coordinated spectrum sharing, interoperability between communication systems, and mesh networks. We are further proposing changes to our equipment authorization processes to accommodate software-defined radios and cognitive radio systems.

Cognitive Radio Capabilities

7. Cognitive radio technologies have the potential to provide a number of benefits that would result in increased access to spectrum and also make new and improved communication services available to the public. A cognitive radio could negotiate cooperatively with other spectrum users to enable more efficient sharing of spectrum. A cognitive radio could also identify portions of the spectrum that are unused at a specific time or location and transmit in such unused ''white spaces,'' resulting in more intense, more efficient use of the spectrum while avoiding interference to other users. Cognitive radio technology could also be used to facilitate interoperability between or among communication systems in which frequency bands and/or transmission formats differ. For example, cognitive radio could select the appropriate operating frequency and transmission format, or it could act as a ''bridge'' between two systems by receiving signals at one frequency and format and retransmitting them at a different frequency and format. Cognitive radio technology can also help advance specific Commission policies, such as facilitating the use of secondary markets in spectrum and improving access to spectrum in rural areas.

8. Cognitive radio systems can be deployed in network-centric, distributed, ad hoc, and mesh architectures, and serve the needs of both licensed and unlicensed applications. For example, cognitive radios can function either by employing cognitive capabilities within a network base station that in turn controls multiple individual handsets or by incorporating capabilities within individual devices.

9. There are a number of capabilities that can be incorporated into cognitive radios. A first is frequency agility, which is the ability of a radio to change its operating frequency, combined with a method to dynamically select the appropriate operating frequency based on the sensing of signals from other transmitters or on some other method. A second is adaptive modulation that can modify transmission characteristics and waveforms to exploit opportunities to use spectrum. A third capability is transmit power control, which allows transmission at the allowable limits when necessary, but reduces the transmitter power to a lower level to allow greater sharing of spectrum when higher power operation is not necessary. A fourth capability that a cognitive radio could incorporate is the ability to determine its location and the location of other transmitters, and then select the appropriate operating parameters such as the power and frequency allowed at its location. Fifth, a cognitive radio could incorporate a mechanism that would enable sharing of spectrum under the terms of an agreement between a licensee and a third party. Parties may eventually be able to negotiate for spectrum use on an ad hoc or real-time basis, without the need for prior agreements between all parties. In addition to these capabilities, any SDR, including a cognitive radio, could incorporate security features to permit only authorized use and prevent unauthorized modifications. We seek comment on what other features and capabilities a cognitive radio could incorporate.

10. While cognitive radios could incorporate all of the capabilities listed above and possibly others, the types of technologies that would need to be employed in a particular device would vary based on the frequency bands where the equipment is deployed and the types of services authorized to operate in those bands. Multiple capabilities may in all likelihood be used simultaneously in cognitive processing. For example, devices sensing unused spectrum may rely on frequency agility in selecting their band of operations and adaptive modulation techniques in setting the power, frequency and type of signal transmitted. Devices might further manage their signals with the location of themselves and other transmitters in mind. Negotiations and exchanges with other users might also occur, contributing to the increased efficiency and reduction of interference for all spectrum users. We review each of these capabilities in the NPRM and seek comment how cognitive radio capabilities might function together to achieve spectrum access, efficiency and interference mitigation. (See paragraphs 24 through 30 of the NPRM).

11. We seek comment on all issues related to the application of cognitive radio technology, including the frequency bands and services that are most likely to benefit from this technology. We conclude that we should continue to prohibit unlicensed devices from emitting in designated restricted bands, which include many bands used for Federal Government operations, and seek comment on this tentative conclusion.

12. The capabilities that can be employed in cognitive radios could be applied in a variety of specific applications and could bring about significant changes in how people approach the use of spectrum. Some applications could make more efficient use of spectrum and others could facilitate the introduction of new uses. Some applications could likely be introduced under existing rules, whereas other applications may require specific rule changes.

Application: Rural Markets and Unlicensed Devices

13. In its Report, the Spectrum Policy Task Force recommended that the Commission explore ways to improve access to spectrum in rural areas. The Commission recently adopted a *Notice of Proposed Rule Making in Facilitating the Provision of Spectrum Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum Based Services (Rural Services NPRM)*, 68 FR 64050, November 11, 2003, to consider proposals for facilitating access to spectrum based services in rural areas. This *Rural Services NPRM* addresses licensed spectrum use, and states that the Commission will consider unlicensed spectrum use in rural areas in a separate proceeding. We note that the *Rural Services NPRM* seeks comment on a definition of rural areas.

14. The lower population density and the greater distances between people in

rural areas can make it difficult for certain types of unlicensed operations at the current part 15 limits to provide adequate signal coverage. Such operations include Wireless Internet Service Providers (WISPs) and wireless LANs operated between buildings or other locations with a large separation between transmitters. These operations could potentially benefit from higher power limits in rural areas, which would result in greater transmission range. Because spectrum is generally not as intensively used in rural areas, it may be possible for unlicensed devices to operate at higher power levels in those areas without causing harmful interference to authorized services. The application of cognitive radio technology could help ensure that devices limit their higher power operation to only rural areas.

15. Devices such as transmitters used by WISPs and wireless LANs often operate under the part 15 spread spectrum rules in § 15.247. In addition, any type of operation (*e.g.*, cordless phones, wireless cameras, fleet management devices) is permitted in certain bands under § 15.249. The power limits currently permitted vary depending on the frequency band and in some cases the signal characteristics, such as the number of hopping channels for spread spectrum devices.

16. Permitting unlicensed devices to operate at higher power levels in rural areas could help provide improved access to spectrum in those areas by permitting greater transmission range and therefore greater coverage areas. Accordingly, we propose to allow higher power operation for certain types of unlicensed devices in certain circumstances, that should benefit consumers in rural areas. We note that while licensed devices are typically licensed for use in a specified geographic area at a specific maximum power level, unlicensed devices generally have no geographic restrictions on operation and can be used in any location. Because spectrum use in rural areas is generally extremely low, measuring spectrum occupancy is a method that could potentially be used to determine when a device is in a rural area and is eligible to operate at higher power. We propose to permit higher power operation by unlicensed devices in any area that has limited spectrum use, provided the device has capabilities to determine whether it is in an area with limited spectrum use. This proposal will benefit persons living in rural areas as well as persons living in other areas that may be underserved by spectrum based services.

17. We propose to implement these changes by adding a new rule section that applies specifically to cognitive radio devices operating in the industrial, scientific and medical (ISM) bands on the frequencies specified in §§ 15.247 and 15.249 of the rules. This proposed rule section would permit higher power operation for cognitive devices than these sections currently allow, provided that the devices meet all the other requirements of §§ 15.247 and 15.249, and that the devices incorporate certain features to determine that they are in an area with limited spectrum use. We also propose to require that unlicensed devices capable of higher power operation in areas of limited spectrum use incorporate TPC capabilities that, when the device is operating at greater than 1 Watt, will limit its power output to the minimum level necessary for reliable communications. We do not propose any changes to the current §§ 15.247 and 15.249 for non-cognitive radio devices. The proposed rule for cognitive devices references all the current requirements in these sections at this time, which include requirements for spread spectrum systems to use specific channel spacings, channel bandwidths, power spectral density or number of hopping channels. These requirements were established to facilitate spectrum sharing with licensed services and between unlicensed operations. However, in areas where spectrum use is low, all of the current requirements in the spread spectrum rules to facilitate spectrum sharing may not be necessary due to the limited number of users in such areas. Because cognitive devices could determine when spectrum is in use and avoid transmission on those frequencies, it may be possible to relax some of the current requirements in the rules in addition to raising the maximum power for cognitive devices operated in areas with limited spectrum use without causing interference to other users.

18. We propose to allow a transmitter power increase of up to 6 times (approximately 8 dB) higher than the current limits in the 902–928 MHz, 2400–2483.5 MHz and 5725–5850 MHz bands under § 15.247 of the rules, and in the 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz and 24.0–24.25 GHz bands under § 15.249 of the rules. This increase is consistent with the Commission's recent proposal in ET Docket 03–201 to permit a power increase of 8 dB for spread spectrum systems using sectorized antennas. This proposal would increase the signal range by a factor of up to 2.5 and increase the coverage area by a factor of six as compared to the current limits, which would be particularly beneficial for wireless LAN and WISP uses. Specifically, the proposed maximum transmitter power levels or maximum field strength levels in areas with limited spectrum use would be:

a. Spread Spectrum Devices (§ 15.247):

- 6 watts for digital transmission systems and the following frequency hopping systems: Systems in the 2400–2483.5 MHz band using at least 75 hopping channels, all systems in the 5725–5850 MHz band and systems in the 902–928 MHz band using at least 50 hopping channels
- 1.5 watts for frequency hopping systems in the 902–928 MHz band using at least 25, but fewer than 50 hopping channels
- 0.75 watts for frequency hopping systems in the 2400–2483.5 MHz band using fewer than 75 hopping channels

b. Unlicensed operation in the 900 MHz, 2.4 GHz, 5.8 GHz and 24 GHz bands (§ 15.249):

- 125 millivolts per meter at a distance of 3 meters in the 902–928 MHz, 2400–2483.5 MHz and 5725–5875 MHz bands
- 625 millivolts per meter at a distance of 3 meters in the 24.0–24.25 GHz band.

19. We note that all of the bands where higher power operation is proposed are allocated on a primary basis for ISM equipment, which is generally not susceptible to interference from other devices. However, each of these bands is also used by licensed services that are entitled to protection from interference by part 15 devices. For example, the 902–928 MHz band is used by the Location and Monitoring Service (LMS), and all of these bands are used by Amateur Radio licensees. Because we are proposing to both limit higher power operation to areas with limited spectrum use and require devices to sense spectrum use before commencing transmissions, we believe that implementation of this proposal would not significantly increase the interference potential to licensed services that operate in one or more of the subject ISM bands. We seek comment on this view. We also seek comment on whether any particular licensed uses of these bands or portions thereof should receive greater protection or be excluded from this proposal?

20. We seek comment on these proposals, including whether higher power operation should be permitted in all frequency bands under §§ 15.247 and 15.249 of the rules, and whether there should be any restrictions on the

applications or types of devices that may operate at higher power. We also seek comment on whether there are any requirements currently in the rules that could be relaxed or eliminated for cognitive radio devices. For example, in addition to the requirements for spread spectrum devices, § 15.247(h) contains a provision that prohibits the synchronization of the timing of hop sets in a non-cognitive way to prevent a group of devices from monopolizing the use of the spectrum and blocking other devices from transmitting. Could this section be eliminated for cognitive devices without adversely affecting spectrum sharing? We also seek comment on whether we should exempt devices operating under the control of a master controller from complying with DFS or other requirements.

21. We further seek comment on whether higher power operation should be permitted for devices operating under any other sections in part 15. For example, § 15.209 allows operation at a low level in almost any frequency band other than the TV bands and certain designated restricted bands. Should higher power operation be allowed under that section? We seek comment on whether the increased levels we are proposing are sufficient to be of benefit to WISPs, wireless LANs or other unlicensed operations in areas with limited spectrum use, and how much of an increase in service area these levels would allow in practice. We also seek comment on whether these power increases are likely to result in interference to other users, and the sufficiency of our proposal that TPC be used to ensure that these higher power unlicensed devices satisfy the applicable power limits—both inside and outside areas of limited spectrum use.

22. We propose that devices operating under the new rule section comply with the same harmonic and out-of-band emission limits as devices operating under §§ 15.247 and 15.249 of the rules. The current harmonic emission limits for devices operating under § 15.249 are independent of the in-band power. Theses limits are 500 microvolts per meter at a distance of three meters for devices operating in the 902–928 MHz, 2400–2483.5 MHz and 5725–5875 MHz bands, and 2500 microvolts per meter at a distance of three meters for devices operating in the 24.0–24.25 GHz band. The out-of-band emission limit for devices operating under § 15.249, 50 dB below the in-band emission limit, is a function of the in-band field strength. For devices operating under § 15.247, the limit for out-of-band emissions that fall within designated restricted bands is also independent of the in-band power. However, the Section 15.247 limit for out-of-band emissions that fall outside restricted bands, 20 dB below the in-band power, is a function of the in-band power. We seek comment on whether we should adjust the limits so that out-of-band emissions from equipment operating at higher power levels are no greater than the current rules allow. Additionally, we note that the 2400–2483.5 MHz band is adjacent to the mobile satellite service downlink band at 2483.5–2500 MHz. We seek comment on the effect that raising the power of unlicensed devices could have on satellite receive terminals in the adjacent band.

23. Also, we note the presence of federal radiolocation operations in the 5725–5925 MHz frequency band. The Department of Defense operates fixed, transportable and mobile radars that are used primarily for surveillance, test range, instrumentation, airborne transponders, and experimental testing. These radars are used extensively in support of national and military test range operations in the tracking and control of manned and unmanned airborne vehicles. Many of the installations where these radars operate are located in rural areas. We seek comment on the potential effects of our proposal, including its cognitive radio safeguards, on such federal radiolocation operations.

24. We propose that unlicensed devices be permitted to operate at higher power in areas with limited spectrum use. We propose that limited spectrum use be defined as the authorized band of operation, *e.g.*, the 2400–2483.5 MHz band, having a certain percentage of spectrum unused. We propose to define ''unused spectrum'' for this purpose as spectrum with a measured aggregate noise plus interference power no greater than 30 dB above the calculated thermal noise floor within a measurement bandwidth of 1.25 MHz, which is the same value specified for unlicensed PCS devices. We also propose that a device must be able to sense across the entire authorized band of operation to determine spectrum occupancy before commencing transmissions at higher power. We seek comment on these proposals, including the specific percentage of spectrum that must be vacant for a band to be considered ''empty enough'' to allow higher power transmission. We seek comment on the specific 30 dB monitoring threshold level proposed in these bands. Because some devices that operate in the spread spectrum bands hop frequency and may not be on a particular frequency at a given instance in time, we seek comment on how long a device must sense a band of spectrum to determine it is unused before the device can transmit at higher power. We also seek comment on the type of receive antenna that should be used in measuring spectrum occupancy, whether the proposed monitoring threshold is reasonable and how wide a frequency band should be monitored to make this determination. We further seek comment on the capabilities a device needs to determine when spectrum is empty enough, whether the required capabilities are achievable now or in the near future, and whether they could be economically incorporated into devices.

25. We propose to require that unlicensed devices operating at higher power levels continue to comply with the current RF safety requirements. We recognize that although it may be relatively easy for a WISP provider to increase its power, for instance, from a central base station, a user's ability to increase its power on the return path may be constrained due to battery or RF safety issues. However, the use of properly designed sectorized receive antennas, coupled with their inherent gain, at the central site could overcome this perceived limitation. We seek comment on whether there are any possible problems with unlicensed devices operating at higher power levels meeting the RF safety limits.

26. It seems apparent that allowing some devices in a band to operate with higher power could block the use of lower power devices, resulting in a situation where certain devices would not be able to operate. We therefore seek comment on whether a device operating at higher power should have to re-sense spectrum use at periodic intervals to determine whether other users are attempting to transmit. If so, how often should it re-sense? Would such a requirement have undesirable effects, such as requiring a WISP to lower power or turn off completely, and possibly lose a connection when another device such as a cordless telephone comes on the air, or causing users of lower power devices to simply cease operating if they received interference? Alternatively, should there be a requirement for devices operating at a higher power level to shut down for some period of time at a set interval to allow an opportunity for other devices to access spectrum? If so, what would be the appropriate time intervals?

27. We seek comment on alternative methods, such as geo-location, that a device could use to determine if it is in a rural area, and whether a combination of techniques should be required. If a

cognitive radio device relied on geo-location, we would defer to WTB Docket No. 03–202 for an appropriate definition of rural area. We seek comment in this docket on the positional accuracy necessary if a geo-location technology such as GPS were used. How would a device using geo-location access a table or database showing where operation is permitted, and who would be responsible for maintaining the database? Should the geo-location technology be required to be incorporated within the device? How would the device react if it were unable to determine its exact position, for example, if it were to be indoors? Could some surrogate method, such as measuring the number of AM or FM broadcast signals in an area prove useful as an alternative optional method for identifying an area that is sparsely populated from a spectrum perspective where higher power operation could be permitted? We also seek comment on whether alternative approaches such as registration should be permitted to authorize operation under higher power limits in rural areas. Finally, we seek comment on whether there are any special enforcement issues when cognitive radio technologies are used to permit the higher power operation we have proposed.

Application: Secondary Markets

28. We recently took several steps in the *Secondary Markets Report and Order*, 68 FR 66252, November 25, 2003 and *Further NPRM* (Secondary Markets Order), 68 FR 66232, November 25, 2003, to facilitate and streamline the ability of spectrum users to gain access to licensed spectrum by entering into spectrum leasing arrangements on reasonable market-driven terms between the private parties. Specifically, we adopted rules to remove regulatory uncertainty and establish clear policies and rules concerning leasing arrangements. In many Wireless Radio Services, licensees are now free to enter into voluntary leasing transactions with spectrum users seeking access to a licensee's spectrum. While the flexible framework facilitating spectrum leasing arrangements does not impose any special technical requirements or constraints on such transactions, in some cases these arrangements may be made easier through the use of emerging technologies like cognitive radio. As discussed in our *Secondary Markets Order*, the ability of potential spectrum lessees to identify available leasing opportunities and negotiate with licensees, *e.g.*, *access mechanism*, is important for successful secondary market transactions. Also, mechanisms to ensure that licensees can reclaim their spectrum from spectrum lessees, *e.g.*, *reversion mechanisms*, are an important consideration for many licensees. The *Further NPRM* portion of the *Secondary Markets Order* seeks comment on changes needed in licensing policies or in the provision of licensing information to facilitate development of such a secondary marketplace in spectrum. The *Further NPRM* also acknowledged the Commission's plans to conduct a separate proceeding on cognitive radio that might, *inter alia*, address the issue of technical requirements for possible leasing of public safety spectrum.

29. Licensees and potential lessees could exchange information via a communication link identifying the spectrum that would be leased as well as the then current terms and conditions for its use. The licensee could, in this manner, control access to and keep track of third party use of leased spectrum by, for example, an exchange of ''tokens'' sent to the lessee's devices. Security of such transactions can be reinforced using technologies like the modern Public Key Infrastructure (PKI) mechanisms used widely by industry today. We seek comment on technical methods that might be used to provide information necessary for leasing and how a device would ''enforce'' the terms of the lease. Although the Commission may not need to adopt specific technical requirements for these mechanisms, we seek comment on whether the Commission could reduce uncertainties that may inhibit leasing transactions by encouraging voluntary technical standards for access to a licensee's spectrum. What approaches to facilitating spectrum leasing transactions could best achieve the goals of our flexible and market-driven policies for spectrum leasing?

Interruptible Spectrum Leasing

30. In the NPRM, we seek comment on potential mechanisms for lessees to access spectrum by means of cognitive radio technology that would provide licensees with the ability to rapidly regain the use of the spectrum when needed. Technology that provides licensees with highly reliable and near-instant access to leased spectrum could be beneficial to a wide variety of spectrum users, such as satellite, cellular, PCS and private radio network licensees, and we accordingly are seeking comment generally on what steps might facilitate the use of this technology. For instance, specifying the technical methods of accessing and reclaiming spectrum could benefit both licensees and potential lessees by standardizing equipment designs, thus lowering equipment, and therefore transaction, costs. An important potential application of this framework is to possible public safety spectrum leasing, where access to, as well as reliable and secure use of, spectrum are critical and the public interest may require strong technical assurances. Therefore, with respect to that particular application, we are seeking comment *inter alia* on whether, if we decide to permit public safety leasing, we should identify one or more specific technical approaches in its rules to be employed by lessees, either at the discretion of the public safety licensee or on a mandatory basis under our rules.

31. We focus here on technical measures for ensuring return of spectrum to the primary licensee under pre-designated conditions. Cognitive radio technologies can be used both to identify spectrum that is available for leased use and to ensure that it reverts to the licensee under the prescribed conditions. In particular, we set forth the details of a ''beacon'' approach that would ensure that licensees would retain real-time access to their leased spectrum. Of course, the beacon and other approaches described in paragraphs 56 and 57 of the NPRM are not necessarily the only ones that could facilitate leased access to spectrum while providing licensees with the ability to reclaim it quickly with ultra-high reliability. We therefore seek comment on other methods that could achieve the same goals, and how these methods should be reflected in our rules.

32. We seek particular comment on the beacon approach, which appears to provide the reliability necessary for some leasing arrangements, and can incorporate features needed for secure access, yet offers reasonable cost and acceptable complexity to implement and maintain. For example, applying this approach to a public safety leasing scenario, the public safety licensee would have control of the beacon and thus could directly regain control of the spectrum when needed. The beacon approach also allows a licensee to incorporate both access and reversion techniques into a technical solution, if it so desires. The lessee's device would have to incorporate the capability to check for the beacon signal at prescribed intervals. If the lessee's transmitter failed to receive a properly authenticated beacon signal for a prescribed time period, it would be programmed to assume access is no longer authorized and would cease use of the leased spectrum. The licensee would have the ability to reclaim the

use of its spectrum after the prescribed listening period. In addition, the licensee's access, return, or reversion of its spectrum would not be impeded by unfavorable signal propagation because no explicit order to the lessee is necessary to terminate the lessee's use.

33. We also seek comment on how information about permissible leased uses of spectrum could be exchanged via a technical mechanism, such as a beacon signal, and on the cognitive capabilities that equipment used by a lessee must have, such as DFS, TPC and geo-location determination, to work with the chosen technical mechanism. For example, the negotiation of spectrum leasing opportunities would most likely require information about spectrum availability, *e.g.*, which channels, scope of authorized service area, and the characteristics of the spectrum available, *e.g.*, modulation, power limits. Other necessary information might include the amount of spectrum available, its expected duration, and perhaps its cost. Different technical information would be needed depending on the nature of the service, frequency bands employed, minimum acceptable quality of service requirements, and other characteristics of licensed and leased spectrum users. We recognize that some of this information might be provided in the negotiation of a long-term leasing agreement. However, cognitive radio technology could be designed to allow licensees to make this information available on a real-time basis and allow automated negotiation of the terms of leased access. In any case, any access mechanism would have to be consistent with the legal framework providing for secondary market transactions in spectrum that we adopt in our separate proceeding on secondary markets.

34. We seek comment on technical methods that might be used by a beacon approach, including those associated with a real-time automated negotiation of leased use rights. In this regard, we describe below several specific technical proposals for a beacon mechanism and the equipment that could be used by the spectrum lessees. As noted above, the beacon need not necessarily be in the form of an RF signal, but could be a physical connection like fiber, copper or coaxial cable and achieve the same results because the key factor of the beacon is the presence of the encrypted signal controlled by the licensee. First, under our proposal, the beacon signal would be sent either constantly or no less frequently than once per second so equipment used by lessees will be able to quickly detect the absence of an authorized beacon signal. Second, to protect against unauthorized use of spectrum, the beacon would contain information on the channel(s) available to prevent unauthorized use of channels by lessees. In addition, the beacon would include the time of day and an electronic signature to prevent ''spoofing,'' whereby an unauthorized third-party originates a rogue beacon signal or retransmits an earlier beacon signal. The beacon's electronic signature should be sufficiently robust to make generating a rogue signal extremely difficult, *e.g.*, use 128-bit encryption, but we seek comment on what level of security would be needed to protect against unauthorized use. While we seek comment on the need for the Commission to define the technical requirements of beacon signatures in order to avoid possible harm from licensees using duplicitous signatures, we recognize that ongoing industry efforts towards standards, such as for public safety communications, might address such issues without need for regulatory oversight. We also seek comment whether multiple beacons should be required in the event that a licensee wishes to make multiple channels or frequency bands available to multiple lessees.

35. Under such a beacon proposal, cognitive devices used by spectrum lessees could incorporate these and other technical safeguards to ensure that use of the spectrum by the licensee would not be compromised. For example, devices would be capable of frequency agility to allow operation only on the channels or frequencies designated as available by the licensee and avoid operation on any other frequencies. We seek comment on other approaches that might be used to constrain leased use to authorized channels. We thus seek comment on all of the proposals regarding access/reversion and on alternatives that may provide similar levels of reliability, security, and implementation complexity.

36. Public Safety Leasing. In addition to seeking comment on the application of technical access/reversion models to possible public safety leasing, we also seek comment here on particular technical issues that would appear to have particular relevance to possible public safety leasing. For example, would changes in modulation type or other parameters as opposed to a cessation of transmission be sufficient in the event a public safety licensee needs to reclaim spectrum? We also anticipate that transmitters operated on leased public safety frequencies would incorporate TPC so the public safety licensee could specify the appropriate operating power, and would be programmed to detect a properly authenticated public safety beacon within two seconds or cease use of the leased spectrum. We seek comment on these proposals, as well as on alternatives to the proposed signal and reversion times that could offer acceptable reversion capability to the public safety licensee. Additionally, other cognitive radio technologies may offer alternative approaches to the proposed beacon approach. We seek comment on any alternatives that may also achieve our goals, *e.g.*, reliability, security, rapid reversion, etc., for public safety spectrum leasing.

37. The speed with which a public safety licensee can reclaim access to its licensed spectrum will be an important consideration in any reliable public safety reversion mechanism. In many instances, public safety use, for example, may not spike within a few seconds in response to emergencies but is more likely to grow at a rapid non-linear rate. Under such usage, instantaneous reversion may be unnecessary, and an appropriate reversion return time may be identified. We seek comment on whether and how cognitive radio technologies could be employed to permit the ''tiering'' of leased channels, which could make some channels available under a system with fast turnaround and other channels with slower turnaround. We also seek comment on public safety use and what appropriate minimums for time to return and at what rates are needed from usage patterns. We seek comment on whether beacon technology would best be implemented in multiple-channel trunked base stations; and whether one or more channels in such base stations could serve the beacon function. We also seek comment on how use of beacon-based technology could guard against interference when, on occasion, radios in a given system operate in the direct mode, *i.e.*, a mobile or portable radio communicating directly with another mobile or portable radio without the signals going through the base station.

38. We also seek comment specifically on how the goals for public safety access to spectrum should be achieved, including any alternative features that proposed technical solutions should employ, and on other considerations important to addressing the technical aspects of public safety spectrum leasing transactions. In this regard, we recognize that although public safety licensees would want to retain control of any cognitive based technology used to ensure the reversion of leased

spectrum, the acquisition of the technology may be funded by lessee(s), subject to the terms of a negotiated lease.

39. Although these specific issues may be of particular import to possible public safety leasing, we also seek comment on them in the context of interruptible leasing by licensees other than public safety entities.

40. Other Issues. We also seek comment on how to ensure that lessees of spectrum do not inadvertently transmit outside the licensee's authorized area and cause harm to other users. In general, we assume that a beacon transmitting in a licensed public safety frequency band at the same power level normally used in the band would provide coverage over the public safety entity's licensed area. This should act as a safeguard against lessee operation beyond the licensed service area because the lessee's radio will not be able to receive the beacon beyond a certain distance. However, because the coverage area of a beacon may not precisely match the licensee's service area and could extend beyond the service area, it may be possible for a lessee to receive a beacon signal outside the authorized service area. We seek comment on whether there are technical mechanisms that could be used to ensure that lessees operate only within the geographic limitations of the license.

Other Applications of Cognitive Radio Technology

Dynamically Coordinated Spectrum Sharing

41. *Coordination of Licensed Operations*. Under current policies, co-frequency spectrum sharing among licensed services is usually accomplished with formalized procedures. These ''prior coordination'' procedures generally require applicants and licensees to identify and address the interference potential of their proposed spectrum use with incumbent users in an engineering analysis performed prior to filing an application. Typically these engineering analyses are based on ''worst case'' assumptions, even if the ''worst case'' occurs relatively infrequently. Prior coordination approaches are generally practical and spectrally efficient when sharing conditions do not change significantly over time. Prior coordinated sharing in the C-Band between GSO FSS and terrestrial fixed services (FS) did not result in significant underutilized spectrum because early GSO earth stations operated with a limited number of transponders on a single satellite and both the earth station and the FS facilities' directionality remained constant. Today GSO earth stations are usually coordinated for more than one satellite orbit position and transponder configuration, often called ''full-band, full-arc'' to support business models that supply satellite capacity on demand, such as with ''teleport'' providers, and also ensure systems can rapidly respond to satellite failures without interference. Such coordination scenarios may offer opportunities for dynamically coordinated spectrum reuse. (See discussion in paragraphs 70 through 72 in the NPRM).

42. We seek comment on ways that we may encourage the use of dynamic coordination approaches. For example, what incentives or regulatory frameworks for dynamic coordination approaches might facilitate satellite and terrestrial coordinated sharing. What coordination procedures would be appropriate for terrestrial to terrestrial sharing? Could satellite providers employ a spectrum reversion mechanism discussed above to permit real-time coordinated use without unreasonable risk of interference to their operations? Would financial incentives encouraging dynamic coordination approaches be warranted? Could our secondary market spectrum leasing provide a framework for such financial incentives? Would explicitly making dynamic coordination an option in our existing coordination procedures be in the public interest?

Facilitating Interoperability Between Communication Systems

43. An important focus of the Commission has been the facilitation of interoperability among non-federal public safety entities. Cognitive radio technologies offer urgently needed solutions to the increasingly crucial interoperability demands facing first-responders and other licensed users. The Act and our rules currently provide a regulatory framework for interoperability. This framework includes various Commission efforts to facilitate interoperability between non-federal entities at the national, regional, state-wide and local level. Also of importance is interoperability between non-federal public safety entities and federal government first responders. Cognitive radio technologies addressed in this proceeding offer a new means of reducing risks to safety of life and national security by increasing the opportunities for first responders interoperability.

44. Both industry and government bodies are actively addressing the complex issues posed by the need for interoperable communication between public safety entities. The Public Safety National Coordination Committee (NCC) recently made recommendations on interoperability and other related issues in their report to the Commission. The Commission's Office of Homeland Security is also exploring potential changes to the Commission's technical rules, policies, procedures, or practices that would facilitate development of cognitive radio technology to enhance public safety communications.

45. Cognitive radio devices' capability to automatically or with some user input identify systems and users that need bridging, could facilitate interoperability under our existing regulatory framework. Devices capable of sensing and identifying signals could dynamically respond to new jurisdictions seeking to deploy interoperable systems. Devices could, in real time, adapt waveforms received from one system and change their modulation formats (such as APCO25 to FM) and frequencies and facilitate interoperability with other systems. For example, during their response to the Pentagon attack, Arlington County Fire's ability to communicate with firemen reporting from other jurisdiction would not have been limited to their supply of radios to distribute. A device could simply have bridged communications from any jurisdictions arriving with their own radios. Cognitive radio devices could also be used to connect to password protected databases available for public safety use that could help identify the kinds of frequencies and waveforms that dynamic interoperability would need to bridge. Devices could also perform this interoperability bridging using encryption technology when secure communications are required. Such a feature might be very useful for federal entities utilizing secure communications systems that assume responsibility for coordinating rescue and response efforts. FBI entities who assume control of coordinating such efforts may need to bridge from secure communication systems in order to communicate with certain non-federal entities. Cognitive radios may also contribute to the provision of E911 by providing a bridge between systems using different air interfaces to provide wireless E911 services. We seek comment on how cognitive radio technologies can facilitate interoperability between systems. We also seek comment on any rule changes necessary to take advantage of these benefits for interoperability between systems. We also seek comment on how

cognitive radio technologies can provide support to wireless E911 services.

Mesh Networks

46. Emerging technologies, such as ''mesh'' networks, rely on each node in an RF network to collect and disseminate information and optimize spectrum use by relaying messages through the RF network. We seek comment on the application of this technology and possible rule changes needed to facilitate the use of these technologies.

47. In a mesh network, each transmitter interacts on a peer-to-peer basis with other nearby transmitters, while also sending and receiving messages mimicking a router that relays messages to and from neighboring transmitters. Through this relaying process, a message can be routed through other transmitters to its destination based on the current conditions of the network. The received power at an antenna is reduced as the distance from a transmitter increases, and thus more power is required to transmit to a receiver farther away. Mesh networks function by ''whispering'' at low power to a neighbor rather than ''yelling'' at a high-power to a node far away. This approach may be spectrally more efficient than simply transmitting directly to a desired receiver at some distance and provide for better sharing scenarios. We seek comment how such techniques could be applied to facilitate our goals of improved spectrum sharing.

48. Mesh networks can allow radio use to expand to areas beyond the reach of network base stations, yet enable multiple users to avoid interference to each other. This capability could make it possible to deploy operations in areas where line of site is obstructed or unavailable and the propagation characteristics of the band would otherwise require unobstructed line of site. For example, such a capability could be helpful for both licensed and unlicensed operations in the microwave bands where common obstructions such as trees limit the ability to deploy services with low power. We seek comment how this technology might serve our efforts to facilitate broadband communication services to consumers, and any rule changes that might be necessary. We also seek comment on the impact that mesh networks will have on the aggregate interference to licensed services.

49. The ability of mesh networks to ''self-heal'' by responding to failures in the network may offer important benefits for ensuring network reliability. If one link in a mesh network fails, a message can be routed to its destination through alternate links. In this way all transmissions from the nodes of a mesh network operate in coordinated manner, in the same manner that Internet routers intelligently respond to outages by routing traffic around failures. We seek comment on how such capabilities could improve the reliability of wireless operations.

SDR and Cognitive Radio Equipment Authorization Rule Changes

50. Although the SDR rules were adopted over two years ago, to date no manufacturers have filed applications to certify a device under our new SDR rules. However, devices have been certified that would meet the Commission's broad definition of an SDR, but the manufacturer did not choose to declare them as such at the time of certification. We, therefore, do not know whether these devices incorporate features to prevent unauthorized changes to the operating parameters because there is no requirement to incorporate security features in a transmitter that is not declared as an SDR. Thus, we are concerned about the potential for parties to make unauthorized changes to software programmable radios after they are manufactured and first sold which could result in harmful interference to authorized services. Further, we note that manufacturers are now developing transmitters that are ''partitioned'' into two or more physical sections connected by wires, where one section houses the control software and another contains the RF transmission functions. We, therefore, believe it is time to revisit the SDR rules to determine if changes are needed concerning whether the SDR rules should be permissive or mandatory, the types of security features that an SDR must incorporate, and the approval process for SDRs that are contained in modular transmitters.

Proposals for Part 2 Rule Changes

51. *Submission of radio software.* The rules require the applicant, grantee, or other party responsible for compliance of an SDR to submit a copy of the software source code that controls the device's radio frequency operating parameters to the Commission upon request. This requirement is analogous to the requirement to supply photographs and circuit diagrams for hardware based devices and was added to assist in enforcement by allowing the Commission's staff to obtain information it could examine to determine if unauthorized changes had been made.

52. Because of the expected complexity and variations in the programming languages of the software used to control radio operating parameters, examining radio software is unlikely to be an effective way to determine whether unauthorized changes have been made to a device. Source code generally cannot be directly compared to the software loaded within a device because the source code is compiled before loading and additional changes to the code may be made in the loading process. Even if there were a way to compare software, manufacturers are permitted to make changes to the software that have no effect on the operating parameters at any time without notice to the Commission, and it could prove difficult for the Commission's staff to determine whether such changes affect the compliance of a device. A high level description of the radio software and flow diagram of how it works would be more useful in understanding the operation of a device than a copy of the software. We therefore propose to delete the requirement that grantees or applicants supply a copy of their radio software upon request, and propose to add a less burdensome requirement that applicants supply a description and flow diagram of the software that controls the radio operating parameters. The existing requirement in the rules that certified equipment must comply with the applicable technical rules appears to be a sufficient safeguard against unauthorized changes to equipment. Further, the rules require that an applicant or grantee supply a sample of a device to the Commission upon request that we can test to determine if a device is compliant. Grantees are also required to maintain records of equipment specifications and any changes that may affect compliance, which must be made available for inspection by the Commission.

53. *Applicability of SDR Rules.* The current rules allow a manufacturer to declare that a particular radio is an SDR when the application for equipment authorization is filed, but currently do not require this declaration. By not declaring a radio as an SDR, the manufacturer is not required to incorporate the necessary security features to ensure that only software that is part of an approved hardware/software combination can be loaded. This means that a radio can be potentially modifiable, and perhaps easily so, to operate with parameters not permitted by the rules, or to operate outside those that were approved for the device, thus increasing the risk of

interference to authorized radio services. However, not all radios that meet the broad definition of an SDR are easily modifiable after manufacture. We seek comment on the need for a requirement that manufacturers/importers declare certain equipment as SDRs, including the benefits of such a requirement in reducing interference and its possible burdens on manufacturers. We also seek comment on the types of devices to which this requirement should apply, including how the rules should distinguish between transmitters that must be identified as SDRs and those that need not be. Our goal for such a requirement is to minimize the possibility of unauthorized operation of software programmable radios, yet avoid imposing new requirements on manufacturers whose equipment meet the definition of SDR but are designed in a manner such that the transmission control software is not easily modified. For example, should we require that transmitters into which software can be loaded to change the operating parameters after manufacture be declared as SDRs, and that they comply with the requirements for SDRs, including incorporation of a means to prevent unauthorized software changes? Should this requirement apply to transmitters in which the software can be modified through means such as a physical interface to a personal computer or other device, an over-the-air download, use of a keypad or buttons on the device, or by replacing a board, card or chip that is not permanently attached to the device? Should this requirement apply to radios that can only be reprogrammed by the manufacturer or service center using proprietary software that has some form of security protection?

54. We further seek comment on whether a requirement to declare certain devices as SDRs should apply to transmitter modules. The Commission recently proposed in a separate proceeding providing manufacturers additional flexibility for authorization of transmitter modules that are partitioned into separate radio front ends and firmware provided they use digital keys to ensure that only a radio front end and firmware that have been certified together may operate together. Would the proposed partitioning and digital key requirements for transmitter modules be sufficient to protect against unauthorized software modifications of modules and eliminate the need to require modules to be declared as SDRs?

55. Equipment used by amateur radio operators is generally exempt from a certification requirement. We have maintained this policy to encourage innovation and experimentation in the Amateur Radio Service. However, we are concerned that it may be possible for parties to modify SDRs marketed as amateur equipment to operate in frequencies bands not allocated to the Amateur Radio Service if appropriate security measures are not employed. However, we do not wish to prevent licensed amateurs from building or modifying equipment, including SDRs that operate only in amateur bands in accordance with the rules. Accordingly, we propose that manufactured SDRs that are designed to operate solely in amateur bands are exempt from the mandatory declaration and certification requirements, provided the equipment incorporates features in hardware to prevent operation outside of amateur bands. We seek comment on this proposal.

56. At present there is a clear distinction between radio transmitter technology, regulated under § 2.801(a) of our rules and various radio service rules, and personal computer technology, regulated in a much less restrictive way under Subpart B of part 15 of our rules. However, increasing computer speeds and speeds of digital-to-analog converters (DAC) may well blur this distinction. A general purpose computer capable of outputting digital samples at rates in the million sample/seconds range or higher could be connected to a general purpose high-power, high-speed DAC card which could effectively function as a radio transmitter. The marketing of such computers, DACs, and software to make them interact could undermine our present equipment authorization program at the risk of increasing interference to legitimate spectrum users since none of them would be subject to the normal authorization requirements. At present this is not a problem, but we wish to consider modest steps now to help ensure that this scenario does not become a serious problem.

57. While such high-speed DACs are presently marketed to the scientific community at high unit costs, we are not aware of any which are marketed as consumer items. We seek comment on whether we need to restrict the mass marketing of high-speed DACs that could be diverted for use as radio transmitters and whether we can do so without adversely affecting other uses of such computer peripherals or the marketing of computer peripherals that cannot be misused. We seek comment on one possible approach as well as welcoming alternative proposals. Would it make sense to require that digital-to-analog converters marketed as computer peripherals that (1) operate at more than one million digital input samples/second, (2) have output power levels greater than 100 mW and, (3) have an output connector for the analog output be limited in marketing to commercial, industrial and business users as we require for Class A digital devices? Would it be preferable to characterize such systems in terms of output frequency and bandwidth rather than input sampling rate? What sampling rate and power limits would be needed to avoid impacting DACs that might have a legitimate consumer use such as, for video systems and other media applications? Is there a practical way to incorporate security features that would limit the frequency range or other operating parameters of these devices? We also seek comment on the specific types of devices that would be affected and the potential burden on manufacturers.

58. *Security and authentication requirements.* The rules require that manufacturers take steps to ensure that only software that is part of an approved hardware/software combination can be loaded into an SDR. The software must not allow the user to operate the transmitter with frequencies, output power, modulation types or other parameters outside the range of those that were approved. Manufacturers may use authentication codes or any other means to meet these requirements, and must describe the methods in their application for equipment authorization. In adopting these requirements, the Commission stated that it may have to specify more detailed security requirements at a later date as SDR technology develops.

59. We seek comment on whether any modifications are necessary to the security and authentication requirements in the rules. Specifically, we seek comment on whether the current rules provide adequate safeguards against unauthorized modifications to SDRs. We also seek comment on whether more explicit security requirements are necessary, such as requiring electronic signatures in software to verify the software's authenticity. We further seek comment on what should happen in the event that reasonable security methods ultimately are broken. Should there be limits to a manufacturer's responsibility if, for example, the manufacturer follows an accepted industry standard for security? If manufacturers' responsibility is limited, how would the Commission enforce its rules, *e.g.*, if interference occurs, against the users of unauthorized software or the creators/

distributors of unauthorized software? At least one party has proposed rule changes to clarify how a manufacturer can comply with the requirements of § 2.932(e) of our rules, and to define the standard of care to be applied. We seek comment whether defining compliance using ''commercially reasonable measures,'' or some other standard, such as ''industry accepted practice,'' would appropriately balance our goals for ensuring compliance with our rules and burdens on manufacturers. As described, device with cognitive capabilities may be subject to new forms of abuse to which other devices are not susceptible. Of course, devices with cognitive capabilities would generally require certification by the Commission, and thus are subject to the marketing and use restrictions of § 2.803. We seek comment on how we can enable the use of cognitive radio technologies, but prevent abuses. Are there features that could be incorporated into devices to help detect attempts to physically tamper with spectrum sensing and geo-location technologies built into devices? Could devices be designed to detect alterations to control software or databases and cease operation if such alterations are detected?

Proposals for Part 15 Rule Changes

60. *Automatic frequency selection for unlicensed devices.* Many frequency bands where unlicensed operation is permitted are not harmonized worldwide. For example, in the United States, unlicensed operation is permitted in the 2400–2483.5 MHz band, while in other countries operation is permitted in the 2400–2500 MHz band. The 2483.5–2500 MHz band is used for the Mobile Satellite Service (MSS) in the United States and is a restricted band under part 15, therefore unlicensed devices are not permitted to transmit in that band to prevent interference to the MSS. Unlicensed transmitters are now being manufactured in which the frequency range of operation can be software selectable. However, a transmitter can not be approved in the United States unless it is capable of complying with the technical requirements of the rule part under which it will be operated. Therefore, an unlicensed transmitter that is capable of operation outside permitted bands of operation under part 15 of the rules cannot be certified for operation in the United States.

61. Manufacturers would like the ability to certify devices to operate over a wider frequency range than is permitted in the United States, provided the devices incorporate some sort of technology that selects the appropriate operating frequency ranges based on the country in which they are used. A device could limit its operation to authorized frequencies when used in the United States, but could operate on additional frequencies as permitted in other countries. This approach could allow the production of devices that could be used worldwide, or at least in a number of different countries, and eliminate the need for manufacturers to produce multiple versions of a device for use in different countries.

62. Allowing certification of frequency selectable wireless devices could benefit consumers and manufacturers by reducing production costs and allowing production of devices that can be used in both the United States and other countries. We therefore propose to allow certification of part 15 devices that are capable of operating on non-part 15 frequencies. We propose to require that such devices incorporate DFS to select the appropriate operating frequency based on the country of operation and must operate on only part 15 frequencies when used in the United States. In addition, we propose that such devices must incorporate a means to determine the country of operation. There are several methods that a device could use to make this determination. One is to incorporate geo-location capability, such as GPS, combined with a database, to determine the device's geographic location. Alternatively, a device could rely on information provided by another device to determine the country of operation or the permissible frequency band. For example, a device such as a wireless LAN card could rely on a network access point to select the appropriate operating frequency band. Under that scenario, it would be necessary to assure that the network access point is capable of determining its location and communicating that information to a connected device. We seek comment on this proposal; in particular, the means that a device should employ to determine its country of operation and select the appropriate operating frequency range. Are there methods other than the ones described above that could be employed? How should a device respond if it is unable to determine its geographic location? If the frequency band or country of operation is determined by an external device such as a network access point, what specific requirements should apply to different types of devices used in a system such as wireless LAN cards and network access points? We also seek comment on how to assure that users cannot select an unauthorized frequency range or easily modify devices to operate in unauthorized frequency ranges. Consistent with our proposals above, we seek comment on whether devices in which the operating frequency range can be selected through software should be required to be declared as SDRs, and therefore required to meet the security and authentication requirements for SDRs to prevent unauthorized modifications.

Pre-Certification Testing Requirements for Cognitive Radios

63. Transmitters must be tested to show compliance with the applicable technical requirements before they can be certified. For unlicensed transmitters, both the technical requirements and the test procedures are specified in part 15 of the rules. For transmitters used in licensed services, the technical requirements are contained in the rule part for a particular service, and the test procedures are specified in part 2 of the rules. The types of tests specified in these procedures include field strength, output power, spurious emissions, occupied bandwidth and frequency stability. We seek comment on the new types of tests that will be required in two broad areas—unlicensed and licensed transmitters.

64. *Tests required for unlicensed devices.* We are proposing to allow unlicensed transmitters to operate at higher power levels in areas with limited spectrum use. In order to make the determination as to when higher power operation is permissible, the transmitter must have the ability to scan the spectrum to determine occupancy. To verify whether a device has the capabilities that we ultimately decide are necessary, there are potentially a number of specific tests that may have to be performed on a specific device. These tests would include:

- Determine the frequency range that can be scanned by device.
- Measure the scanning resolution bandwidth.
- Determine the sensitivity of the scanning receiver used to examine spectrum occupancy.
- Test the ability of the device to correctly determine spectrum occupancy based on presence of various standardized input test signals.
- Determine time period to monitor before declaring that the spectrum is not occupied.
- Ensure transmitter power control adjusts to the correct level.
- Time to revisit a portion of the spectrum to ensure that it is still unused.

• Response time to vacate a portion of the spectrum when it is determined that the spectrum is being used.

65. We seek comment on the above tests as well as on any other tests that may be needed to assure compliance by unlicensed devices with the SDR and any new cognitive radio rules, as well as a more detailed description of the measurement procedures that could be used. For testing a device's response to various standardized input signals, we seek comment on the frequencies, types and levels of the signals that should be used. Should there be a series of input signal tests required, and if so, what should they be? We also seek comment on whether the Commission should develop such test procedures or whether they should be developed through an industry standards organization such as ANSI.

66. *Tests required for interruptible radios.* We previously discussed that cognitive radios could conceivably share spectrum with other services, such as public safety or commercial users. Such sharing could be facilitated by use of a reversion mechanism, as proposed for public safety frequencies, that causes the cognitive radio to cease transmission when the primary user of the spectrum needs to use it. The reversion mechanism could be the loss of a beacon signal or there could be some other control signal telling the cognitive radio to cease transmission. In order to assure that the reversion mechanism works properly, certain new tests may be needed for radios using one of these technologies. We seek comment on the testing criteria may be appropriate for an RF beacon based system. Likewise, we seek comment on what testing criteria may be appropriate for beacon systems whose signal is not delivered over the air. We seek comment on whether these tests are appropriate, and whether additional tests should be required:

• Ability of the radio to sense a beacon or other control signal on the appropriate frequency or from another source.

• Minimum receive sensitivity for the control signal.

• Response time to vacate channel when beacon signal is lost or other control signal orders cessation of transmission.

67. *Other required tests specific to cognitive radios.* In addition to the specific cases described above, there may be a need to establish a more general framework for testing cognitive radios. We seek comment on the need for the following tests for different types of cognitive radio technology.

68. Listen-before-talk systems scan one or more frequency ranges to determine whether there are any other users present before transmission. The following tests may be appropriate for listen-before-talk systems:

• Determining the frequency band that is scanned by device.

• Measuring the scanning resolution bandwidth.

• Sensitivity of the scanning receiver used to determine spectrum occupancy.

• Ability of the device to select an operating frequency and power level based the presence of various standardized test input signals.

• Determine time period to monitor before declaring that the spectrum is not occupied.

• Time to revisit a portion of the spectrum to ensure that it is still unused.

• Response time to vacate a portion of the spectrum when it is determined that the spectrum is being used.

We seek comment on the need for these tests and on any other tests that may be needed for listen-before-talk systems. For testing a device's response to various standardized input signals, we seek comment on the frequencies, types and levels of the signals that should be used. Should we require a series of input signal tests, and if so, how many?

69. Geo-location systems use GPS or some other method to determine the transmitter's location. A database can be used to determine the transmitter's proximity to other devices that need to be protected from interference. The following tests may be necessary for devices that use geo-location. We seek comment on the need for these tests and for any other tests that may be required for radios that incorporate geo-location technology:

• Ability to correctly identify its location based on GPS or some other method.

• Ability to access database to correctly determine location and authorized operating parameters of other transmitters in the vicinity.

• Device response when geo-location signal is lost or can not be found.

70. Cognitive radios may allow transmissions using new or novel formats. For example, it may be possible to divide a signal so transmissions occur simultaneously using multiple non-contiguous frequency blocks. Such waveforms could potentially result in more efficient use of spectrum by allowing small unused blocks of spectrum to be ''combined'' into larger, more useful blocks of spectrum. However, this type of technology raises some novel measurement issues because the Commission did not envision its use when developed the rules. We therefore seek comment on the following questions related to this technology.

• How should the transmit power be measured to determine compliance with the power limits? Should the measurement be of the power per channel, the total power over all channels, or some other measurement?

• How can the bandwidth be measured?

• How should the modulation type be defined?

Initial Regulatory Flexibility Analysis

71. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities 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 11 of the NRPM. The Commission will send a copy of the NPRM, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[2]

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

72. In the Notice of Proposed Rule Making, we propose several changes to parts 2, 15, 90 and other parts of the rules. Specifically, we propose to:

(1) Eliminate the requirement for applicants and grantees of equipment authorization to supply a copy of the software that controls the operating parameters of a software defined radio, but add a new requirement that applicants for equipment authorization supply a description and flow diagram showing how the radio software operates

(2) Require that certain radios that meet the definition of a software defined radio must be declared as such at the time of filing the certification application, and that they must incorporate a means to prevent unauthorized software changes that could change the operating parameters of the radio.

(3) Permit certification of wireless LAN cards that incorporate additional

[1] *See* 5 U.S.C. 603. The RFA, *see* 5 U.S.C. 601–612 has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. 104–121, Title II, 110 Stat. 857 (1996).

[2] *See* 5 U.S.C. 603(a).

frequency bands for use in other countries, but limit their operation to authorized frequencies in the United States,

(4) Permit certain unlicensed devices to operate at higher power levels in areas with limited spectrum use;

(5) Allow equipment to be developed that could allow public safety entities to lease spectrum on a temporary basis but reclaim it immediately when necessary.

73. 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 wireless internet service providers (WISPs) are using unlicensed devices within wireless networks to serve the needs of consumers. WISPs around the country are providing an alternative high-speed connection in areas where cable or DSL services have been slow to arrive. The higher power limits 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.

74. These proposals could also benefit public sector entities by allowing the development of ''smart'' equipment that could enable the leasing of public sector spectrum to generate needed revenue, but would contain safeguards that allow the spectrum to be reclaimed by the public sector entity in the event of an emergency.

B. Legal Basis

75. 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

76. 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.[3] 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.[4] 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 may additional criteria established by the Small Business Administration (SBA).[5]

Radio and Television Broadcasting and Wireless Communications Equipment Manufacturers

77. 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.[6] 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.[7] 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 at least 1,150 small manufacturers of radio and television broadcasting and wireless communications equipment, and possibly there are more that operate with more than 500 but fewer than 750 employees.

WISPs and Other Wireless Telecommunication Service Providers

78. The SBA has developed a small business size standard for Cellular and Other Wireless Telecommunication, which consists of all such firms having 1,500 or fewer employees.[8] According to Census Bureau data for 1997, in this category there was a total of 977 firms that operated for the entire year.[9] Of this total, 965 firms had employment of 1,000 employees or more.[10] Thus, under this size standard, the majority of firms can be considered small.

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

79. Both licensed and unlicensed transmitters are already required to be authorized under the Commission's certification procedure as a prerequisite to marketing and importation, and the proposals in this proceeding would not change that requirement. There would, however, be several changes to the compliance requirements.

80. Software defined radios in which the software can be easily changed after manufacture would have to be declared as software defined radios at the time the application for certification is filed. This would be a change from the current process, in which declaring a device as a software defined radio is optional. A software defined radio must incorporate security features to prevent unauthorized software changes that affect the operating parameters, and the applicant must describe them in the certification application. We do not expect that this would be a significant compliance burden because manufacturers of radios that would be affected by this requirement generally already take steps to ensure the security of the radio software.

81. Unlicensed transmitters that would be permitted to operate at higher power in rural and other areas with limited spectrum would have to incorporate sensing capabilities to ensure that higher power operations could occur only in areas where it is permitted. The applicant for certification would have to demonstrate in the application that the equipment meets the requirements.

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

82. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): ''(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 and reporting requirements

[3] *See* U.S.C. 603(b)(3).

[4] *Id.* 601(3).

[5] *Id.* 632.

[6] 13 CFR 121.201, NAICS code 334220.

[7] 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.

[8] 13 CFR 121.201, NAICS code 517212 (changed from 513322 in October 2002).

[9] U.S. Census Bureau, 1997 Economic Census, Subject Series: Information, ''Establishment and Firm Size (Including Legal Form of Organization), ''Table 5, NAICS code 513322 (issued October 2000).

[10] *Id.* The census data do not provide a more precise estimate of the number of firms that have 1,500 or fewer employees; the largest category provided is ''Firms with 1,000 employees or more.''

under the rule for such 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.'' [11]

83. If the rules proposed in this notice are adopted, we believe they would have a significant economic impact on a substantial number of small entities because the rules will impose the following costs: (1) Compliance with equipment technical requirements, such as incorporating cognitive capabilities into devices capable of higher power or multi-band operation or using a beacon or other mechanism to enable leased use of spectrum, and (2) compliance with reporting requirements, such as declaring certain radios as software defined radios and supplying certain information about the equipment to the Commission. However, the burdens for complying with the proposed rules would be the same for both large and small entities. Therefore, there would be no differential and adverse impact on smaller entities. Further, the proposals in this *NPRM* are beneficial to both large and small entities. Because we believe that the economic impact of the proposed rules on smaller entities would be, in this setting, beneficial rather than adverse, we believe it would be premature to consider specific alternatives to the proposed rules. However, we solicit comment on any such alternatives commenters may wish to suggest for the purpose of facilitating the Commission's intention to minimize any adverse impact on smaller entities.

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

84. None.

Ordering Clauses

85. Pursuant to sections 4(i), 302, 303(e), 303(f), 303(r) and 307 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 302, 303(e), 303(f), 303(r) and 307, this Notice of Proposed Rule Making is hereby adopted.

86. Pursuant to sections 4(i), 302, 303(e), 303(f), 303(r) and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 302, 303(e), 303(f), 303(r) and 307, ET Docket No. 00–47 is terminated.

87. 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.

[11] 5 U.S.C. 603(c)(1)–(c)(4).

List of Subjects in 47 CFR Parts 2, 15 and 90

Communications equipment, Radio, Reporting and recordkeeping requirements.

Federal Communications Commission.

Marlene H. Dortch,

Secretary.

Proposed Rule Changes

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 15 and 90 to read as follows:

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

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 2.944 is revised to read as follows.

§ 2.944 Submission of radio software description.

Applications for certification of software defined radios must include a description and flow diagram of the software that controls the radio frequency operating parameters.

3. Section 2.1033 is amended by adding paragraphs (b)(12), (b)(13) and (c)(17) to read as follows:

§ 2.1033 Application for certification.

* * * * *

(b) * * *

(12) Applications for certification of software defined radios must include the information required by §§ 2.932(e) and 2.944.

(13) Applications for certification of radios operated pursuant to § 90.xxx must demonstrate compliance with the requirements in § 90.yyy.

(c) * * *

(17) Applications for certification of software defined radios must include the information required by §§ 2.932(e) and 2.944.

* * * * *

PART 15—RADIO FREQUENCY DEVICES

4. The authority citation of part 15 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, 304, 307, 336, and 544a.

5. Add § 15.202 to read as follows:

§ 15.202 Certified operating frequency range.

Certification may be obtained for a device that is capable of operating on frequencies not permitted by this part, provided the device incorporates DFS and operates on only United States frequencies when operated in the United States.

6. Add § 15.206 to read as follows:

§ 15.206 Cognitive radio devices.

(a) Devices operating under the provisions of § 15.247 may operate with a power level six times greater than the maximum permitted in these sections under the conditions specified in paragraph (c) of this section.

(b) Devices operating under the provisions of § 15.249 may operate with a field strength level 2.5 higher than the maximum permitted in this section under the conditions specified in paragraph (c) of this section.

(c) Intentional radiators operating may operate at the higher power limits specified in paragraphs (a) and (b) of this section subject to the following conditions:

(1) Devices must incorporate a mechanism for monitoring the entire band that its transmissions are permitted to occupy.

(2) Devices must monitor for signals exceeding a monitoring threshold of 30 dB above the thermal noise power within a measurement bandwidth of 1.25 MHz.

(3) Devices may operate at higher power if signals exceeding the monitoring threshold are detected in less than XX% of the band in which they are permitted to operate.

(4) Devices must incorporate transmit power control to limit their power output to no greater than the maximum normally permitted in §§ 15.247 or 15.249 when the criteria in paragraph (c)(3) is not met or when higher power operation is not necessary for reliable communications.

PART 90—PRIVATE LAND MOBILE RADIO SERVICES

7. The authority citation for part 90 continues to read as follows:

Authority: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

8. Add § 90.xxx to read as follows:

§ 90.XXX Secondary Leasing of a Public Safety License.

Secondary Leasing of a Public Safety License shall operate subject to the following minimum reversion technical requirements:

(1) Devices operating under this rule must employ mechanisms for the immediate, reliable, and secure preemption by and reversion to the

primary public safety licensee. Devices must employ such mechanisms as required to ensure they operate lawfully and in compliance with the leasing agreements authorized in this part.

(2) Devices employing a Beacon Signal Detector mechanism as provided in § xx.xxx of this part shall be in compliance with the minimum reversion technical requirements of this rule.

9. Add § 90.yyy to read as follows:

§ 90.yyy Technical Requirements: Beacon Signal Detector Leasing Operations.

Operations conducted under the rules governing secondary leasing agreements in § xx.xxx of this part may operate subject to a beacon system satisfying the following criteria:

(1) Public Safety licensees shall transmit a beacon signal no less frequently than once per second specifying the frequency or frequencies available for use, the time of day and a secure identifying signature of the Public Safety Licensee Leasor.

(2) Devices operating under § xx.xxx of this part must detect the Public Safety Licensee's beacon signal or cease operations within two seconds. Devices must also incorporate a means to select the transmission frequency specified in the Public Safety Licensee's beacon signal.

[FR Doc. 04–3240 Filed 2–13–04; 8:45 am]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 600

[I.D. 021004B]

Magnuson-Stevens Act Provisions; General Provisions for Domestic Fisheries; Application for Exempted Fishing Permits (EFPs)

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notification of a proposal for EFPs to conduct experimental fishing; request for comments.

SUMMARY: The Assistant Regional Administrator for Sustainable Fisheries, Northeast Region, NMFS (Assistant Regional Administrator) has made a preliminary determination that the subject EFP application contains all the required information and warrants further consideration. The Assistant Regional Administrator has also made a preliminary determination that the activities authorized under the EFP would be consistent with the goals and objectives of the Northeast (NE) Multispecies Fishery Management Plan (FMP). However, further review and consultation may be necessary before a final determination is made to issue the EFP. Therefore, NMFS announces that the Assistant Regional Administrator proposes to recommend that an EFP be issued that would allow one commercial fishing vessel to conduct fishing operations that are otherwise restricted by the regulations governing the fisheries of the Northeastern United States. The EFP would allow for exemptions from the FMP as follows: the Gulf of Maine (GOM) Rolling Closure Areas; and the minimum fish size requirements, for the temporary retention of undersized fish for data collection purposes. All experimental work would be monitored by a Research Specialist from the Woods Hole Oceanographic Institution (WHOI).

Regulations under the Magnuson-Stevens Fishery Conservation and Management Act require publication of this notification to provide interested parties the opportunity to comment on applications for proposed EFPs.

DATES: Comments on this document must be received on or before March 3, 2004.

ADDRESSES: Comments on this notice may be submitted by e-mail. The mailbox address for providing e-mail comments is *DA398@noaa.gov*. Include in the subject line of the e-mail comment the following document identifier: ''Comments on MWRA Harbor and Outfall Monitoring Project-Flounder Survey.'' Written comments should be sent to Patricia A. Kurkul, Regional Administrator, NMFS, Northeast Regional Office, 1 Blackburn Drive, Gloucester, MA 01930. Mark the outside of the envelope ''Comments on MWRA Harbor and Outfall Monitoring Project-Flounder Survey.'' Comments may also be sent via facsimile (fax) to (978) 281–9135.

FOR FURTHER INFORMATION CONTACT: Brian Hooker, Fishery Management Specialist, phone 978–281–9220.

SUPPLEMENTARY INFORMATION: On January 26, 2004, NMFS received an application for an EFP from the WHOI in support of a Massachusetts Water Resources Authority (MWRA) project entitled ''MWRA Harbor and Outfall Monitoring Project Phase 4--Flounder Survey.'' Since 1991, Michael J. Moore of the WHOI has been contracted by the MWRA to conduct an annual survey of winter flounder health in the month of April. In 2003, a high prevalence of blind-side ulcers were observed in flounders from western Massachusetts Bay. Review of these data by the MWRA Outfall Monitoring Science Assessment Panel has led to the need to add to the sampling stations for 2004. In particular, it was deemed necessary to add three stations in Federal waters that are upstream from the Boston Outfall. These stations would be located in 30–minute square block numbers 123 and 124.

The experimental fishing trip would be an estimated 5 days in duration, covering a total of nine sampling stations: the three new stations in Federal waters, plus six stations in state waters. Sampling would consist of collecting 50 winter flounder larger than 12 inches (30.5 cm) in total length from each station. Once the target sample is reached, the vessel would move onto the next station until nine samples of 50 winter flounder have been reached. The researcher requests that the chartered research vessel be allowed to land legal-sized fish, caught during the execution of this project, for which the vessel is currently permitted. The estimated catch for all nine stations would be 3,600 lb (1,633 kg) of yellowtail flounder; 1,800 lb (816 kg) of cod; and 1,350 lb (612 kg) of winter flounder. The vessel would not be authorized to receive exemptions from days-at-sea regulations or possession limits for this EFP.

Authority: 16 U.S.C. 1801 *et seq.*

Peter H. Fricke,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 04–3392 Filed 2–13–04; 8:45 am]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 600

[I.D. 021004C]

Magnuson-Stevens Act Provisions; General Provisions for Domestic Fisheries; Application for Exempted Fishing Permits (EFPs)

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notification of a proposal for EFPs to conduct experimental fishing; request for comments.

SUMMARY: The Assistant Regional Administrator for Sustainable Fisheries, Northeast Region, NMFS (Assistant