

**List of Subjects in 40 CFR Part 228.**

Environmental protection, Water pollution control.

Dated: March 15, 2000.

**Chuck Clarke,**

*Regional Administrator for Region X.*

For the reasons set out in the preamble, Chapter I of title 40 is amended as set forth below:

**PART 228—[AMENDED]**

1. The authority citation for Part 228 continues to read as follows:

**Authority:** 33 U.S.C. 1412 and 1418.

2. Section 228.15 is amended by revising paragraphs (n) (4) (i), (ii), (iii), (iv), (v), and (vi) to read as follows:

**§ 228.15 Dumping sites designated on a final basis.**

\* \* \* \* \*

(n) \* \* \*

(4) \* \* \*

(i) Location: 43°22'58" N., 124°19'32" W.; 43°21'50" N., 124°20'29" W.; 43°22'52" N., 124°23'28" W.; 43°23'59" N., 124°22'31" W. (NAD 83)

(ii) Size: 4.42 kilometers long and 2.44 kilometers wide.

(iii) Depth: Ranges from 6 to 51 meters.

(iv) Primary Use: Dredged material.

(v) Period of Use: Continuing Use.

(vi) Restriction: Disposal shall be limited to dredged material determined to be suitable for unconfined disposal and any other restrictions contained in the then-currently approved site monitoring and management plan.

\* \* \* \* \*

[FR Doc. 00-7734 Filed 3-30-00; 8:45 am]

**BILLING CODE 6560-50-P**

**FEDERAL COMMUNICATIONS COMMISSION****47 CFR Part 2**

[ET Docket No. 00-47, FCC 00-103]

**Inquiry Regarding Software Defined Radios**

**AGENCY:** Federal Communications Commission.

**ACTION:** Notice of inquiry.

**SUMMARY:** This document requests comments on "software defined radio", which the Commission believes could have wide range implications for radio technology and our regulatory policies. Software defined radios have the potential to change the way users can communicate across traditional services and to promote efficient use of

spectrum. The Commission believe's that software defined radios could significantly affect a number of Commission functions, including spectrum allocation, spectrum assignment, and equipment approval. The purpose of this inquiry is to gather information on the state of software defined radio technology, interoperability issues, spectrum efficiency issues, equipment authorization processes, and other relevant issues.

**DATES:** Comments June 14, 2000; and reply comments July 14, 2000.

**ADDRESSES:** All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 415 12th Street, SW, TW-A325, Washington, DC 20554.

**FOR FURTHER INFORMATION CONTACT:** Hugh Van Tuyl, Office of Engineering and Technology, (202) 418-7506.

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's *Notice of Inquiry*, ET Docket 00-47, FCC 00-103, adopted March 17, 2000, and released March 22, 2000. The full text of this Commission decision is available for inspection and copying during normal business hours in the FCC Reference Information Center, Room Cy-A257, 445 12th Street, SW, Washington, DC, and also may be purchased from the Commission's duplication contractor, International Transcription Services, Inc. (202) 857-3800, 1231 20th Street, NW, Washington, DC 20036.

**Summary of Notice of Inquiry**

1. The Commission initiated this *Notice of Inquiry* ("NOI") to obtain comments from the public on a variety of issues related to software defined radios. Software defined radios could offer tremendous advantages to consumers over currently available wireless equipment. These benefits include lower cost, a greater variety of features, and the ability to adapt to multiple communication standards. They could also offer advantages to manufacturers, such as increased economies of scale in production, increased worldwide market opportunities, and a decrease in the number of devices that must be maintained in inventory. Software defined radios could expand access to broadband communications for all persons and increase competition among telecommunication service providers. Through this inquiry, we seek input to help us evaluate the current state of software defined radio technology, and to determine whether changes to the Commission's rules are

necessary to facilitate the deployment of this technology. Upon review of the responses to this inquiry, we will determine whether to propose any changes to the rules.

2. Software defined radio technology was originally developed for the United States military. The "SPEAKEasy" project was undertaken by the Department of Defense with the goal of developing a multi-band, multi-mode software. The SPEAKEasy project showed that a software defined radio is feasible. Nevertheless, there are many technological hurdles that must be overcome before software defined radios can be widely deployable. For example, there are limitations on the speed and dynamic range of current analog to digital converters, physical limitations on the frequency range over which an antenna can operate, and speed and cost constraints on digital signal processing circuitry. In addition, standards that would allow interoperability between hardware and software produced by different manufacturers are still under development. Therefore, in order to assist us in understanding the current state of software defined radio technology, we seek comment in the following areas.

- What features in a radio are apt to be controlled by software? For example, could the operating frequency, output power, and modulation format be software controlled?
- What are the specific limitations of current software defined radio technology? What are the cost implications?
- What capabilities could software defined radios have that are not found in current radio technology?
- When could software defined radios be deployed commercially, and for what services or purposes?
- What work is being done on software defined radios internationally, and are there any steps the Commission should take to encourage this work?

3. Interoperability. The Commission's rules are divided up into a number of parts that contain the requirements for various licensed radio services. The rules for each service specify the operating frequencies and other technical requirements for radio equipment in that particular service. In some cases there is overlap between these frequencies and other requirements, so equipment can be developed to operate in more than one service. However, in most cases, equipment designed to operate in one service can not communicate with equipment designed to operate in another service, and in some cases can not even communicate with other equipment in the same service due to

lack of common transmission standards or operating frequencies.

4. The inability of users to communicate due to non-uniform standards within services or between services can be a serious problem. The ability of software defined radios to change frequency and transmission standards would appear to be a way to overcome the lack of interoperability between different wireless systems. We are therefore asking for comment on the following questions.

- To what extent can software defined radios improve interoperability between different public safety agencies?
- To what extent can software defined radios improve interoperability between equipment and services using differing transmission standards?
- To what extent would software defined radios move toward uniformity in standards within or across bands?
- To what extent can software defined radios be used to facilitate transitions from one technical standard to another, such as the transition mandated by the land mobile "refarming" proceeding?
- What particular means could be employed by software defined radios to facilitate interoperability?

5. Improving spectrum efficiency and spectrum sharing. The Commission allocates bands of spectrum to the various radio services in the rules, and maintains a table of these frequency allocations. In order to operate within a service, a license issued by the Commission is required. The rules for each service specify eligibility requirements for obtaining a license, and the technical requirements for operation, including location, power and frequency. Licenses may be issued through an application process, or through a competitive bidding process.

6. Because of the ability to be easily reprogrammed, a software defined radio would not be limited to operation within a single fixed frequency band or on a limited set of pre-programmed channels. It could have the capability of operating on any frequency within the limits of its design, and could operate on channels of varying widths with varying modulation formats. Further, it should be possible to design the equipment with some "intelligence," which would let it monitor the spectrum to detect usage by other parties and transmit on open frequencies. These capabilities could open up new possibilities in the area of spectrum allocation and licensing.

7. The use of software defined radios may also enable new types of spectrum sharing that are currently precluded by today's conventional equipment. For example, our PCS rules permit wide flexibility in terms of the services

offered and technology employed in the PCS spectrum. In the event that a PCS licensee has spectrum available in excess of its immediate needs, it could lease that spectrum on a short-term basis to a third party. Software defined radio could facilitate such sharing. A third party could, for example, acquire from a manufacturer software defined radio equipment capable of being configured to offer different services in the various frequency ranges. Having negotiated for spectrum use, it would be in a position to rent a package of equipment and "airtime" to end users needing communications capacity on a short-term basis. It would load the appropriate software to properly configure the equipment at the time the end user enters into the rental agreement. Another alternative would be for the end user to contract directly with the licensee for the necessary spectrum and then rent the properly configured software defined radio equipment. With today's technology, such short-term sharing is difficult or impossible to accomplish due to the difficulties associated with quickly configuring radios for different applications in novel spectrum configurations. As a result, we believe that significant public benefits might flow from software defined radio technology. The public benefits include increased communications capacity for end users and better utilization of the spectrum resource. We seek comments regarding these potential benefits and what regulatory steps we might take to

8. Functions described in the NOI have the potential to allow spectrum to be utilized more efficiently. We are therefore seeking comment on the following areas related to frequency allocation and licensing.

- To what extent could software defined radios improve the efficiency of spectrum usage?
- What particular functions related to spectrum usage could a software defined radio perform? Could it locate free spectrum, dynamically allocate bandwidth, and enable better sharing of the spectrum?
- How specifically could it carry out these functions?
- What are the benefits of the spectrum sharing arrangements described above, and what steps might we take to permit the use of software defined radios to enable such sharing arrangements?
- What changes may be appropriate for the way the Commission currently allocates spectrum?
- If changes are warranted, how could we make the transition from the current allocation and licensing model to a new model?

9. Equipment approval process. Section 302 of the Communications Act

of 1934, as amended, authorizes the Commission to make reasonable regulations, consistent with the public interest, governing the interference potential of equipment that emits radio frequency energy. The Commission carries out its responsibilities under this section by establishing technical regulations for transmitters and other equipment to minimize their potential for causing interference to radio services, and by administering an authorization program to ensure that equipment reaching the market complies with the technical requirements. The authorization program requires that equipment be tested either by the manufacturer or at a private test laboratory to ensure that it complies with the technical requirements. The majority of radio transmitters require the submission of an application that must be reviewed and approved before the equipment can be marketed, although certain transmitters may be authorized through a manufacturer's self-approval process.

10. A transmitter is approved to a specific set of technical parameters, including the operating frequencies, output power, and types of radio frequency emissions. If a manufacturer changes these parameters after a piece of equipment has been authorized, the FCC issues a new approval before the unit may be marketed with the changes. By design, the operating parameters of a software defined radio can be readily changed in the field by altering its software. Such a change could violate the terms of the transmitter's equipment authorization by causing it to operate in modes for which it has not been approved. Also, our rules do not allow parties other than the grantee of the equipment authorization to make modifications to approved equipment without obtaining a new approval. Even if a new approval were obtained by the original grantee, the rules require the modified transmitter to be labeled with a new FCC identification number, which would be impractical for software modification of equipment that is already in the field. We therefore seek comments on the following issues related to the authorization of software defined radio transmitters.

- Should we approve the radio hardware, the software or the combination of them?
- Are the currently required measurements in Part 2 of the rules appropriate for software defined radios?
- How should software defined radio equipment be tested for compliance, including compliance with SAR requirements? What type of approval process and labeling would be appropriate?

• Should we regulate who changes the software and the manner in which it is done? If so, should the Commission maintain records of such modifications?

• What are the various means that may be used to download new software? We anticipate, for example, that software could be downloaded by methods such as direct connection to a programming device or over the airwaves. To what extent will the software interfaces be standardized?

• Should we require anti-tampering or other security features? How would such security features work? Could equipment be designed to prevent it from transmitting in certain designated frequency bands, such as those allocated exclusively for government use, as a safeguard against causing interference?

• Do we need to adopt additional requirements for software defined radios to ensure the privacy of users' communications?

11. One possible scenario for an approval process for software defined radios could be as follows. The software could be tested and approved to ensure that the transmitter meets the applicable technical requirements under all operating conditions. In order to ensure that untested and unapproved software could not be loaded, such transmitters would have an authentication system that checks the software for an authentication code added to it by the FCC or a Telecommunications Certification Body (TCB). The software itself would be submitted for approval in a process similar to today's application process except that a copy of the object code would be supplied in machine-readable form. Upon approving the software application, which would involve a test of the hardware and software together similar to today's tests, the FCC or TCB would compute the authentication code for the submitted source code and send it to the applicant. The authentication system would be a two key system in which the key needed to compute the authentication code would be known to only the FCC or TCB, and the key needed to check in a transmitter object code which is being loaded would be publicly available.

12. In an analogy to the current requirement for labeling a transmitter, there may be a need for a method to allow users to determine whether the desired operating software is currently loaded in a transmitter, and to allow Commission enforcement personnel to verify that the software has been approved. To meet this need, the transmitter could display information about the software installed by a means such as a liquid crystal display (LCD) screen in response to an input from a keypad. The identification information about the software installed in the radio

could include such information as the technical operating parameters, the source of the software, and the name of the body that approved it. The user manual and the authorization application would describe how to access this information. Since such radios are expected to have displays for user information and input mechanisms for the user in normal use, we do not think this requirement would be burdensome. We seek comments on the following questions about this possible approval method.

• Is there a need for such an approval system, and is it feasible and practical?

• What type of authentication system should be used? Should there be one system or alternative systems? Who should have responsibility for generating the authentication codes: the FCC, TCBs, equipment manufacturers, or some other party?

• In the case of transmitters subject to verification how should authentication of software be handled? For example, could an "authentication only" service be offered in which the FCC or TCB computes the authentication code for the software after all elements of compliance with the FCC rules are verified by the manufacturer?

• How should simple changes to software be handled that do not affect the operating parameters of the equipment but require the computation of a new authentication code? Could an "authentication only" service be offered for them?

• Is there a need for a method to display information about the software loaded in a transmitter? If so, what method should be used and what information should be displayed?

13. Other matters. The questions raised in this notice are intended to solicit information to assist the Commission in deciding whether to propose rule changes as a result of the developing software defined radio technology. We realize that these questions do not necessarily encompass all of the issues raised by this technology. Commenters may want to address whether software defined radio technology could help parties comply with Sections 255 and 251(a) of the Communications Act. These sections require manufacturers of telecommunications equipment and providers of telecommunications services to ensure that such equipment and services are accessible to persons with disabilities, if readily achievable. Commenters may also wish to address how we would enforce any new rules for software defined radios. Accordingly, comments are invited on any other matters or issues that may be pertinent to software defined radios.

Federal Communications Commission.

**Magalie Roman Salas,**

*Secretary.*

[FR Doc. 00-7967 Filed 3-30-00; 8:45 am]

**BILLING CODE 6712-01-U**

## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Part 73

[DA 00-586; MM Docket No. 99-212; RM-9640]

### Radio Broadcasting Services; Amelia, LA

**AGENCY:** Federal Communications Commission.

**ACTION:** Proposed rule; denial.

**SUMMARY:** This document denies a petition for rule making filed by Mountain West Broadcasting proposing the allotment of FM Channel 249C3 to Amelia, Louisiana, as that locality's first local aural transmission service. Petitioner failed to establish the availability of a suitable location for tower construction as the required site restriction located 18.4 kilometers south of the community at coordinates 29-30-21 NL and 91-03-46 WL to accommodate Channel 249C3 at Amelia is in marshland. See 64 FR 31173, June 10, 1999. With this action, this proceeding is terminated.

**ADDRESSES:** Federal Communications Commission, Washington, DC 20554.

**FOR FURTHER INFORMATION CONTACT:** Nancy Joyner, Mass Media Bureau, (202) 418-2180.

**SUPPLEMENTARY INFORMATION:** This is a synopsis of the Commission's Report and Order, MM Docket No. 99-212, adopted March 8, 2000, and released March 17, 2000. The full text of this Commission decision is available for inspection and copying during normal business hours in the FCC's Reference Information Center (Room CY-A257), 445 Twelfth Street, SW., Washington, DC. The complete text of this decision may also be purchased from the Commission's copy contractor, International Transcription Service, Inc., 1231 20th Street, NW., Washington, DC 20036, (202) 857-3800.

Federal Communications Commission.

**John A. Karousos,**

*Chief, Allocations Branch, Policy and Rules Division, Mass Media Bureau.*

[FR Doc. 00-7828 Filed 3-30-00; 8:45 am]

**BILLING CODE 6712-01-P**