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POSITION STATEMENT

IMPROVING U.S. SPECTRUM POLICY DELIBERATIONS

Adopted by the IEEE-USA Board of Directors (3 Oct. 2018)

IEEE-USA recommends that the U.S. Government improve its decision-making process for spectrum management in order to stimulate technical innovation, encourage private capital formation to fund technical innovation, improve U.S. competitiveness in the international telecommunications marketplace, and ensure the availability of reliable spectrum for disaster response and national defense.

As the U.S. society and economy are becoming more mobile and more information-centric, radio spectrum policy is increasingly important to ensure maximum economic growth and to balance that growth with critical national security, public safety, and socially important uses. While key parts of spectrum management require an understanding of technical issues (e.g., how much will spectrum use X disrupt spectrum use Y through various interference mechanisms?), other aspects require more subjective considerations dealing with the relative impact on society of competing uses.

To improve the functioning of spectrum management and stimulate the economy, IEEE-USA recommends several changes to existing policy. The Federal Communication Commission (FCC) and the Executive branch through its National Telecommunications and Information Administration (NTIA) can implement some of these changes without legislation, while others would require Congressional action. Although these recommendations focus on process improvement to increase the quality and timeliness of FCC and NTIA actions, some also may encourage investment in innovative technologies by removing regulatory uncertainties.

This statement was developed by the IEEE-USA Committee on Communications Policy and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good and promotes the careers and public policy interests of the nearly 180,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.

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BACKGROUND

The basic mechanisms for spectrum management in the U. S. Government have changed little since the Communications Act of 1934. The FCC, an independent agency with five commissioners appointed for staggered 5-year terms by the President and confirmed by the Senate, has responsibility for spectrum use by the private sector, as well as by state and local governments. Federal spectrum use is the responsibility of the President and is delegated by statute to the Department of Commerce's NTIA. No statutory mechanism exists to resolve domestic policy disagreements between these two organizations.

RECOMMENDATIONS:

Our recommendations focus on improving processes to speed decision-making, but also may encourage innovation by reducing regulatory uncertainty at the FCC and NTIA.

Some of these recommendations will require additional government spending. It is clear that the overall budget situation will result in new federal expenditures being closely examined. However, the cost of present expenditures, or even of the expanded expenditures discussed below, is minuscule in comparison to the size of the telecommunications industry marketplace. The potential positive impact that improved regulation would have on the industry will likely dwarf the cost of such modest regulatory increases. Further, since the telecom industry is a basic infrastructure of the U.S. economy, increased efficiency will spur economic growth for both telecom users and new entities that exploit new telecom features, e.g., app developers. Finally, the cost of both the FCC and NTIA spectrum regulation is matched by user fees that are deposited in the Treasury, so these costs could be recovered through modest increases in user fees as well as by their economic benefits.

The FCC and NTIA should explicitly acknowledge the role of Section 7 of the Communications Act of 1934, as amended, and the intent of Congress to encourage new communications technology and services. These agencies should adopt transparent procedures for determining which innovations are subject to this statute and should make information on such proceedings readily available. The FCC and NTIA should recommend changes to the statute in a timely way, if the current terms of Section 7 are deemed impractical.

Section 7 of the Communications Act[i] was passed in 1982 to facilitate the approval and introduction of new technology in FCC-regulated industries. Since the passage of this legislation, the FCC has failed to fully adhere to its provisions. FCC Commissioner Ajit Pai recently called Section 7 "the neglected stepchild of communications law."[ii] Since NTIA shares jurisdiction with the FCC over bands that are shared with federal systems, or where use could impact federal systems, some of the provisions of Section 7 also apply to NTIA.

The FCC initiated a Notice of Proposed Rulemaking in February 2018 that seeks to clarify how it interprets Section 7 and how it will deal with new technologies seeking treatment under the terms of this provision. The FCC should conclude this deliberation in a timely way to resolve uncertainties about how it deals with new technology, especially with respect to decision time to resolve non-routine spectrum policy questions for such systems.

If the NTIA and FCC decide that the present provisions of Section 7 need to be revised to make them more practical, they should include a plan for making proposed changes in their annual legislative requests.

Petitions for rule changes and clarifications are key issues in the regulation of the dynamic telecommunications industry. The FCC should act on such petitions more transparently, and make available information on petitions and their status on a consistent and timely schedule.

In spectrum regulation, innovations often require a rule change or interpretation for their commercial use. Responding to these petitions in a timely manner has been a persistent problem for the FCC.

The First Amendment guarantees the right "to petition the Government for a redress of grievances," a right also stated more recently in the Administrative Procedures Act (APA).[iii] Yet, for decades, the FCC has had minimal transparency with respect to petitions in both technical and nontechnical matters. Filed petitions can sit for years without any acknowledgement that they were filed, or without public access to their content at FCC. For example, a November 2007 petition[iv] filed by CTIA, a major trade association, did not receive any public attention at the FCC until January 2010, when a Public Notice[v] was issued requesting comments on some, but not all, of the issues in the petition. If a major trade association cannot get transparency on a petition, the challenges facing a startup company needing an answer on a possible rule change, or clarification for a new product or service, seem daunting.

The FCC should use its website to announce the filing and status of petitions within a few months of their filing to meet the intent of the APA. The Commission should review its backlog of petitions on a regular basis, to resolve such issues more expeditiously.

In selecting Presidential appointments to the FCC, NTIA, and the State Department in communications policy functions, consideration should be given also to individuals with experience in information and communications technology (ICT) to broaden the backgrounds of the officials in these key positions.

While the ICT industries have been major contributors to recent economic growth, the presidential appointees in the three major agencies that deal with national and international

telecommunications issues have not in recent memory included anyone with actual ICT industry experience. Indeed, in line with practice for the last 20 years at most regulatory commissions, a large number of the appointments have been of former congressional staffers. While these staffers have valuable backgrounds, a near monoculture of people with the same background may not be optimal in such a highly technical area. Many types of experience are necessary in communications policy deliberations, but the consistent lack of individuals with technical experience may be detrimental to agency deliberations.

FCC commissioners should consider appointing an individual with experience in information and communications technology (ICT) as at least one of their three assistants.

FCC commissioners have three "professional assistants" that they can appoint independent of civil service laws.[vi] The original legislation required one of these assistants to be an engineer, but that restriction was later deleted. Today, all three assistants in FCC commissioners' office are usually lawyers with no prior experience in ICT industries. While the FCC's jurisdiction is quite large and includes issues ranging from broadcast ownership and content to corporate mergers of telecom carriers, technical issues ranging from spectrum management to the technical evolution of "wired" networks remain a key part of its jurisdiction. An individual with ICT experience could add new insight into the impact of current and proposed regulations on both new businesses, whose access to capital often depends on capital markets' perceptions of regulations, and established businesses.

While there have been legislative proposals to require specific academic backgrounds for some of the commissioners' assistants, a more flexible approach would be to urge commissioners to consider at least one assistant with actual experience in ICT.

The FCC and NTIA should supplement the FCC's existing Technological Advisory Council (TAC) and NTIA's Commerce Spectrum Management Advisory Committee (CSMAC), which consist mainly of representatives of major communications firms, with a new advisory committee that serves both agencies and focuses on independent reviews of options for resolving spectrum conflicts and identifying outdated policies. The new group should be modeled on the EPA Science Advisory Board and the NRC Advisory Committee on Reactor Safeguards. Members should have the necessary security clearances to deal with issues involving classified federal government spectrum users.

Both the FCC's TAC and NTIA's CSMAC have been filled with members who are, in most cases, representatives of affected parties. While this representation is beneficial in many cases -- in reviewing what affected parties want and how they might be impacted by possible decisions -- it does not necessarily provide the agencies with all the options

possible with today's technologies. The FCC has never asked the TAC to recommend or evaluate options on pending docketed proceedings. On the NTIA side, the CSMAC charter has no provisions for classified deliberations, indicating that NTIA is not using CSMAC for reviewing many key pending government/federal spectrum policy matters.

The FCC and NTIA should also supplement their existing committees with a new advisory committee, patterned on the prestigious committees that serve Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA), consisting of distinguished members without immediate conflicts of interest (e.g., academics and retirees who have agreed to limit their consulting activities in exchange for payment as special government employees). A common committee that advises both agencies would be a cost-effective way to make sure both are presented with objectively evaluated technology policy options. The FCC commissioners and the NTIA administrator can then combine this input with more subjective factors in making policy decisions in the national interest.

The FCC and NTIA should have the resources to contract with the National Academies of Science and Engineering (NASEM), Federally Funded Research and Development Centers (FFRDCs), and private analysis contractors to supplement their internal staffs on novel technical policy questions where they lack the appropriate internal resources.

Other federal regulatory agencies with technical jurisdiction have resources that can be used to contract for studies on new technologies and their policy implications in order to supplement the agency's permanent staff. Both the National Academies and Federally Funded Research and Development Corporations (FFRDCs) are often used by other agencies, yet FCC and NTIA lack the funds to use these resources. As a result, proceedings in innovative technologies often drag on for years. Also, the two agencies lack resources to review current technical policies to determine whether they have become outdated. While NTIA has the Institute for Telecommunications Sciences (ITS) as an internal resource, most ITS activities are actually studies for other agencies, while FCC and NTIA have minimal resources to use this "internal FFRDC."

An example of how outside resources have been used to resolve contentious technical policy issues and guide US policy on to a new path in the past is the 1970 National Academies study that recommended a technical solution to the telephone interconnection issue.[vii] This study set the basic framework for Part 68 of the Commission's Rules, which in turn, was the foundation for telephone interconnection rules in many other countries.

More recently, the MITRE Corporation, an FFRDC, did a study[viii] in 2001 for the FCC, ordered by special legislation,[ix] to recommend alternatives for resolving the contentious and unprecedented technical issues in the 12 GHz terrestrial/direct broadcast satellite spectrum-sharing proceeding (often referred to as "Northpoint"), ET Docket 98-206. These MITRE recommendations then formed the basis for the Multichannel Video Distribution and Data Service rules[x] that the FCC adopted in 2002, some of the most technically complex rules the

FCC has ever adopted.

Thus, in both the Part 68 and MVDDS cases, outside independent resources were used to resolve technically complex, contentious issues in a timely way.

The NTIA and FCC technical staffs are key to the long-term success of U.S. spectrum policy. Recruiting and developing the careers of these personnel should be done using the best practices of other agencies involved in technical policy development.

The FCC legal and technical staffs are roughly comparable in size, and both are key resources in the agency's mission. However, the FCC for many years has given low priority to recruiting and career development for entry-level technical staff. Indeed, while legal staff recruiting starts at the beginning of the academic year, technical staff recruiting often has been delayed until all budget issues were resolved, typically near the end of the academic year, when top students have already selected employers. The FCC should follow best practices of other federal agencies that have significant technical staffs, with respect to both timing of recruiting and later career development activities.

All technical staff, not just new hires, should be encouraged to continue their educations and be given access to the resources and time to do so. This education could include attending and participating in technical conferences, as well as more formal education at colleges and universities. Staff should also be encouraged to participate in outside professional organizations.

The executive branch should act to review and implement the recommendations for federal spectrum management reform in Sections 5.2 – 5.6 of the July 2012 President's Council of Advisors on Science and Technology (PCAST) report, "Realizing the Full Potential of Government-Held Spectrum," to facilitate the reallocation and sharing of federal spectrum for private sector use.

The PCAST spectrum report[xi] is controversial in some areas. But the findings and recommendations in Sections 5.2-5.6[xii] of the report have attracted little controversy. These sections deal with improving the implementation of spectrum management for federal users pursuant to Sections 305 and 902 of the Communications Act of 1934, as amended.[xiii] As the report clearly states, the players in federal spectrum management lack both the incentives and resources to ensure that wireless spectrum is used for maximum national benefit. Incumbent federal spectrum users lack the financial resources to explore alternatives to their present spectrum use that might make more spectrum available to other federal and nonfederal users. The report proposes an increased White House role in strategic spectrum policy, one that has been lacking for several decades. The recommendations for improved federal spectrum management in the PCAST report deserve

serious consideration and implementation.

The FCC and NTIA should review, and consider adopting, the IEEE-USA recommendations for clarifying harmful interference.

Many spectrum policy decisions dealing with innovative wireless technology and services must consider whether the new technology or service will cause "harmful interference" to existing users. The FCC, NTIA, and the International Telecommunications Union (ITU) use the same definition of harmful interference:

> *"Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these [Radio] Regulations."*[xiv]

In practice, interpreting these 31 words in the context of modern technology has been very controversial and is often quite time-consuming. In 2012, IEEE-USA released a white paper[xv] "Clarifying Harmful Interference Will Facilitate Wireless Innovation," which addresses possible approaches for making harmful interference determinations more transparent. The white paper suggests breaking the issue into six sub-problems, and clarifying acceptable approaches for dealing with these sub-problems.

The white paper also stresses the importance of the FCC and NTIA using comparable approaches in making harmful interference determinations to improve transparency. Improved transparency and more timely determinations in this area will encourage capital formation in wireless R&D and bring technical innovation more rapidly to the US economy.

The FCC should complete action in a timely way on Docket 09-157, which deals with wireless technical innovation.

In August 2009 the FCC initiated a Notice of Inquiry dealing with "Fostering Innovation and Investment in the Wireless Communications Market", (Docket 09-157).[xvi] This proceeding was intended to identify issues that affect wireless innovation and to consider changes to FCC policies that might facilitate such innovation. The proceeding recognized that "Policies that foster continued innovation have helped to encourage capital investment in wireless, and to deliver new and empowering technologies and applications to American consumers."

Unfortunately, the FCC has not acted on this proceeding, sending signals to capital markets that are the exact opposite of the original intent of the proceeding. This issue is key in spectrum policy, and the FCC should finish its deliberations and develop an action plan to encourage innovation to stimulate economic growth. The action plan should address the industries that develop and operate wireless technologies, the industries that build on new developments (e.g., "app" developers), and the non-communications industries whose

productivity is improved through the use of innovative technologies.

ENDNOTES

[i] 47 USC 157:

> a) It shall be the policy of the United States to encourage the provision of new technologies and services to the public. Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this chapter shall have the burden to demonstrate that such proposal is inconsistent with the public interest.
> (b) The Commission shall determine whether any new technology or service proposed in a petition or application is in the public interest within one year after such petition or application is filed. If the Commission initiates its own proceeding for a new technology or service, such proceeding shall be completed within 12 months after it is initiated.

[ii] http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315268A1.pdf
[iii] 5 USC 553(e)
[iv] This petition was not made available at the FCC website until 2010, but was available on the CTIA site: http://files.ctia.org/pdf/filings/FINAL--CTIA--_Jammers_Petition_for_Declaratory_Ruling.pdf
[v] http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-10-14A1.pdf
[vi] 47 USC 154(f)(2)
[vii] National Research Council, "A Technical Analysis of the Common Carrier/User Interconnections Area", June 1970, http://www.nap.edu/catalog.php?record_id=13320
[viii] MITRE Corporation, Analysis of Potential MVDDS Interference to DBS in the 12.2–12.7 GHz Band, April 2001, http://transition.fcc.gov/oet/info/mitrereport/mitrereport_4_01.pdf
[ix] The FCC's Fiscal Year (FY) 2001 budget authorization contained a requirement that the FCC select an independent engineering firm to perform an analysis to determine whether these two services can share the band without any interference to DBS systems.
[x] 47 CFR 101.1401,1440
[xi] http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf
[xii] The findings and recommendations involved are given on p. 49-50 of the report:

> **Finding 5.1**: There is no incentive system today for federal government agencies to be efficient in their use of spectrum or to share spectrum allocated to them with the non-Federal sector.
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> **Finding 5.2**: A public private partnership (PPP) is the best mechanism to ensure that optimal use is made of the federally-held spectrum and of related investments in spectrum research and testing.
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> **Finding 5.3**: International harmonization of spectrum policies is essential to product innovation, interoperability and roaming, spectrum efficiency, and cross-border frequency coordination.
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> **Recommendation 5.1**: PCAST recommends that the White House Chief Technology Officer (CTO) with senior officials at an equivalent level from the National Security Staff

(NSS), the Office of Management and Budget (OMB), and the National Economic Council (NEC) formalize a Spectrum Management Team (SMT) to work with the National Telecommunications and Information Administration (NTIA), the Federal Communications Commission (FCC), and the major federal agencies that use spectrum to carry out the President's directive.

Recommendation 5.2: PCAST recommends that the NTIA, working with the SMT and Federal agencies, reexamine the partitioning of federal spectrum usage in light of current and emerging technology. One objective of this reexamination is to aggregate current spectrum partitions to create substantial frequency blocks in order to facilitate sharing through common technical use rules.

Recommendation 5.3: PCAST recommends that the President indicate that all federal agencies should cooperate with the SMT and NTIA to establish and implement a government-wide process and mechanism to share federally-held spectrum. Within one year, the SMT working with the NTIA should formulate concrete 5-year and 10-year goals for federal spectrum sharing opportunities in order to recommend to the President how to appropriately update his 2010 goal
of making 500 MHz of federal and non-federal spectrum available over the next
10 years.

Recommendation 5.4: PCAST recommends that OMB, working with the SMT and NTIA, take steps to implement a mechanism that will give federal agencies incentives to share spectrum. Such a mechanism would accurately internalize the opportunity cost of federal spectrum resources and manage them over long time horizons using a "currency-like" accounting, allocation, and incentive system ("Spectrum Currency").

Recommendation 5.5: PCAST recommends that OMB should implement a sustainable funding mechanism to foster a federal spectrum sharing system. The existing Spectrum Relocation Fund should be redefined as a revolving "Spectrum Efficiency Fund" that recycles private sector payments for use of federal spectrum into reimbursements to federal agencies for investments that facilitate spectrum sharing and enhance spectrum efficiency. Congress should allow the Fund to reimburse qualifying costs by any Federal service, not just those in revenue-generating bands.

Recommendation 5.6: PCAST recommends that the President appoint an advisory committee of industry executives (e.g. CEOs), to be known as the Spectrum Sharing Partnership Steering Committee (SSP), to advise the SMT on a policy framework to maximize commercial success, centered on a public private partnership for sharing federally-held spectrum, and implementation milestones that lay the groundwork for the first spectrum superhighways.

Recommendation 5.7: The United States, represented by the Department of State with advice from NTIA and the FCC, should make international harmonization of spectrum allocations to wireless broadband, particularly in bands used or planned to be used for mobile broadband applications in the United States, a key element of the U.S. position at the 2015 World Radiocommunication Conference (WRC-15) and in bilateral and regional discussions with its own neighbors, Mexico and Canada.

[xiii] 47 USC 305 gives the President, not FCC, responsibility for spectrum management of federal agencies. 47 USC 902 delegates this authority to the Department of Commerce's National Telecommunications and Information Administration. This basic bifurcation predates the creation of FCC in 1934.
[xiv] 47 C.F.R. 2.1
[xv] http://*www.ieeeusa.org/policy/policy/2012/073112.pdf*
[xvi] http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-66A1.pdf