

**Statement of
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Federal Communications Commission
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Energy and Commerce Committee
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“The Role of Receivers in a Spectrum Scarce World”

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Good morning Chairman Walden, Ranking Member Eshoo, and Members of the Communications and Technology Subcommittee.

My name is Ron Repasi and I am the Deputy Chief of the Federal Communications Commission’s Office of Engineering and Technology (OET). OET is the Commission’s primary resource for engineering expertise and it provides technical support to the Chairman, Commissioners, and the FCC’s Bureaus and Offices. I have served as an engineer at the Commission in several capacities over the past 20 years. Prior to joining OET, I spent more than a decade in the Commission’s International Bureau where I helped secure global spectrum allocations for fixed and mobile satellite services at two ITU World Radiocommunications Conferences. I also supported the development of service rules for satellite operations, including provisions for shared

satellite and terrestrial spectrum use. In OET, I have served as the agency's representative to the Interdepartmental Radio Advisory Committee (IRAC), dealing with competing spectrum demands among federal and non-federal operators. I also work with our federal partners in other forums to develop new and innovative ways to deal with the need for more spectrum.

I appreciate your bipartisan interest in receiver standards, and for this opportunity to testify concerning the role of receivers in enabling spectrum to be used for new and innovative communications services. I'm pleased to report on the FCC's efforts to explore this issue in a comprehensive way that includes stakeholders and technical experts in both the federal and private sectors.

There is no question that, without concerted action, the demand for mobile broadband spectrum would quickly outpace the available supply. The Commission has, and continues, to take numerous steps to meet this demand, including reallocating spectrum, fostering advanced spectrum sharing techniques, and facilitating improvements in efficient use of the spectrum. The National Broadband Plan set an ambitious goal of freeing up 300 MHz of additional spectrum for reallocation or shared use for mobile broadband services by 2015. Indeed, the FCC has focused its efforts on several fronts to develop and create spectrum-use opportunities and is on track to exceed the 300-MHz-by-2015 goal.

The Commission has generally managed spectrum by focusing on transmitters as opposed to receivers. The Commission has traditionally identified the frequency bands in which various types of transmitters may operate and established limitations on their

power and the radio noise they may generate outside their designated frequency bands. The goal here is to prevent interference outside of the designated band by transmitters.

The performance of receivers has generally been left to the marketplace. Receivers are expected to operate within the same parameters as their associated transmitters. That is not always the case because receivers can sometimes pick up energy outside the spectrum provided for the service in which they operate. In establishing provisions for new services, the Commission often invites comment about any receiver issues that should be taken into account, particularly relative to legacy equipment. Where such issues arise, the Commission has addressed them in a variety of ways, such as establishing guard bands between the existing and new radio services, placing technical or operational restrictions on the new service, or requiring the new service to correct any interference that may occur.

Receiver performance is becoming increasingly important as a limiting factor as we move to repurpose spectrum and pack more services closer together on the spectrum chart. The continuing challenge for the Commission will be to maximize the amount of usable spectrum for cost effective deployment of new communication services while sufficiently protecting incumbent receivers. If receiver technology remains static or is unable to keep pace with the rapid evolution of transmitter networks, the challenges before the Commission will increase dramatically.

In 2003, the Commission initiated a Notice of Inquiry to consider incorporating receiver interference protection standards into its spectrum policy on a broader basis. The proceeding was terminated without prejudice in 2007 but the Commission concluded

that nothing precludes it from evaluating these issues raised by parties in the context of other proceedings that are frequency band or service specific. The comments during that process provided an important first step in focusing on the relationship between receiver performance and spectrum efficiency.

Over the past several years, receiver performance issues have arisen in some instances as a conflict between legacy stakeholders and new entrants where deployment of new technologies and services threatens to adversely impact an incumbent or place restrictions on the new entrant. Examples include interference issues between new cellular radio systems and public safety radio systems, proposed terrestrial mobile data services and satellite digital radio systems, new terrestrial wireless services and fixed satellite services, and ancillary terrestrial service in the mobile satellite service and GPS.

More recently, the Commission acted to address the issue of receiver performance and its impact on access to spectrum for new services. Earlier this year, Chairman Genachowski initiated a review of spectrum efficiency and receiver standards with a two-day workshop at FCC headquarters, featuring a broad range of experts and stakeholders, including licensees, equipment manufacturers and consumers. The workshop addressed the characteristics of receivers and how their performance affects the efficient use of spectrum and the development of new services. Key topics included current practices for receiver design, case studies involving interference due to receiver performance, and new approaches for promoting interference avoidance and efficient use of spectrum, given the current receiver base and potential future deployments.

Chairman Genachowski has also tasked the Commission's Technological Advisory Council (TAC) to study the issue of receiver performance, and OET Chief Julius Knapp has been working with the TAC as it develops its recommendations. The role of receivers in enabling access to spectrum for new services affects a broad range of stakeholders, from the federal as well as the private sector. An approach that is being discussed within the TAC is based on developing interference protection limits that would define what signal levels services would be expected to tolerate from adjacent services. A licensee would need to demonstrate that it is experiencing signal levels above the limit in order to make a claim of harmful interference. The TAC is considering whether the interference protection limits might be established through a multi-stakeholder process and whether rules would be appropriate.

What has been revealed in the TAC discussions is that the private sector has published receiver standards for many services, but such standards often are not developed in coordination with adjacent services, are not well known, or the basis for the standards is not well understood. Better awareness and coordination could improve this situation, perhaps championed by the private sector and with the FCC in the role of facilitator. The TAC plans to finalize its recommendations at its December 10, 2012 meeting and then submit them to the Commission for consideration.

Commission staff has also participated in workshops organized by the private sector to discuss ideas about how to address receiver spectrum issues. Staff has met with filter and electronic component suppliers as well to discuss technology developments that hold promise for improving the interference rejection capabilities of receivers.

These efforts by the Commission to gain a broader perspective on receiver performance have been conducted in tandem with OET's cooperation with the Government Accountability Office (GAO), providing support as GAO carries out the requirements of Section 6408 of the Middle Class Tax Relief and Job Creation Act of 2012 related to the study of receiver performance and spectrum efficiency. We look forward to the GAO report and consulting with the Congress as we consider what next steps may be appropriate following its release.

Conclusion

Again, thank you for this opportunity to testify here today. The Commission looks forward to working with you and your staff to forge solutions to future engineering challenges. I would be happy to answer any questions you may have.