

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

In the Matter of)	
)	
Promoting Expanded Opportunities for Radio)	ET Docket No. <u>10-236</u>
Experimentation and Market Trials under Part 5 of)	
the Commission's Rules and Streamlining Other)	
Related Rules)	
)	
2006 Biennial Review of Telecommunications)	ET Docket No. 06-105
Regulations – Part 2 Administered by the)	
Office Of Engineering and Technology (OET))	

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NOTICE OF PROPOSED RULEMAKING

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By the Commission: Chairman Genachowski, Commissioners Copps, McDowell, Clyburn, and Baker
issuing separate statements.

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I. INTRODUCTION

1. Today, the Commission takes steps to promote innovation and efficiency in spectrum use in our Part 5 Experimental Radio Service (ERS). For many years, the ERS has provided fertile ground for testing innovative ideas that have led to new services and new devices for all sectors of the economy. We propose to leverage the power of experimental radio licensing to accelerate the rate at which these ideas

propose to leverage the power of experimental radio licensing to accelerate the rate at which these ideas transform from prototypes to consumer devices and services. Our goal is to inspire researchers to dream, discover and deliver the innovations that push the boundaries of the broadband ecosystem. The resulting advancements in devices and services available to the American public and greater spectrum efficiency over the long term will promote economic growth, global competitiveness, and a better way of life for all Americans.

2. We target six areas in which we propose to provide increased opportunities for experimentation and innovation. In particular, we propose to: (1) create new opportunities for universities and researchers to use a wide variety of radio frequencies for experimentation under a broad research license that eliminates the need to obtain prior authorization before conducting individual experiments; (2) empower researchers to conduct tests in specified geographic locations with pre-authorized boundary conditions through the creation of new “innovation zones”; (3) promote advancement in the development of medical radio devices by creating a medical experimental authorization that would be available to qualified hospitals, Veterans Administration (VA) facilities, and other medical institutions; (4) broaden opportunities for market trials by revising and consolidating our rules; (5) promote greater overall experimentation by consolidating and streamlining our existing rules and procedures; and (6) open new opportunities for experimentation by making targeted modifications to our rules and procedures.

II. BACKGROUND

3. The Commission’s rules contain numerous provisions for experimentation and development of new radio equipment and techniques that are scattered throughout Title 47 of the Code of Federal Regulations (CFR). The ERS rules, which are contained in Part 5 and permit a broad range of experiments in all services except for broadcast systems, prescribe the manner in which the radio spectrum may be made available to manufacturers, inventors, entrepreneurs, and students to experiment with new radio technologies, equipment designs, characteristics of radio wave propagation, or service concepts related to the use of the radio spectrum.¹ In order to encourage innovation, the Part 5 rules provide great flexibility regarding allowable frequency range, power, and emissions. In exchange for the flexibility we give researchers to design and conduct experiments and tests, experimental operations are not protected from harmful interference from allocated services and they must not cause harmful interference to stations of authorized services, including secondary services.² Additionally, experimental stations can be required to immediately cease operation at our request, and are subject to revocation without notice.³

4. Our ERS program has a record of success. A variety of new technologies and services that began as experiments have been subsequently developed into services and technologies the American public relies on every day. For example, in the early 1990s, the Commission authorized experiments for innovative new radio equipment and devices⁴ which ultimately led to establishing the Personal

¹ See, e.g., 47 C.F.R. §§ 5.1, 5.3 and 5.89.

² See 47 C.F.R. § 5.85. See also 47 C.F.R. § 2.102(b)(2) and (3).

³ See 47 C.F.R. § 5.83.

⁴ See, e.g., experimental license granted to Qualcomm, Inc. for PCS testing in the 1850-1990 MHz band, valid from February 21, 1992 to July 1, 1994, File Number 2345-EX-PL-91; experimental license granted to Omni-Point Corporation for PCS testing in the 1850-2200 MHz band, valid from March 12, 1992 to July 1, 1994, File Number 2174-EX-PL-91.

Communications Services (PCS) in the 1850-1990 MHz band.⁵ More recently, the Commission issued an experimental license to the Alfred Mann Foundation, for development of wirelessly controlled implantable medical devices.⁶ The success of these experiments has resulted in an ongoing rulemaking proceeding that seeks to allow up to 24 megahertz in the 413-457 MHz band such use.⁷ Studies being conducted by the University of Maryland on the characteristics, use and applications of WiMAX and 4G technologies under the authority of an experimental license could lead to new advances in those fields.⁸

5. There are seven additional rule parts allow for developmental work within a particular service, and these rules are generally more restrictive than those contained in Part 5. Specifically, Parts 22, 73, 74, 80, 87, 90, and 101 of our rules provide for issuance of developmental licenses.⁹ Like ERS licenses, developmental licenses are issued on a non-interference basis. However, they are limited to applicants eligible for licenses in that particular service and on frequencies that are allocated to that service.¹⁰ Additionally, the developmental rules may require that applications be accompanied by a petition for rulemaking seeking changes consistent with the operation under investigation. Also, as noted above, experimentation with broadcast radio technologies is not permitted under the ERS rules but is instead allowed under separate provisions set forth in Parts 73 and 74 of our Rules.¹¹

⁵ See Amendment of the Commission's Rules to Establish New Personal Communications Services, ET Docket No. 90-314, *Second Report and Order*, 8 FCC Rcd 7700 (1993); *Memorandum Opinion and Order*, 9 FCC Rcd 4957 (1994).

⁶ The Alfred Mann Foundation was granted an experimental authorization in 2004, valid from January 6, 2005 to November 16, 2009, for testing of implantable medical devices in the 216-224.9995 MHz and 400-470 MHz bands. This authorization was renewed in 2009, and is now valid until December 1, 2014. See File Numbers 0255-EX-PL-2004 and 0228-EXRR-2009.

⁷ See Amendment of Parts 2 and 95 of the Commission's Rules to Provide Additional Spectrum for the Medical Device Radiocommunication Service in the 413-457 MHz band, ET Docket No. 09-36, *Notice of Proposed Rulemaking*, 24 FCC Rcd 3445 (2009).

⁸ Call Sign WF2XJX (available for viewing through the Commission's Experimental Licensing System at <https://apps.fcc.gov/oetcf/els/index.cfm>).

⁹ See 47 C.F.R. §§ 22.165(2); 22.377(b); 22.401; 22.403; 22.409; 22.413; 22.591(a); 22.599(b); 73.72; 73.1010(e)(1); 73.1510; 73.1010; 73.3500(a); 73.3533(a)(2); 73.3536(b)(2); 73.3539(a); 74.1; 74.15; 74.16; 74.101; 74.102; 74.103; 74.112; 74.113; 74.131; 74.132; 74.133; 74.151; 74.161; 74.162; 74.163; 74.165; 74.181; 74.182; 74.183; 74.184; 78.107(a)(2)(ii); 80.25(c); 80.33; 80.377; 80.391; 87.27(b); 87.37; 90.35(c)(75); 90.35(c)(89); 90.35(d)(6); 90.250(i); 90.501; 90.503; 90.505; 90.507; 90.509; 90.511; 90.513; 90.515; 90.517; 101.21(b); 101.129(a); 101.401; 101.403; 101.405; 101.407; 101.409; 101.411; and 101.413. Additionally, provisions contained in Part 1 set forth general rules for development licenses issued in the eight service rule parts. See 47 C.F.R. §§ 1.913(a)(1); 1.981; and 1.2003.

¹⁰ See, e.g., Fixed Microwave Services, Part 101, Subpart F, Developmental Authorizations.

¹¹ Part 5 permits a broad range of scientific and technical experimentation, whereas Part 74 is specifically limited to "research and experimentation for the development and advancement of new broadcast technology, equipment, systems or services which are more extensive or require other modes of transmission than can be accomplished by using a licensed broadcast station under an experimental authorization." In addition, section 73.1510 of the Commission's rules provides for experimentation by broadcasters, "directed toward improvement of the technical phases of operation and service, and ... may use a signal other than the normal broadcast service signal." See 47 C.F.R. §§ 5.3, 73.1510 and 74.102. Because broadcast radio technologies are fundamentally different from non-broadcast radio technologies and are not encompassed by the ERS, we do not solicit comment on the broadcast radio experimentation procedures as part of this proceeding.

6. There is an overall trend of increasing experimental activity. For example, disposals (grants and dismissals) under the ERS increased from 1,067 in 2000 to 1,235 in 2005 to a projected 1,481 in 2010.¹² By contrast, much less activity takes place under our developmental rules. Since 1999 in the non-broadcast (wireless) radio services ten developmental licenses have been granted under Part 22 (Public Mobile Services), one has been granted under Part 80 (Maritime Services), 37 have been granted under Part 87 (Aviation Services), and eight have been granted under Part 90 (Private Land Mobile Radio Services). None have been granted since 1999 under Part 101 (Fixed Microwave Services).¹³

7. To further provide flexibility, the Commission permits limited market studies so that developers can assess whether their equipment designs show promise in the marketplace. Just like the experimental rules, the rules for market studies can be found in multiple rule parts. Under Part 5, limited market studies are permitted for experimental operations provided that all transmitting and receiving equipment is owned by the licensee, the licensee informs all participants in the study that it is strictly temporary, and the size and scope of the study is limited.¹⁴ For devices that are beyond the experimental stage, but have not yet been certified (*e.g.* a new mobile phone), rules in Part 2 allow exceptions to the general prohibition on marketing of radio frequency (RF) devices prior to equipment authorization, subject to disclosure and labeling requirements and other restrictions.¹⁵ The restrictions on unauthorized RF equipment also limit the number of devices that may be imported to conduct tests or market studies. Generally, up to 2000 units are permitted to be imported within an authorized service for which an operating license is required, and up to 200 units are permitted to be imported for all other products.¹⁶

8. In August 2009, the Commission issued the *Wireless Innovation Notice of Inquiry*,¹⁷ which, *inter alia*, solicited comment on the types of experimentation that would promote innovation in the wireless sector, ways to encourage more experimentation in pure research and whether the Commission should explore modifying its current rules for the issuance of experimental licenses under our Part 5 Rules. Among other things, the *Wireless Innovation NOI* asked whether research organizations such as universities should be permitted to operate experimental stations without coordination of individual frequencies,¹⁸ and sought specific information as to how the restrictions on market studies affected innovation and whether the requirement that the experimenter own all of the transmitting and/or receiving equipment favors manufacturers over other entities.¹⁹

9. Commenters responding to the *Wireless Innovation NOI* generally support greater flexibility for experimental licensees. The Telecommunications Industry Association (TIA) supports streamlining the authorization process to enable experimentation and development with respect to innovative wireless

¹² These figures include all Part 5 experimental application types: new licenses, modifications of licenses, assignment of licenses, license renewals, transfers of control, and grants of Special Temporary Authority.

¹³ See *infra* n. 137.

¹⁴ See 47 C.F.R. § 5.93.

¹⁵ See 47 C.F.R. § 2.803.

¹⁶ See 47 C.F.R. § 2.1204.

¹⁷ See *Fostering Innovation and Investment in the Wireless Communications Market*, GN Docket No. 09-157; *A National Broadband Plan For Our Future*, GN Docket No. 09-51; *Notice of Inquiry*, 24 FCC Rcd 11322 (2009) (*Wireless Innovation NOI*).

¹⁸ *Id.*, 24 FCC Rcd at 11344, para. 66.

¹⁹ *Id.*, 24 FCC Rcd at 11343-44, para. 65. For example, the *Wireless Innovation NOI* asked whether our rules limit the value of the experimental study in cases in which substantial marketing data is an essential component of determining the success or failure of the experiment.

technologies and services; *e.g.*, by reducing the need for duplicative filings when an authorization process involves the same applicant applying for authorization of consecutive iterations of the same technology.²⁰ AT&T supports Special Temporary Authority (STA) testing of new uses for spectrum and spectrum sharing and that it routinely coordinates STA applications to allow testing of systems and devices by third parties, but it cautions that such testing should be done in a way that does not harm commercial users.²¹ Boeing supports limiting the ability of incumbent users to refuse to coordinate spectrum use with experimental licensees.²² Similarly, Lockheed Martin requests that the Commission amend Part 5 to specify that incumbents may not refuse to coordinate spectrum use with experimental licensees unless the requested use will cause harmful interference.²³

10. The *National Broadband Plan (Plan)*,²⁴ which was released in March 2010, recommended that the Commission begin a rulemaking to explore ways to facilitate researchers' use of spectrum, including frequency bands above 20 GHz, by modifying the current Part 5 experimental license rules. It further recommended that such a rulemaking draw upon any relevant ideas from the *Wireless Innovation NOI*, and evaluate whether regulatory restrictions should be relaxed to permit research organizations to conduct broader market studies. Finally, the *Plan* recommended that the Commission consider changes to its rules to permit research organizations to operate experimental stations without individual coordination of frequencies, conditioned on not causing harmful interference to authorized stations. To facilitate the use of spectrum by researchers, the *Plan* recommended that the Commission work with the National Telecommunications and Information Administration (NTIA) to identify underutilized spectrum that may be suitable for conducting research activities.²⁵

III. DISCUSSION

11. We propose, below, rule changes in six specific areas in which we can build on the experimental licensing program's record of promoting innovation and creating cutting-edge technologies. Our goal is to further accelerate innovation in this space. Given the immense spectrum challenges created by the tsunami of broadband demand, we seek to find ways to use the power of experimental licensing to shorten the time it takes to transform concepts into consumer products and to bring ideas from the lab to the marketplace.

12. We propose to create a new type of experimental license – a program experimental license – which would carry broad authority to conduct an ongoing program of research and experimentation under a single experimental authorization, and that would only be available to qualified institutions. In the first

²⁰ See TIA Comments, GN Docket Nos. 09-51 and 09-157, at 5-6.

²¹ See AT&T Comments, GN Docket Nos. 09-51 and 09-157, at 91.

²² See Boeing Reply Comments, GN Docket Nos. 09-51 and 09-157, at 4.

²³ See Lockheed Martin Comments, GN Docket Nos. 09-51 and 09-157, at 5.

²⁴ *Connecting America: The National Broadband Plan*, Federal Communications Commission, March 2010 (available at <http://www.broadband.gov/download-plan/>).

²⁵ *Id.* at Recommendation 7.7, p. 125. The FCC and NTIA are co-regulators of the spectrum and work together to ensure that spectrum policy decisions promote efficient use of the spectrum consistent with both the economic interests and national security of the nation. A Memorandum of Understanding (MOU) has been established to formalize coordination processes between the two agencies. See Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration signed January 31, 2003. The MOU sets out a coordination framework between the two agencies in which each provides notice of proposed actions that could potentially result in interference to their regulated users. Based on this coordination, the Commission may place specific conditions on a license.

three sections, below, we describe in detail the three varieties of program experimental licenses we propose to offer: 1) the research program experimental radio license; 2) the innovation zone program experimental radio license; and 3) the medical program experimental radio license. Under our proposed rule revisions, we would continue to offer individual conventional experimental radio licenses to conduct research and experimentation related to the development of new radio technologies and techniques and for product development and market trials.²⁶ These conventional experimental radio licenses would be available to entities not qualified to hold a program experimental radio license, and for those experimental activities that would not be authorized under program licenses.

13. In the last three sections, below, we identify additional opportunities to streamline, consolidate, and modify our existing rules in ways that can promote greater experimentation. For example, we propose rule changes that can provide greater opportunities for equipment manufactures and service providers to conduct product development and market trials. Collectively, we believe that these proposed rule changes, together with a new effort to promote the opportunities for experimentation that the Commission offers and to highlight experimental licensing success stories, can help spark the next generation of innovations that will promote economic growth, global competitiveness, and a better way of life for all Americans.

A. Creating New Opportunities for Universities and Researchers

14. *Background.* The Nation's colleges, universities, and non-profit research organizations are a powerhouse for ideas that fuel major advances in communications and propel both fundamental research and applied development in the field.²⁷ Given the vital role of research and development as an engine of innovation and investment that delivers critical economic benefits, we propose new procedures by which qualified institutions would be permitted to conduct radiofrequency experiments without prior authorization of specific frequencies, subject to web-based registration and reporting requirements, avoidance of certain restricted frequencies, and other limitations.

15. Research institutions already use our experimental licensing program to deliver impressive results. Columbia University, for example, holds an experimental license that supports its work on advanced research in network experimentation through the Global Environment for Network Innovations (GENI) project, a unique virtual laboratory for at-scale networking experimentation.²⁸ This project is

²⁶ The term conventional experimental radio license refers to the individual experimental radio licenses available under our current rules as opposed to the newly proposed program experimental license. Conventional experimental licenses are issued for the conduct of a specific or series of related research or experimentation projects related to the development and advancement of new radio technologies and techniques or a product development trial or a market trial.

²⁷ Gonzaga University's Smart Antenna Laboratory, which seeks to develop high performance, low-cost interference-filtering smart-antenna prototypes, enables innovations in the design, simulation, and testing of interference-reducing, high-performance communications radios, algorithms, and antenna systems in such areas as life-critical first responder communications and smart grid energy and natural resource management. See <http://nsf.gov/awardsearch/showAward.do?AwardNumber=1040327>. (describing a recent \$1.175 million grant from the National Science Foundation). See also National Broadband Plan at 121 (noting how top research universities and laboratories are conducting experiments with very fast gigabit (1 Gbps) networks). We further acknowledge the many contributions of academics. As an example, Dr. Joseph Mitola of the Stevens Institute of Technology, who was a panelist in our September 7, 2009 spectrum workshop, was a pioneer of SDRs and coined the term "software radio" in 1991. See <http://web.it.kth.se/~maguire/jmitola>.

²⁸ Call Sign WF2XMW (available for viewing through the Commission's Experimental Licensing System at <https://apps.fcc.gov/oetcf/els/index.cfm>). The GENI project includes numerous leading colleges and universities, including the University of Colorado, Carnegie Mellon, Georgia Tech, Indiana University, Princeton, Rutgers, (continued....)

leading to vast advancements for a faster and more reliable internet. The Oklahoma University School of Meteorology relies on experimental authorizations to support its research of the marine boundary layer and landfalling hurricanes.²⁹ Advancements in this field will save the lives of many individuals and improve emergency response in the event of natural disasters. The fast pace of technology development today demands that the Commission strive to find further ways to support efforts to ensure that the United States remains a world leader in radio technology research and development. We believe that we can identify and successfully remove barriers that may be impeding more active research and experimentation.

16. The existing experimental rules are generally written to support discrete research projects,³⁰ require detailed documentation prior to approval,³¹ and contain restrictions on how experiments can be modified once authorization is granted.³² We believe that the current arrangement is an ill fit for the culture of inquiry and exploration at academic and research institutions, and that it is not nimble enough to account for the rapid changes and modifications typical of today's technological research. By limiting experiments to a narrowly defined inquiry, specific frequencies, emissions and power levels, our current rules can prevent researchers from using the results of experiments to try out new ideas and make innovative changes unless they obtain a new or modified authorization. The time and process for obtaining experimental authorizations can also be a roadblock to innovation. Diverse research projects are often conducted simultaneously under different experimental authorizations across separate organizational units within an institution or under different research partnerships with corporate partners. The need to obtain multiple authorizations can result in additional administrative burdens and inefficiencies, and serve to stifle the interaction of research ideas that can multiply their impact.³³ Moreover, the nature of the academic calendar, challenge of limited course lengths and constraints in securing funding serve to make it less attractive for research institutions to apply for, and await processing of, multiple new experimental authorizations. In sum, the limitations inherent in our existing rules may hinder research and innovation and retard the speedy transformation of ideas into marketable products – ultimately resulting in an unfavorable environment for conducting research in the United States.

17. Moreover, where our rules make provisions for additional flexibility in experimental licensing, we do not believe that those procedures are sufficiently robust to allow for the type of scientific innovation we seek to promote. While Section 5.75 of the Rules provides for the grant of a blanket license, this benefit is an exception to the general rule that “[a]n application ... will normally require a separate license for each experiment,” and is limited to “experiments [that] are related or conducted by the same manufacturer.”³⁴

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Stanford, Washington University in St. Louis, and University of Wisconsin-Madison. *See* http://www.geni.net/?page_id=2.

²⁹ Call Sign WA2XNA (available for viewing through the Commission's Experimental Licensing System at <https://apps.fcc.gov/oetcf/els/index.cfm>).

³⁰ *See* 47 C.F.R. § 5.55(c) (stating that “[e]ach application ... shall be specific and complete with regard to station location, proposed equipment, power, antenna height, and operating frequency; and other information required by the application form and this part.”)

³¹ *Id.* *See also* 47 C.F.R. § 5.63, Supplementary statements required (mandating the submission of a narrative statement, in conjunction with an application, that details nature and objectives of the proposed research).

³² 47 C.F.R. § 5.77, Changes in equipment and emission characteristics.

³³ *See National Broadband Plan* at 121, citing National Research Council.

³⁴ *See* 47 C.F.R. § 5.75.

18. To provide expanded opportunities for research institutions beyond the existing experimental authorization procedures, we draw on ideas set forth in the *National Broadband Plan* and the *Wireless Innovation NOI*. Recommendation 7.7 of the *Plan* suggests that the Commission start a rulemaking proceeding “to establish more flexible experimental licensing rules for spectrum and facilitate the use of this spectrum by researchers.”³⁵ In addition, the *Wireless Innovation NOI* asked whether research organizations should be permitted to operate experimental stations without individual coordination of frequencies and, if so, whether such an arrangement would foster innovation and new wireless services and applications.³⁶ Commenters in the proceeding were generally supportive of the concept.³⁷

19. *Proposal.* We propose to establish, under the program experimental license, a process by which qualified institutions will be permitted to use of a broad range of radio frequencies for research and experimentation on a non-interference basis without having to obtain prior authorization for the use of specific frequencies. Holders of the new research program experimental radio license will be given broad authority to conduct any experiments that further the goals of innovation and efficiency in spectrum use under such a license, subject to limitations discussed below and ongoing reporting requirements through, for example, narrative filings submitted via a Commission web page. These institutions would still be able to continue to apply for conventional experimental radio licenses, as appropriate to the needs of the institution and type of research being conducted. We seek to find a balance that allows research organizations the greatest level of flexibility to experiment – particularly in high-value bands that may host the newest generation of consumer devices and applications – in order to unlock enormous economic and social benefits, while respecting the fundamental principle that experiments must be designed to avoid harmful interference to existing services.³⁸ As commenters address our proposals, we ask that they explain how their ideas address these overarching concepts and the tension between them.

20. This new research license will be limited to colleges, universities, and non-profit research organizations. These institutions typically have a record of generating the types of innovations and technological breakthroughs we seek to foster. We tentatively propose to limit applications under this rule to Accreditation Board for Engineering and Technology (ABET) accredited institutions with graduate research programs in place or existing industry partnerships and to nationally recognized non-profit research laboratories.³⁹ Further, we propose that these institutions must have defined campus settings and institutional processes to monitor and effectively manage a wide variety of research projects. We seek comment on this proposal. Specifically, we seek comment on what criteria we should use to define a “nationally recognized non-profit research laboratory.” Are there any standards or certifications that we should require for such institutions? Additionally, if commenters believe we should incorporate a broader range of institutions, what criteria should we use for selection, and how does that more effectively balance the interests at stake here?

21. To be effective, the authorization must allow for experimentation within the largest range of frequencies practical. As an initial matter, Section 15.205(a) of our rules lists “restricted bands” that typically host sensitive or vital operations and that warrant special attention to prevent possible harmful

³⁵ See *National Broadband Plan* Recommendation 7.7, p. 125.

³⁶ See *Wireless Innovation NOI*, para. 66.

³⁷ See, e.g., Comments of The Boeing Company at 12, Comments of Nickolaus E. Leggett at 3-4.

³⁸ We note that the flexibility we are proposing here would not absolve parties from complying with the requirements of other federal agencies (e.g., FDA, FAA, etc.).

³⁹ For example, the Department of Energy has many laboratories with mechanisms in place to foster collaboration and partnerships with industry. See, e.g., “Doing Business with the National Labs” available at: http://www1.eere.energy.gov/industry/financial/pdfs/doing_business_natl_labs.pdf.

interference.⁴⁰ Because it would not be appropriate to include these frequencies in a research program experimental radio license, we propose that the license not allow experiments on frequencies that are listed in Section 15.205(a). We recognize that Section 15.205 categorically excludes all frequencies above 38.6 GHz. The National Broadband Plan observed that frequencies above 20 GHz may be modestly used in urban areas and may be nonexistent in most other areas.⁴¹ We conclude that it would be counterproductive to exclude spectrum in the 38-300 GHz range from the benefits of added innovation and research, but that it is also important to protect sensitive bands above 38.6 GHz. Many federal agencies use spectrum above 38.6 GHz for satellite communication and scientific research which use extremely low received signal levels.⁴² Thus, we propose that a research program experimental radio license also allow experiments on those frequencies above 38.6 GHz except for those that are listed in footnote US246 of the Table of Frequency Allocations.⁴³ Under this proposal we would permit licensees to conduct experiments on all other frequencies. We seek comment on these proposals. Are there other frequencies that we should categorically exclude, and if so why?

22. For purposes of the research program experimental radio license, we propose to simply restrict all operations to the grounds of the licenseholder's campus.⁴⁴ In this regard, we propose that the applicant for a research license specify a geographic area that is inclusive of an institution's real-property facilities, and that the application may be returned or a license restricted to specify a smaller area if necessary to ensure adequate interference protection. We recognize that, for institutions located in dense urban areas or with compact campuses, this interference protection restriction may have the practical effect of limiting all research activity to a smaller subset of the campus, or even to an individual laboratory or other controlled environment. We also propose that emissions must not exceed non-interfering levels beyond the authorized geographical area. Should we rely on the licensee to meet this requirement by evaluating the radiofrequency use in the proximity of its campus, or should there be a specific measure, such as a maximum measured power flux density (pfd) limit a set distance from the boundary? If so, at what level should this pfd be set? Should there be different pfd limits for different bands? If so, how should the pfd vary by frequency band? And finally, we seek comment on whether a standard method needs to be specified for calculating the pfd. We seek comment on whether additional technical limits should be imposed. Should we restrict transmitters to specific sites? Should experiments be limited to terrestrial operations or can airborne operations also be permitted? If so, are there special requirements that should be imposed on airborne operations given the long line of site distances of these operations. Finally, should there be a threshold power limit above which we would always require an individual license under our traditional experimental authorization procedures, and if so, what should this power be – 100 watts, 10 watts, the limits specified for Part 15 unlicensed operations, or some other limit? Commenters who advocate a specific limit should also discuss how the levels of interference protection that such a limit would provide would also allow sufficient flexibility to conduct a wide range of experiments. We also seek comment on whether we should make special distinctions between indoor and outdoor use, either as part of the general terms of the research program experimental radio license grant or through distinct requirements associated with the testing and reporting requirements we discuss below.

⁴⁰ See 47 C.F.R. § 15.205(a). The rules only allow for spurious emissions in any of the restricted frequency bands.

⁴¹ See *National Broadband Plan* at 125.

⁴² These systems may be passive, such as radio astronomy, or active, such as satellite downlinks.

⁴³ See 47 CFR § 2.106, footnote US246.

⁴⁴ We recognize that many colleges also conduct valuable research activities outside the campus setting. For such work, an innovation zone program experimental radio license, discussed *supra*, will provide new opportunities for research and innovation.

23. Our proposal would give institutions greater opportunities to design and implement tests without the burdens associated with the existing prior approval process associated with individual experimental authorizations. In its comments to the *Wireless Innovation NOI*, Boeing described difficulties it has experienced in meeting specific requirements under its experimental licenses to coordinate and obtain the consent of existing licensees, and strongly supported the idea of permitting research organizations to operate experimental stations without individual coordination of frequencies.⁴⁵ Given the unique abilities of universities and research institutions to act as trusted stewards of the radio resource, they are prime candidates for a new type of license designed to permit a broad range of research and innovation in the radio spectrum. As an ultimate safeguard, we will not hesitate to revoke a research program experimental radio license in cases where we find that an institution has not properly managed the expanded privileges associated with the license.

24. We also propose to afford institutions much greater flexibility in choosing the frequency band(s) and technical characteristics associated with individual tests and experiments conducted under the authority of a research program experimental radio license. We recognize that some types of experiments have added filing requirements under our existing rules. For example, Section 5.53(c) requires the submission of an environmental assessment in certain cases, Section 5.63(e) requires applicants for an experimental authorization involving a satellite system not already authorized by the Commission to submit information regarding orbital debris mitigation plans, and Section 5.63(a) sets forth procedures for requesting non-disclosure of proprietary information.⁴⁶ These rules serve important legal and public interest purposes, and cannot be readily accommodated under the broad research license concept. We therefore propose to provide that a research program experimental radio license will not authorize any experiment that would require additional, specialized filings beyond the standard application requirements for an experimental radio license. Researchers proposing these types of experiments must apply for a conventional experimental radio license to obtain the necessary authorization for their tests. We seek comment on this proposal. In addition, are there other types of tests in addition to those we discuss above that require additional filings and, therefore, should not be authorized under a research program experimental radio license?

25. While we do not believe that it is necessary to impose overly prescriptive methods to control the potential for interference from experiments conducted under the broad authority of a research program experimental radio license, we emphasize that all experiments must be conducted on a non-interference basis to primary and secondary licensees, and that the licensee must take all necessary technical and operational steps to avoid harmful interference to authorized services.⁴⁷ Before conducting tests, a licensee must evaluate the propagation characteristics of the frequencies to be used in individual experiments, the operational nature of the services normally operating on those and nearby frequencies, and the specific operations listed within the Commission's licensing databases.⁴⁸ On-line tools, such as the Commission's General Menu Reports system (GenMen), which allows users to search many different FCC licensing databases from one place, will facilitate these tasks.⁴⁹ Experiments must be designed to use the minimum power necessary and be restricted to the smallest practicable area needed to accomplish

⁴⁵ Comments of The Boeing Company in GN Docket No. 09-157 at 10-12 (describing, for example, the refusal to coordinate by licensees that have yet not built out facilities in the areas Boeing proposes to experiment).

⁴⁶ See 47 C.F.R. §§ 5.53(a), (c) and (e).

⁴⁷ Section 333 of the Communications Act, as amended, prohibits willful or malicious interference to authorized services. See 47 U.S.C. § 333.

⁴⁸ Access to these services is made available via web and other sources on the Commission website at <http://www.fcc.gov>.

⁴⁹ GenMen is available at http://fjallfoss.fcc.gov/General_Menu_Reports/.

the experiment's goals, *e.g.* an individual laboratory, specific campus building, or designated portion of the campus – in other words, they must be crafted to be consistent with the existing procedures under which experimental authorizations operate.⁵⁰ Researchers may also decide to reduce the frequencies used in the experiment, restrict the time of use (*e.g.* to overnight hours), limit the duration of tests, or employ other means to address potential interference concerns. We further propose to require that all experiments must comply with our existing experimental rules involving matters such as protected areas and antenna structure placement, but that these issues will not be routinely evaluated during the grant of the research license. In addition, we note that our existing experimental licensing rules require a licensee to transmit its assigned call sign unless it has been specifically exempted by the terms of its station authorization.⁵¹ We believe that this requirement is important in that it makes it easier to identify signals from experiments, but we also recognize that not all experimentation lends itself to easy over-the-air station identification. We propose to require that tests conducted under the authority of a research license either transmit station identification as part of the broadcast or provide detailed testing information (such as starting time and duration) via a web-based reporting portal. Because of the nature of the research license, we propose to require the communication of information that is sufficient to identify the license holder and the geographic coordinates of the station. We are especially interested in comments regarding how we would structure the web-based reporting, and whether there are other notification methods that we should allow that do not require use of the actual experimental radio broadcast. We seek comment on these proposals.

26. Prior to a new spectrum user's commencement of operations, notification is generally conducted to ensure that harmful interference concerns can be identified and corrected. In many cases under our existing experimental licensing procedures, we issue grants that are conditioned on notifying or successfully coordinating with existing licensees. The Commission's diverse policies and procedures reflect the different operational, business, and engineering concerns posed by the many sharing scenarios of the multitude of spectrum uses possible under our rules.⁵² Under the research program experimental radio license concept, we envision that the nature and scope of individual tests will vary greatly. Some experiments will be conducted with the support of and in conjunction with existing licensees as part of research to improve existing network devices and system designs. For others, experimenters may opt to use short-term leasing or other secondary market mechanisms to secure access to spectrum bands on which they want to experiment. Many experiments may be confined to laboratory settings, or be conducted in shielded environments, such as Faraday cages, where the interference environment is tightly controlled.⁵³ Because the appropriate level of notification to and coordination with incumbent licensees will necessarily vary for each of these experiments, we are not proposing to establish a specific coordination requirement for research program experimental radio licenses.

27. We nevertheless believe that we must make provisions for licensed users whose operations are geographically and/or spectrally near ongoing experiments. First, we propose to require that prior to

⁵⁰ We would expect, for example, that large universities with sprawling campuses would need to design relatively few experiments that cover their entire geographic footprint.

⁵¹ See 47 C.F.R. § 5.115.

⁵² A complete discussion of the Commission's many coordination rules and procedures is unnecessary for current purposes, but many services require prior coordination with incumbent parties prior to application filing, coordination via the Interdepartmental Radio Advisory Committee (IRAC) for band shared by federal users, as well as real-time sharing rules and policies that rely on volunteer or licensee directed negotiations.

⁵³ A Faraday cage is an enclosure usually formed by a mesh of conducting material designed to block out external static electric fields and to keep RF fields generated within the cage from escaping.

commencement of any experiment or test, certain information be made publicly available via a Commission developed web-based registration. We propose that such registrations contain contact information for the researcher in charge who can address concerns raised prior to testing as well as act as a “stop buzzer” in the event that a licensee reports an unanticipated interference incident during the actual testing phase. In addition, we propose that these registrations contain the frequencies or frequency bands under test, the maximum effective isotropically radiated power (EIRP) or effective radiated power (ERP) under consideration (as applicable to the proposed experiment) and a description of the geographic area in which the test will be conducted. Should other information also be collected? We propose that these registrations be completed at least seven calendar days prior to commencement of any test or experiment to ensure that interested parties have sufficient time to assess whether they believe harmful interference may occur to their systems. Unlike our existing rules, however, experimenters would not have to await specific approval or authorization to conduct the test once the seven days has elapsed. Before conducting the experiment, the experimenter must evaluate and account for interference concerns raised by interested parties, and it must obey any instructions from the Commission to delay, modify, or abandon the experiment. Specifically, if any licensee of an authorized service raises interference concerns, we propose that the service licensee must contact the research program experimental radio license responsible party and the service licensee must post its concerns along with supporting documentation to the web registration page. We propose that the experiment not be permitted to commence until the parties resolve the issue. We further propose that the service licensee will bear the burden of proof that the proposed experiment will cause harmful interference. It is expected that parties work in good faith to resolve such concerns, including modifying experiments if necessary to reach an agreeable resolution. In making this proposal, we seek to balance the interests of incumbent spectrum users with the ability to conduct tests in a timely manner. Is seven days a sufficient timeframe? Or is it too long such that it may constrain testers from being able to adjust on-the-fly as they analyze current test results? Will the proposed method for resolving interference concerns prior to experimentation result in an efficient and fair process for identifying and addressing such concerns? Should we require a specific dispute resolution process? At what point would we expect parties to raise their concerns directly with us?

28. We also note that, under our existing rules, experiments must avoid use of public safety frequencies except when a compelling showing can be made that such use is in the public interest.⁵⁴ Operation on public safety frequencies must also be coordinated. Should these provisions continue to apply to tests conducted under a research license? Will these requirements, in conjunction with the seven-day notice requirement we propose, be sufficient to protect public safety interests while encouraging important research and experimentation in this area? We seek comment on these proposals.

29. Additionally, we believe that the web-based registration can capture two reporting requirements that are currently part of our application process for conventional experimental radio licenses. In cases where the experiment is to be used for the purpose of fulfilling requirements of a contract with an agency of the United States government, or if the experiment is to be used for the sole purpose of developing equipment for exportation to be employed by stations under the jurisdiction of a foreign government, we propose that the registration contain the information currently required under Section 5.63(b) and (c) of our Rules.⁵⁵ We seek comment on this proposal.

30. We propose to implement additional measures that will make it easier for incumbent licensees and other interested parties to become aware of pending tests and make experimenters aware of their concerns, and seek comment on what those measures should be. Should we develop an automated

⁵⁴ See 47 C.F.R. § 5.85(d).

⁵⁵ See 47 C.F.R. § 5.63(b) and (c).

process for distributing such information by RSS feeds or other means?⁵⁶ If so, should we further categorize this information by frequency band, geographic location, or other means? Would the Commission's Tower Construction Notification System (TCNS) serve as a useful model? TCNS allows companies to voluntarily submit notifications of proposed tower constructions to the FCC which in turn provides this information to federally-recognized Indian Tribes, Native Hawaiian Organizations (NHOs), and State Historic Preservation Officers (SHPOs) who can then respond directly to the companies if they have concerns about a proposed construction.⁵⁷ We seek comment on this proposal.

31. We further believe that we must make special provisions to prevent harmful interference on the frequency bands that are commonly used in a campus setting and that are vital for public safety purposes or are used for campus security operations. For example, experiments on bands assigned to mobile service providers (e.g. the Cellular Radiotelephone Service, broadband PCS, AWS, 700 MHz) could have the potential to disrupt mobile telephone use on campus – at a minimum inconveniencing one of the most active and engaged mobile device user communities, and at worst, impeding the ability to reach 911 or receive campus-wide emergency text alerts.⁵⁸ Television and radio broadcast bands are used in support of the Emergency Alert System (EAS).⁵⁹ In recognition of these vital interests, we propose to require that, for tests that affect bands used for the provision of commercial mobile services, emergency notifications, or public safety purposes on the institution's grounds,⁶⁰ the licensee first develop a specific plan that avoids interference to these bands. The plan would: 1) provide notice to those who might be affected by the test; 2) allow for the quick identification and elimination of any harm the experiment is causing users, and 3) in the case of vital public safety functions, provide an alternate means for accomplishing such tasks during the duration of the experiment. We further propose to require that the holder of the research program experimental radio license submit this plan to the Commission in conjunction with the registration it submits at least seven days prior to commencement of any test or experiment, as described above. We would routinely make the entire submission publicly available. Should we also require that a licensee be required to specifically notify the commercial carrier(s) or other entit(ies) listed as the licensee for the affected band(s) in all of these situations, or only in situations where specified conditions are met (such as when the experiment will be conducted outside of buildings or away from controlled venues where access can be restricted, such as laboratories)? If so, should we require the licensee's concurrence prior to the test? Ultimately, we want to establish a process which delivers the benefits of experiments conducted at universities and research institutions, but that also prevents interference to users of wireless services and frequencies used for emergency and public safety purposes. We seek comment on these proposals.

32. We seek comment on how we should address noncompliance with our rules and procedures, including the failure of a holder of a research program experimental radio license to address and resolve cases of harmful interference within a reasonable amount of time. We propose to modify the cancellation

⁵⁶ RSS (Real Simple Syndication) is a type of web format for publishing frequently updated works and automatically syndicating them to interested subscribers.

⁵⁷ More information on TCNS is available at http://wireless.fcc.gov/outreach/index.htm?job=tower_notification.

⁵⁸ We note that, just as there are now fewer pay landline telephones available to consumers, many college dormitories no longer have in-room landline phones.

⁵⁹ The EAS is a national public warning system that permits the President to communicate to the public during a national emergency and for state and local authorities to deliver important emergency information, such as AMBER alerts and weather warnings. See <http://www.fcc.gov/pshs/services/eas/>.

⁶⁰ See, e.g., 47 C.F.R. § 20.18 (E911 service on commercial bands); 47 C.F.R. Part 90, Subpart B (Public Safety Radio Pool).

provisions of our rules to make it clear that we can both deny permission to conduct specific tests under a research program experimental radio license and that we can revoke the research program experimental radio license at any time.⁶¹ We seek comment on this proposal.

33. We note that many institutions have offices that conduct administrative functions and provide coordination and support on a campus-wide scale. We propose to require each institution to identify a single point of contact who is ultimately responsible for all experiments conducted under the research license – including that the reporting requirements we establish for this type of authorization are met and all applicable rules are observed. This individual will serve as the initial point of contact for all matters involving interference resolution, and must have the ability to discontinue any and all experiments being conducted under the license, if necessary. We propose to require a licensee to identify this individual along with contact information such as a phone number and e-mail address at which he or she can be reached at any time of the day, and to keep this information current. We seek comment on other requirements, such as whether this designated individual should be required to respond to inquiries within a set time period, or possess the ability to halt experiments within a certain period of time? We seek comment on these matters, as well as the overall concept of requiring a single point of contact with this level of responsibility.

34. We believe that in addition to the registration process described above, there should be a reporting requirement associated with the research program experimental radio license. We tentatively conclude that it should be as minimally burdensome as possible and should be narrowly tailored to ensure that experiments conducted under the license comply with the Commission's rules and procedures and to build a public record of active innovation in the field of radio communications that can be used to encourage and inspire further technological advancements.⁶² Are there additional objectives we have overlooked? How can we meet these objectives? We propose to require that after completion of an experiment, the license holder file a brief narrative statement describing the results of the test, including any interference incidents and steps taken to resolve them. What should constitute a "test" and at what point has a test evolved sufficiently to require a supplemental filing? Should the holder of a research program experimental radio license be required to file periodic reports (*e.g.*, a yearly report) updating the status of ongoing tests, or summarizing the activity conducted under a research license? We seek comment on these matters.

35. We seek comment on the duration, terms, and scope of a research license. While such a license is intended to afford qualified institutions greater flexibility in how they conduct experiments, we intend to ensure that all other rules and limitations of our existing experimental procedures will continue to apply. For example, holders of a research license cannot deploy permanent facilities or offer services for sale.⁶³ Similarly, we propose to issue these licenses for a limited, five-year duration, which is consistent with the longest experimental license term our rules currently allow. We would permit license renewals. Is this an appropriate timeframe? In this context, would it make sense to issue initial research licenses for a lesser period (*e.g.* two years) and subsequently, upon sufficient showing of compliance with the rules we adopt, issue renewals for five-year periods? We also ask how research licenses should

⁶¹ See 47 C.F.R. § 5.83.

⁶² We distinguish this proposal from Section 5.73 of our Rules which provides for the filing of a report on the results of an experimental program, but does not require such a report unless it is specifically stated as a condition of the authorization. 47 C.F.R. § 5.73. Our intent here is to reduce the reporting requirements necessary prior to and during experimental research, and to reduce the overall reporting requirements necessary under research licenses versus our existing licensing process. We do not intend – or do we think it would serve the public interest – to eliminate reporting requirements entirely.

⁶³ See 47 C.F.R. §§ 5.53(a) and 5.93(b).

govern experiments conducted by multiple institutions conducted across different campuses.⁶⁴ We propose to require that each participating institution hold a research license (or obtain an individual license that would authorize the experiment), but that only one institution would be required to fulfill the reporting requirements associated with the research conducted across different campuses and that that institution be charged with identifying and making available the single point of contact with authority over the experiment. We also seek comment on how we should address specific licensing issues involving individual institutions. For example, if an institution has multiple campuses, should we issue one research program experimental radio license per institution that encompasses all campuses, or should we issue a separate license for each campus? Are situations where we should routinely issue more than one research program experimental radio license for a single campus, and if so, what are they? We expect to direct applicants for research licenses to use FCC Form 442 and attach a supplemental narrative that sets forth the information we need to assess the application (e.g. a showing that the applicant is a qualified institution, a description of the campus the license will cover, etc.).⁶⁵ As the Commission transitions to a new Consolidated Licensing System (CLS), we will assess whether there is a more effective way to collect the information we need to evaluate a research license application.⁶⁶ We seek comment on these proposals.

36. We also ask whether it would be appropriate to initiate the research license concept in the context of a pilot program, by which we would choose a limited number of institutions to which we would grant licenses and under which we would evaluate the program before expanding its scope. We recognize that while the research license concept holds great promise for promoting research investment and fostering wireless innovation, we also need to be sensitive to questions and concerns that commenters may raise in how to deploy this concept. Would a pilot program be an appropriate way to balance our interests in promoting innovation and flexibility while protecting against harmful or unanticipated interference? If so, would ten institutions be an appropriate number, and what criteria should be used to select them? Are there other provisions we should adopt that would make such a pilot program more successful? We seek comment on all of these proposals.

37. Finally, we note that the Commission's experimental licensing rules currently have a provision for school and student authorizations.⁶⁷ These rules, last updated in 1998,⁶⁸ are generally intended for use by students through high school for purposes such as science fairs, school projects, and participation in radio clubs. The rules provide for an informal application by letter and allow transmissions in limited frequency bands at low power levels.⁶⁹ Given the changes in both technology and the Commission's processes over the last twelve years including those proposed herein, we question whether these rules are still necessary. First, we are not aware that these rules have seen widespread use. In addition, we note that all applications are now required to be filed electronically⁷⁰ and that students

⁶⁴ For example, the GENI project described *supra* n. 28 involves research conducted at numerous universities.

⁶⁵ Form 442 is the existing application form for new or modified experimental radio station authorization. It must be filed electronically, and is available at <https://fjallfoss.fcc.gov/oetcf/els/forms/442Entry.cfm>.

⁶⁶ The development of CLS is part of a long-term initiative to combine the functions of the current licensing and application systems, including the Experimental Licensing System. See <http://reboot.fcc.gov/reform/systems/cls>.

⁶⁷ See 47 C.F.R. § 5.89.

⁶⁸ See Amendment of the Commission's Rules to Revise the Experimental Radio Service Regulations, ET Docket No. 96-256, *Report and Order*, 13 FCC Rcd. 21391 (1998).

⁶⁹ The rules allow for transmissions in the 27.23–27.28 MHz, 460–461 MHz, 462.525–467.475 MHz, 2402–2483.5 MHz and 10.00–10.50 GHz bands at up to 4 watts EIRP.

⁷⁰ See 47 C.F.R. § 5.55(b).

may want to experiment in more bands than those provided for in this rule. Thus, we propose to eliminate this rule and require that students desiring to experiment obtain a conventional experimental radio license using the electronic filing process. If there is a good reason to keep these special provisions for students, how can we provide for a streamlined process? Advocates for such a process should provide specific suggestions regarding how such streamlining should be implemented. Alternatively, we ask if these provisions should be maintained, but moved to Part 15 to allow for student use of approved equipment on an unlicensed basis. Advocates for such an action should also address whether certain safeguards need to be added to the rule to ensure proper radio usage.⁷¹

B. Establishing Innovation Zones

38. *Background.* A second way we can promote innovation through the program experimental license concept is by providing greater opportunities for testing and experimentation in specified geographic locations with pre-authorized boundary conditions. We envision that such zones, which could include isolated or protected areas, could become havens for enterprise and innovation because we would permit experimenters to explore a variety of technologies with reduced barriers to entry. Our research license proposal, above, balances the interest in providing the greatest level of opportunities for new research and discovery against increasing unwarranted risks of harmful interference to existing users by restricting licensing to trusted research institutions; here, we propose to make a carefully restricted set of locations available for a broader range of experimentation by all qualified applicants to achieve a similar result. The creation of innovation zone program experimental radio licenses provides a unique opportunity to foster robust wireless engineering experimentation and development that will lead to important contributions to both fundamental and applied research in the field

39. Recommendation 7.7 of the *National Broadband Plan* identified a need for more spectrum to be made available for researchers, suggesting that the Commission and other governmental stakeholders “identify underutilized spectrum that may be suitable for conducting research activities.”⁷² The licensing of innovation zones for experimentation would further this idea. A recent paper published by IEEE offers a practical illustration of how such zones might assist cutting-edge researchers. In describing the design and deployment of a building-wide cognitive radio network testbed, the authors described the challenges in meeting existing regulatory requirements.⁷³ Even though they had obtained multiple experimental licenses, researchers had to account for the risk that “extreme [radiofrequency] flexibility and reconfigurable components that exist in next-generation radios” could cause users to transmit on unauthorized bands. The researchers had to devise both software- and hardware-based methods that restricted transmissions to the testbed frequencies while not diminishing the quality of the research. An innovation zone licensing approach could have eliminated many of these design challenges and permitted testers to use a greater range of frequencies.⁷⁴

40. We note that such zones would be different from, yet complementary to, such ideas as the FCC-NTIA Innovation Test-Bed designed to foster innovative concepts for sharing spectrum between

⁷¹ See, e.g., 47 C.F.R. §§ 15.23 (Home-built devices) and 15.25 (Kits).

⁷² See *National Broadband Plan*, at p. 125.

⁷³ Timothy Newman, S.M. Shajedul Hasan, Danial DePoy, Tamal Bose, Jeffrey H. Reed, *Designing and Deploying a Building-Wide Cognitive Radio Network Testbed*, IEEE Communications Magazine, Vol. 48, No. 9, (Sept. 2010) at 106-111.

⁷⁴ Under this example, which was set on the Virginia Tech campus, the researchers may also have met the qualifications we propose for a research program experimental radio license.

Federal and non-Federal users,⁷⁵ or Recommendation 7.6 of the *Plan*, which calls for a wireless test-bed designed to promote the science underlying spectrum policymaking on such issues as sharing among different spectrum users.⁷⁶ Consistent with our general experimental authorization rules, innovation zones would be designed to minimize the potential of interference to other users and, most likely, would be in places where researchers would find freedom from traditional sharing or interference concerns.

41. *Proposal.* We propose to create an innovation zone program experimental radio license that would give innovators greater flexibility to conduct and modify the terms of their experiments without having to secure the additional approvals that our traditional experimental authorization rules would require. Licensees nevertheless would still be bound by the general limitations that come with an experimental license and would be expected to limit individual experiments conducted under the license to the minimum scope and size necessary to accomplish the test's goals. These licenses would be structured similar to the research program experimental radio license model discussed above, but would have different eligibility and use restrictions. Specifically, we propose that each licensee must hold appropriate technical credentials demonstrating advanced technical competence in radio engineering, but emphasize that applicants will not necessarily have to be associated with a college, university, or non-profit research organization to be eligible for an innovation zone program experimental radio license. We envision that innovation zones would permit operations over large areas, and would not be appropriate for use by a single entity at its exclusive-use facility (such as within a large manufacturer's plant grounds). Innovation zones would, however, be ideal for universities and research institutions that wish to conduct research in off-campus settings.⁷⁷ We seek comment on this proposal generally, and whether there are additional technical qualifications that we should require of these licensees.

42. We seek comment on what criteria we should use to identify areas that are sufficiently isolated or protected to serve as innovation zones. What propagation, geographic or other wireless engineering characteristics should we look for? To be effective, the authorization for innovation zones must allow for access to the largest range of frequencies practical. We propose that the innovation zone program experimental radio license broadly permit experiments on any frequency that is not specifically listed in Section 15.205(a) of our rules, except that experiments could use frequencies above 38.6 GHz so long as they are not listed in footnote US246 of the Table of Frequency Allocations.⁷⁸ We recognize that in geographically remote areas it may not be necessary to impose limitations on the use of the restricted frequency bands. We seek comment on when and how we should impose restrictions on individual licenses and/or in particular innovation zones that are located in remote areas. We recognize that certain geographic areas offer great potential as innovation zones, but their use would raise additional considerations. For example, how should we treat geographic areas and frequencies that we consider, here, to be in the Commission's inventory because they are not licensed?⁷⁹ These large areas could provide an excellent opportunity for researchers to experiment on a wide scale with different network topologies and advanced communications systems without fear of encroaching on existing spectrum use.

⁷⁵ See respectively, 23 FCC Rcd 1654 (2008) and NTIA Docket No. 080129095-8096-01, published in 73 Fed. Reg. 6710.

⁷⁶ See *National Broadband Plan*, Recommendation 7.6, at p. 124.

⁷⁷ As an example, we note that the University of Colorado has conducted extensive research and experimentation at NTIA's Table Mountain facility, which is located near Boulder, Colorado but outside boundaries of the university campus. Accordingly, experiments at this site could not be authorized under the terms of a research license.

⁷⁸ See para. 21, *supra*.

⁷⁹ These include areas that are not currently licensed, areas that did not receive the necessary minimum bids at auction and areas where the licensee has returned the license to the Commission.

However, such areas could be subject to re-auction, limiting long-term research opportunities.⁸⁰ We propose to permit such areas to be licensed as innovation zones, but to emphasize that experimental use is subject to discontinuance if the bands are re-auctioned prior to the end of the innovation zone license term. Similarly, should we tie the availability of an innovation zone to specific frequency bands in the Commission's inventory? We seek comment on these matters.

43. We seek comment on what requirements are necessary to allow for proper oversight of innovation zone program experimental radio licenses. We propose to delegate to the Office of Engineering and Technology the responsibility for establishing, maintaining, and routinely updating the list of available innovation zones. What additional provisions should we adopt? Should we first identify geographic areas that are suitable innovation zones and promote their use among researchers, or are there different ways to build the innovation zone inventory? Should we limit the number of applicants for a specific zone or otherwise manage the use of this resource among different parties? Should we provide a single license with a requirement to provide and manage access to all parties seeking to conduct an experiment at fair and reasonable terms? For example, a single licensee could assign different experiments to different areas within the larger geographic area or provide a means for time-sharing equipment or could manage a database providing access on an as-needed basis to parties.⁸¹ Would this be a better approach than issuing multiple licenses within an innovation zone?⁸² We point out that in the single licensee case there would be a single responsible party that could be contacted for gaining access or in instances where interference may be occurring. We ask that advocates of the single licensee model provide comment on criteria we could use to select such a licensee.

44. We tentatively propose to establish the same types of application and reporting requirements for innovation zone program experimental radio licenses that we require for research program experimental radio licenses, except where described differently, below. We propose to require the responsible party to file an application that describes the requested geographic area of operation, the frequencies to be used for testing, the maximum power levels associated with planned operations, and any other relevant technical characteristics pertaining to test equipment, antennas, etc., that would be necessary to identify and mitigate potential interference. An innovation zone licensee would then be permitted, under the terms of its license, to design and conduct any test that meets these criteria. The licensee would, however, be required to provide the Commission on a timely basis and through a web-based reporting system, an up-to-date list of the testing that is being conducted with at least a seven-day lead time before the tests are performed.⁸³ It would also have to report the conclusion of individual tests. Should the holder of an innovation zone program experimental radio license be required to file periodic reports (e.g., a yearly report) updating the status of ongoing tests, or summarizing the activity conducted under its license? Are additional notification or coordination procedures warranted for experiments

⁸⁰ The Commission could potentially announce a re-auction in a time frame as short as a few months to as long as several years after the prior auction.

⁸¹ In this model, entities interested in using database access methods to provide opportunistic use could conduct research on optimizing various assignment algorithms as well as obtaining an understanding of how these methods would scale for a large system deployment. For more information on these techniques, *see* our companion item in ET Docket No. 10-237, Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies, *Notice of Inquiry*, released Nov. 30, 2010.

⁸² A single licensee managing an enterprise zone would be similar to the band manager concept the Commission has used to manage interference among multiple users in the 746-764 and 776-794 MHz bands. *See* Service Rules for the 746-764 and 776-794 MHz bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000).

⁸³ As with the research program experimental radio license, we could explore the establishment of an RSS feed or other mechanism that would make interested parties aware of tests planned in an innovation zone.

conducted in certain bands, such as those used for public safety or EAS purposes? If so, should we apply the same pre-test notice process that we are proposing for the research license, above?⁸⁴ We tentatively conclude that innovation zone program experimental radio licenses should be granted for the same five-year duration we propose for research experimental licenses to encourage robust levels of experimentation by minimizing administrative burdens, and that we permit license renewals. We also propose to require the licensee to identify a single point of contact who has authority to stop any tests being conducted in the innovation zone, and to apply the same dispute resolution procedures we adopt for research program experimental radio licenses. We seek comment on these proposals.

C. Promoting Advancements in Health Care

45. *Background.* Recognizing that improving America's health is among the most important tasks for the Nation, the National Broadband Plan discussed how broadband-enabled solutions are a crucial component for fostering more innovative, efficient, and productive delivery of health care services.⁸⁵ As we look to further promote health care advances through devices that use radio communications, we seek the perspective of those who innovate and invest in this area. What can we do to promote research and innovation in the health care sciences while providing for adequate protection against unwanted consequences? The FCC and the Food and Drug Administration (FDA) share a common goal to facilitate the development of wireless technologies to improve public health. Our primary focus, for purposes of this Notice of Proposed Rulemaking, is on the process by which medical devices that rely on radio communications are developed and tested.

46. Recent Commission actions illustrate how the medical device marketplace is rapidly evolving to produce sophisticated new applications that promise to fundamentally alter health care treatment and advance patients' quality of life. Last year, we created the Medical Device Radiocommunication (MedRadio) service to authorize both body-worn and implanted medical devices within a five megahertz-wide spectrum band.⁸⁶ Pending rulemaking proceedings explore spectrum needs for networked medical devices that can, for example, restore mobility to paralyzed limbs and organs or create advanced body sensor networks.⁸⁷ In a July 2010 Memorandum of Understanding, the Commission and the FDA's Center for Devices and Radiological Health agreed to procedures designed to promote collaboration, provide clarity and improve the efficiency of the regulatory processes applicable to broadband and wireless enabled medical devices.⁸⁸ An accompanying joint statement recognizes that "the American

⁸⁴ See *supra* para 31 (describing special procedures to prevent harmful interference to services in certain frequency bands).

⁸⁵ See *National Broadband Plan*, at Chapter 10.

⁸⁶ See "Investigation of the Spectrum Requirements for Advanced Medical Technologies Amendment of Parts 2 and 95 of the Commission's Rules to Establish the Medical Device Radiocommunication Service at 401-402 and 405-406 MHz," ET Docket No. 06-135, *Report and Order*, 24 FCC Rcd 3474; *Erratum*, 24 FCC Rcd 4689 (2009). (*MedRadio Report and Order*) The MedRadio rules built upon the former Medical Implant Communications Service (MICS) – which had limited operation to implanted medical devices.

⁸⁷ See Amendment of Parts 2 and 95 of the Commission's Rules to Provide Additional Spectrum for the Medical Device Radiocommunication Service in the 413-457 MHz band, ET Docket No. 09-36, *Notice of Proposed Rulemaking*, 24 FCC Rcd 3445 (2009), *supra* n. 7; Amendment of the Commission's Rules to Provide Spectrum for the Operation of Medical Body Area Networks, ET Docket No. 08-59, *Notice of Proposed Rulemaking*, 24 FCC Rcd 9589 (2009).

⁸⁸ See *Memorandum of Understanding Between the Federal Communications Commission and the Food and Drug Administration Center For Devices and Radiological Health*, July 26, 2010, available at http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0726/DOC-300200A2.doc.

public...should have clear regulatory pathways, processes, and standards to bring broadband and wireless-enabled medical devices to market.”⁸⁹

47. A landmark joint FCC/FDA meeting held on July 26-27, 2010 brought together health care, technology, government, and academic experts who began exploring ways that government can ensure the safety and reliability of wireless broadband-enabled medical devices while increasing their availability to consumers and health care providers.⁹⁰ One theme that arose from this meeting was the need for environments in which manufactures and developers could test wireless medical systems and devices. Such test-beds could shorten the time it takes to transform ideas to products by, for example, allowing testing of interoperability and RF immunity in an increasingly complex radiofrequency environment. Our proposal draws heavily on these ideas.

48. *Proposal.* We propose to create a new medical program experimental radio license, available to hospitals and other health care institutions, as a third type of program experimental license. We envision the creation of cutting-edge test-bed facilities, where manufacturers and developers could try out new wireless medical technologies and assess operational readiness. Researchers, educators and practitioners could partner with Veterans Affairs facilities and leading research and teaching hospitals, for example, to speed the development of new ideas and innovations. A medical experimental authorization would allow for the testing and operation of new medical devices that use wireless telecommunications technology for therapeutic, monitoring, or diagnostic purposes that have not yet been submitted for equipment certification, or for devices that use RF for ablation, so long as the equipment is designed to meet the FCC’s technical rules.⁹¹ The FDA’s investigational device exemption (IDE) may be applicable when these experiments involve patients.⁹² In this regard, we note that the FDA in consultation with the FCC is exploring approaches to streamline IDEs for wireless medical devices, when an IDE is required. The medical experimental license program would be supervised by the FCC in consultation with the FDA

⁸⁹ See *Joint Statement on Wireless Medical Devices, U.S. Food and Drug Administration/Federal Communications Commission* (FDA Commissioner Dr. Margaret Hamburg and FCC Chairman Julius Genachowski), July 26, 2010, available at http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0726/DOC-300200A1.doc.

⁹⁰ See “FCC Announces Agenda and Participants for July 26-27 Joint FCC/FDA Meeting on Wireless Medical Technology,” July 26, 2010 advisory from FCC, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-300091A1.doc. The transcript of the July 26-27 Joint Meeting is available at <http://www.regulations.gov>.

⁹¹ The program proposed here includes experimentation for two types of medical devices: 1) Radio-frequency (RF) wireless medical devices which are medical devices that include at least one function that is implemented using RF wireless communications; examples of functions that may be implemented wirelessly include data transfer, device control, programming, power transmission, remote sensing and monitoring, and identification. (see the FDA’s Radio-Frequency Wireless Technology in Medical Devices Draft Guidance at: <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm077210.htm>). FCC regulation of these devices is generally accomplished under the Wireless Medical Telemetry Service in Part 95, subpart H of the Commission’s rules; some devices may be regulated under the Private Land Mobile Radio Service rules in Part 90 or the unlicensed devices rules in Part 15 and are subject to equipment certification; and 2) Medical devices that use RF for ablation (*i.e.*, removal of a part of biological tissue usually by surgery. RF ablation can very precisely deliver RF energy to kill specific cells, such as cancer cells, without causing damage to nearby healthy cells). FCC regulation of these devices falls under the Industrial, Scientific, and Medical Equipment rules in Part 18 and are subject to equipment verification. The FDA also has regulatory authority over medical devices.

⁹² An approved investigational device exemption (IDE) permits a device that otherwise would be required to comply with a performance standard or to have premarket approval to be shipped lawfully for the purpose of conducting investigations of that device. See 21 C.F.R. § 821.1. We note that the IDE procedures are not applicable when testing or experimentation is done in a laboratory setting where patients are not exposed to RF energy.

to determine the applicability and approval of the license to ensure that patient safety is considered. This program is not intended to replace the FDA's existing oversight and review programs.

49. The proposals herein are intended to shorten the time it takes manufacturers to develop devices and systems by streamlining the approval process – in particular, the process by which medical equipment must be approved under the Commission's equipment authorization procedures.⁹³ Consequently, this arrangement could lead to quicker development of medical breakthroughs that will help all Americans, including the brave men and women who were wounded in defense of our Nation and who deserve our best efforts to facilitate the creation of tools and services that could ease their transition to civilian life.

50. It is important that we limit eligibility of medical program experimental radio licenses to the right institutions. Should we restrict licensing to entities that meet specific criteria, such as accreditation by a particular certification body – or should we instead require an entity, as part of its submission, to make an affirmative showing that it is engaged in the health care field and that it has sufficient resources and expertise to oversee tests conducted under the authority of a blanket license? How might we include federal medical institutions such as those operated by the Department of Veterans Affairs or military services in this program, where the facility itself is under the jurisdiction of the Executive Branch and authorizations would ordinarily be granted by the NTIA, but certain tests might be conducted by non-federal entities? How could we structure the coordination process between these governmental entities to balance the interests of military services while at the same time expediting the development of new medical devices? We seek comment on this matter. We propose to require that, in all cases, facilities that seek a medical program experimental radio license demonstrate that they possess basic expertise in radio management. We seek comment on whether we should require baseline qualifications for demonstrating this expertise, or if it will be sufficient for applicants to make an affirmative showing that they hold these skills. For example, we believe it is important to have the ability to identify and correct RF related problems. In this regard, we recognize that some institutions may not be well versed in the FCC rules or spectrum management issues and may have to collaborate with an industry partner to develop new devices once a specific need is identified. In these instances, can the requirement for basic expertise in radio management be satisfied by the industry partner or should it reside with the host institution? Alternatively, could a third party be used to manage spectrum under the medical experimental authorization? For example, the American Society for Healthcare Engineering (ASHE) was designated by the Commission to manage the use of medical wireless telemetry equipment in health care settings.⁹⁴ We seek comment on whether such an approach can work for medical research activities.

51. We tentatively conclude that the medical program experimental radio license should be granted to the institution that creates and manages the test bed environment in which the specific research activities will be conducted, as opposed to the manufacturers and experimenters who may be conducting the actual tests. We believe that this approach strikes the right balance between our goal of promoting robust radio experimentation and the necessity of providing safeguards against harmful interference, because institutions can establish a single point of contact with knowledge of and control over all testing that is being conducted, and because such institutions should have ultimate control over their facilities.⁹⁵

⁹³ The Commission's Equipment Authorization Procedures are specified in Part 2, Subpart J of our rules. In general, equipment using the radio frequency spectrum may not be imported and/or marketed until it has been shown to be in compliance with technical standards found in the various Commission rule parts that govern the service in which the equipment is to be operated. *See* 47 C.F.R. § 2.901 *et seq.*

⁹⁴ Information on wireless medical device registration is available on ASHE's website at: <http://www.ashe.org/resources/WMTS/>.

⁹⁵ Under such an arrangement, we could require the designation of a single person who would be able to respond to interference complaints and who holds the authority to stop any ongoing tests.

To the extent that we permit the requirement for basic expertise in radio management to be satisfied an industry partner or third-party manager, how should we structure the licensing process? Should we, for example, issue multiple licenses but require one party to identify itself as the responsible party?

52. As with the research program experimental radio license and innovation zone program experimental radio license proposals, above, we propose that a medical program experimental radio license will offer broad authority under which individual tests will be conducted, but that such tests should be limited in scope to what is necessary to meet a particular test's goals. For example, the tests conducted under a medical program experimental radio license will provide researchers an opportunity to assess the susceptibility of new devices to interference as well as whether they might cause interference to other devices. Such tests can be conducted in a controlled environment so that any electromagnetic interference issues can be identified and remedied prior to devices being distributed to the public. We propose the same limitation on use of frequencies for medical program experimental radio licenses as we do for research program experimental radio and innovation zone program experimental radio licenses. That is, researchers may use any frequency so long as it is not listed in Section 15.205(a), except that frequencies above 38.6 GHz may be used so long as they are not listed in footnote US242 of the Table of Frequency Allocations.⁹⁶

53. We seek comment on what information we should require of an applicant, in addition to a demonstration of its qualifications to hold a license. We propose to follow the same general application procedures as those to be established for the other program experimental radio license types. We tentatively conclude that a licensee must specify the rule parts, frequencies, and geographic areas in which it plans to conduct tests. Is there additional information that we should require at the application stage? We propose that the license term be set for an initial five-year period, and that we permit license renewals. What other provisions should we incorporate into our rules?

54. How should we define the scope of permissible operations under a medical program experimental radio license? We tentatively conclude that experiments conducted under the medical experimental authorization should be limited to investigations and tests involving therapeutic, monitoring, and diagnostic medical equipment and that the institution be given broad leeway to choose the frequency band(s) and technical characteristics appropriate to each experiment without having to seek specific prior FCC approval.⁹⁷ We also take a fresh look at our existing experimental authorization rules as applied to medical equipment. Are there any rules that we should relax or modify due to the unique nature of or the importance of promoting advancements in the medical device field? As an initial matter, we propose that tests conducted under a medical experimental authorization not be subject to our traditional station identification rules. Our past experience in the medical device field suggests that such requirements are impractical for many of the devices we expect to be tested under the proposed new authorization, and that the typical power level and deployment environment for such devices will serve to reduce the potential for unanticipated interference that cannot be readily identified and resolved. Although we propose to require that operations must be tailored to comply with applicable FCC technical rules, should we also establish a method by which innovators can test devices that may not completely conform to the rules provided they have performed a risk assessment that includes an evaluation of how to protect the existing base of devices already in use in the medical facility? Are there any standards for risk assessment that should be used in this regard?⁹⁸ We ask because the test beds we hope to foster through medical

⁹⁶ See para. 21, *supra*.

⁹⁷ We note that all experiments must comply with the Commission's RF safety rules limiting human exposure to RF radiation. See 47 C.F.R. §§ 1.1307(b), 1.1310, 1.1091 and 2.1093.

⁹⁸ For example, ISO 14971 is a medical device standard titled, "Application of Risk Management to Medical Devices." ISO 14971:2007 specifies a process for a manufacturer to identify the hazards associated with medical devices, including in vitro diagnostic (IVD) medical devices, to estimate and evaluate the associated risks, to control (continued....)

experimental authorizations appear to be ideal venues to conduct empirical testing to support assertions that devices and systems will operate successfully in real-world settings.⁹⁹ Should operations conducted under a medical experimental authorization be limited to a specific geographic area – such as the licensee’s medical campus – or will the other proposed limitations on eligibility and operations provide sufficient protection against unanticipated consequences? More specifically can testing under a medical program experimental radio license be expanded to include body worn or implanted devices that travel with the patient, or should these types of tests be governed by the conventional experimental radio license? We seek comment on all of these matters.

55. We also seek comment on what reporting requirements we should impose under a medical program experimental radio license. In exchange for the flexibility to conduct these tests, we believe that a license-holding institution should bear an obligation to prepare and submit a report detailing the results of its findings for review by the FCC and for dissemination to the medical community at large. Thus, just as teaching hospitals provide a venue where new techniques can be developed and the knowledge shared, the medical experimental authorization would offer medical innovators fertile ground in which they could nurture and develop their ideas in a real-world setting, and where ideas and advancements can readily propagate throughout the medical community.¹⁰⁰ We propose to require that the licensee submit, through the same web site used for project registration, a report within 30 days after conclusion of the test that briefly summarizes its findings, and that the licensee also file a yearly report to the experimental licensing system of the activity that has been performed under the license.¹⁰¹ Our intent with these reporting requirements is not to make public proprietary or company confidential information, but to provide a venue for sharing information that researchers would find beneficial in the goal of patient care.¹⁰² We also propose that the licensee must provide the Commission on a timely basis an up-to-date list of the testing that is being conducted with at least a seven calendar day lead time before the tests are performed, and include such basic information as the frequencies and rule parts under which the medical device is intended to operate, the number of units that may be employed, the duration of the study, and the geographic scope of the experiment. Such information would make it easier to identify and remedy any unanticipated interference that may occur during the test. We also propose to apply the same dispute resolution procedures we adopt for research program experimental radio licenses. As with our other program experimental radio license proposals, we anticipate that reports would be filed via a Commission

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these risks, and to monitor the effectiveness of the controls. See http://www.iso.org/iso/catalogue_detail.htm?csnumber=38193. Also, the Joint Commission, an independent, not-for-profit organization that accredits and certifies health care organizations and programs in the United States, has several standards related to medical devices, including EC 6.10, “Management of the Environment of Care.” See <http://www.jointcommission.org/>.

⁹⁹ Given the particular importance of advancing health care and the immense potential that many new medical device proposals hold, we want to find ways to avoid having to evaluate arguments that are based solely on paper filings and theoretical calculations. See e.g., *MedRadio Report and Order*.

¹⁰⁰ The National Institutes of Health in describing its policy for the sharing of research data, notes that sharing benefits the scientific community through such means as reinforcing open scientific inquiry and facilitating the education of new researchers. See http://grants.nih.gov/grants/policy/data_sharing/data_sharing_faqs.htm.

¹⁰¹ Licensees have the capability to upload documents, including reports, to the license file in the experimental licensing system for any of their call signs.

¹⁰² For example, a researcher may discover that a certain type of modulation should be avoided for body worn medical devices because it is susceptible to interference from devices that patients are likely to encounter on a daily basis, such as RF based anti-theft devices in many stores.

web page, and that filings would be posted in a public and easily accessible manner.¹⁰³ Because one of our objectives is to make available findings for review and dissemination to the medical community at large, we specifically seek comment on whether these proposed reporting requirements are sufficient to meet our goals. Specifically, are there other recognized reporting policies or protocols that are used within the medical community that we should be aware of?¹⁰⁴ Are there ways for us to align elements of our reporting requirements with those policies?

56. We believe that the medical experimental authorization will create a new path for bringing innovative broadband and wireless-enabled medical devices to market, and will foster tangible advancements in the vital area of health care. Such licenses will eliminate the need to obtain multiple experimental licenses and will encourage the creation of test beds for medical device innovation. Because medical research initiatives and grants are increasingly seeking opportunities to obtain profound advancements over present-day approaches, it is especially important to give innovators of medical radio devices opportunities to make the types of bold proposals that are more likely to attract widespread research funding and support.¹⁰⁵ By restricting licenses to qualified health care entities and for therapeutic, monitoring, and diagnostic medical equipment will provide protection against unanticipated harmful interference to other medical devices and existing radio services. As a practical matter, we observe that many medical devices typically operate on a shared, non-exclusive secondary basis and at low power levels. Moreover, because of the coordination of this program with the FDA, as well as with that agency's overall regulatory oversight of medical devices, we believe that the testing of new and innovative devices under medical experimental authorizations can be accomplished in a way that protects patient safety and health. We seek comment on our proposal, and encourage commenters to help us craft this concept into rules that will create test-beds for the rapid and robust development of new medical devices.

D. Broadening Opportunities for Market Trials

57. *Background.* Market studies and real-world trials can be vital to the transformation of prototypes to fully functional new products and services that meet consumer needs. As such, they are powerful tools that contribute to a greater understanding of the marketability of innovative technologies and services and provide crucial feedback for the process of developing new technologies. Our rules currently provide opportunities for researchers, manufacturers, service providers, and others to better understand the technical, business, or operational potential of new technologies. However, these rules are scattered over several rule parts and it can be confusing to understand which rules apply for different situations. To remedy this, we propose modifications of our rules and procedures that will bring clarity to the market trial process and encourage more robust market trial activities by a greater number of innovators.

58. As background, Commission rules generally prohibit devices from being marketed or operated prior to receiving a grant of equipment authorization. However, exceptions do exist. Section 2.803 of our rules allows for conditional sales, advertising and display, and outright sales to certain

¹⁰³ As with the research license, we could explore the establishment of an RSS feed or other mechanism that would make interested parties aware of tests planned in an innovation zone.

¹⁰⁴ See, e.g., National Institutes of Health Data Sharing Policy, *supra* n. 100.

¹⁰⁵ For example, the Quantum Program at the National Institute of Biomedical Imaging and Bioengineering at the National Institutes of Health seeks "to achieve a profound (quantum) impact on the prevention, diagnosis, or treatment of a major disease or national public health problem through the development and implementation of biomedical technologies," and anticipated making approximately \$8,000,000 in fiscal year 2010 available to fund one to three awards. See <http://grants.nih.gov/grants/guide/rfa-files/RFA-EB-09-003.html>.

businesses of equipment not yet certified so long as proper notice is provided to the prospective buyer.¹⁰⁶ That rule section also provides for a manufacturer to operate its product for demonstration or evaluation purposes under the authority of a local FCC-licensed service provider.¹⁰⁷ Additionally, Section 5.3(j) of our rules permits licensees operating under experimental radio authorizations to conduct “limited market studies.” Such studies are not defined in Part 5, but Section 5.93 of our rules restrict equipment ownership to the licensee, require notice to participants that the operation is temporary, and stipulate that the size and scope of the experiment be subject to the limitations that the Commission establishes on a case-by-case basis.¹⁰⁸

59. We also note that recent reports and inquiries have recognized the benefits that would ensue if we were to provide greater opportunities for market trials. The *National Broadband Plan* suggested that we evaluate whether these regulatory restrictions should be relaxed to permit research organizations to conduct broader market studies.¹⁰⁹ Similarly, in the *Wireless Innovation NOI*, we sought comment on the benefits of revising our rules governing market studies with particular focus on whether the requirement that experimenters own all of the transmitting and/or receiving equipment used in a study favors manufacturers over others who seek to conduct market studies.¹¹⁰

60. *Proposal.* Building on these themes, we propose to bring more clarity to our rules regarding operating and marketing of RF devices prior to equipment approval and also to relax the conditions under which market trials can be conducted.¹¹¹ Taken together, the rules in Part 2 and Part 5 describe the range of operating and marketing that will be allowed as new RF devices move from concept through experimental, developmental and pre-production stages. These proposed rule changes will make it easier for a wide variety of entities to engage in market studies and certain types of testing. We envision that these modifications will make it easier to set up and conduct market trials in general, and that the rules

¹⁰⁶ See 47 C.F.R. § 2.803(b) (allowing “...conditional sales contracts between manufacturers and wholesalers or retailers where delivery is contingent upon compliance with the applicable equipment authorization and technical requirements.”); 47 C.F.R. § 2.803(c) (requiring this notice to be displayed with devices not yet certified: “This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.”); 47 C.F.R. § 2.803(d) (stating, in part that “...the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization ... provided that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution. If a product is marketed in compliance with the provisions of this paragraph, the product does not need to be labeled with the statement in paragraph (c) of this section.”).

¹⁰⁷ 47 C.F.R. § 2.803(e)(3)(ii) states that “[i]nstead of obtaining a special temporary authorization or an experimental license, a manufacturer may operate its product for demonstration or evaluation purposes under the authority of a local FCC licensed service provider. However, the licensee must grant permission to the manufacturer to operate in this manner. Further, the licensee continues to remain responsible for complying with all of the operating conditions and requirements associated with its license.”

¹⁰⁸ See 47 C.F.R. §§ 5.3(j) and 5.93.

¹⁰⁹ See *The National Broadband Plan*, Recommendation 7.7, at 125 (discussing the rules for market studies codified at 47 C.F.R. § 5.93).

¹¹⁰ See *Wireless Innovation NOI*, at 24 FCC Rcd. 11343-44, para. 65.

¹¹¹ We note that in the case of medical devices, the FDA has regulations regarding their marketing. See, e.g., U.S. Food and Drug Administration Guidance, “How to Market your Device” available at: <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/HowtoMarketYourDevice/default.htm>.

would no longer unduly favor manufacturers over others who could drive innovation and investment through the use of market trials.

61. Section 2.803 of our rules describes when radio frequency devices may be marketed or operated prior to equipment authorization and typically would apply during the later stages of product development and pre-production. We propose to split this rule into two separate rules for marketing and for operating such devices. Our goal is to maintain the general requirement that devices may not be marketed or operated prior to equipment authorization, but to clarify and simplify the existing exceptions to this rule.¹¹² Marketing of devices prior to equipment authorization is permitted limited purposes, such as making conditional sales contracts or in conjunction with trade show displays. Operation of devices prior to equipment authorization is conducted under the authority of a service license or a grant of special temporary authority, or under the rules for unlicensed devices in Part 15, 18 or 95. Additionally, both operation and marketing of radio frequency devices prior to equipment authorization is permitted pursuant to trials conducted under the authority of a Part 5 experimental radio service authorization. We propose to clearly state this as an exception to our general Part 2 rules.

62. We propose to cross-reference the definition of “marketing” as it is used in Section 2.803(e)(4) of our rules in the revised Part 5 market trial rules we ultimately adopt. Under Section 2.803(e)(4), marketing is defined to include sale or lease of equipment, or offering for sale or lease, including advertising for sale or lease, or importation, shipment, or distribution for the purpose of selling or leasing or offering for sale or lease.¹¹³ We seek comment on whether this definition meets the needs of parties interested in conducting market trials and ask if there alternative definitions or additional categories that should be added. We will use the proposed definition as the basis for the remainder of our proposals, and make appropriate changes based on the record should the Commission move to adopt different market trial rules. Thus, we ask that commenters who propose to expand the existing definition of “marketing” also provide detailed information on how other related rules need to be similarly modified.

63. We propose to expand upon the existing concept of “limited market studies” as currently codified in our Part 5 rules.¹¹⁴ Specifically, we propose to adopt a new subpart that contains provisions for two types of trials – product development trials and market trials. A product development trial would be defined as an experimental program designed to evaluate product performance in the conceptual, developmental, and design stages, and that typically requires testing under expected use conditions. A market trial would be defined as a program designed to evaluate product performance and customer acceptability prior to the production stage, and that typically requires testing under expected use conditions to evaluate actual performance and effectiveness. These trials would be conducted under the authority of a Part 5 license and, because they would typically involve equipment that has not yet been authorized, would operate as an exception to our Part 2 rules.

64. Our proposed rules for product development trials are designed to generally track the existing rules for limited market studies. We envision that such tests might include equipment that would not be able to be operated in compliance with existing Commission rules absent an experimental radio authorization. As such, we would explicitly prohibit the marketing of devices operated as part of a product development trial and retain the restrictions on ownership to the licensee and notification to users that are part of the existing limited market study rule. We seek comment on the proposed product development trial rules.

¹¹² See, e.g., *supra* notes 106 and 107.

¹¹³ See 47 C.F.R. § 2.803(e)(4).

¹¹⁴ See 47 C.F.R. § 5.93.