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Hearing on "The Role of Receivers in a Spectrum Scarce World"

Testimony of
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Subcommittee Chairman Walden, Ranking Member Eshoo and members of the committee, on behalf of the Consumer Electronics Association (CEA), thank you for the opportunity to testify at today's hearing on "The Role of Receivers in a Spectrum Scarce World."

CEA's more than 2,000 member companies include almost all of the world's leading consumer electronics manufacturers and hundreds of small businesses. CEA's members design, manufacture, distribute, and sell a wide range of consumer products including televisions, smartphones, tablets, computers, digital video recorders ("DVRs"), game consoles, navigation devices, music players, cordless telephones, radios, and products that combine a variety of these features and pair them with services. CEA and its members have a vital interest and an important role to play in ensuring the most effective and efficient use of spectrum.

As we continue to examine how to make the most efficient use our nation's spectrum, CEA believes that spectrum management must include an approach that examines the interaction between transmitters and receivers. We refer to this as a "systems approach." This view, which is aligned with the most recent thinking among the many experts working on the subject, need not cause a shift from "command and control" spectrum management to "command and control" device regulation. The pillars of spectrum policy in a world of over-crowded airwaves must include: (1) better information about receivers in the field and their ability to tolerate

interference; (2) certainty on possible new allocations so that businesses and federal spectrum users may make informed design and investment decisions; and (3) primary reliance on stakeholders to find the cost and performance boundary between adjacent systems.

When one considers the vast number of receivers that are operating in a myriad of bands, there has been a remarkably low incidence of reported harmful interference. As spectrum resources become crowded, however, industry is incentivized to design and deploy highly robust transmitters and receivers. To do so, and to reduce the risks of interference, government and industry must also work to more carefully define the environment in which these systems operate. Some adjustments to spectrum policy must be made to facilitate repurposing spectrum going forward.

To be clear, equipment manufacturers and mobile providers have a strong self-interest in developing and deploying devices that are resistant to forms of interference and devices that create as little interference as possible. The limited amount of available spectrum combined with the high cost of spectrum and the dynamic interference environment faced by the industry incentivizes the development of efficient and robust receivers.

For an example of this market and technical reality, commercial mobile service providers require that their mobile receivers meet very stringent design specifications to ensure non-interference and efficient use of spectrum. Similarly, manufacturers of devices using unlicensed spectrum must ensure their receivers are not susceptible to interference, while still efficiently using the available spectrum. The technology used by licensed and unlicensed mobile devices is state-of-the-art and extraordinarily robust. Indeed, the interference and operational environment faced by mobile devices requires highly advanced receivers to ensure proper operations and, in the case of unlicensed devices, to operate on a secondary, non-interference basis.

Licensed mobile devices must initially meet applicable wireless standards bodies' requirements prior to use by wireless providers. The two primary examples are the standards created by the *Third Generation Partnership Projects* known as 3GPP and 3GPP2. Industry has developed these standards to ensure that items such as: (1) reference sensitivity levels; (2) receiver input levels; (3) adjacent channel selectivity; and (4) blocking characteristics are standardized and controlled. Moreover, these requirements are extremely stringent to protect licensed providers from harmful self-interference as well as adjacent band interference from other operations. However, just designing and building equipment to meet internationally recognized industry requirements is not the final step for licensed mobile devices. Next, an industry-driven certification process must certify them. Finally, licensed mobile devices are put through rigorous interoperability tests by the individual wireless providers to make certain that the device, including the receiver, is operating as intended, in an effective and robust manner.

Digital TV receivers provide another example of effective response by industry stakeholders to document the RF environment and the associated tradeoffs made by receivers to operate in the wide range of expected signal levels. The standard in this case is *ATSC Recommended Practice: Receiver Performance Guidelines*, known as ATSC A/74. Broadcasters, TV manufacturers, tuner designers and chip suppliers all contributed to the development of A/74. Manufacturers inform us that A/74 is an important part of the design input as they develop and test TV receivers. A/74 captures an understanding of the broadcast reception environment in which received signal strength varies tremendously and the desired TV channel may be considerably weaker than adjacent channels. CEA believes that A/74 serves as a good starting point for the necessary industry-to-industry dialog that is needed to complete incentive auctions and to introduce new mobile broadband services as the upper adjacent neighbor to the TV band.

As evidenced by this hearing, the debate over efficient use of spectrum has moved beyond knee-jerk reactions and entered a thoughtful, solutions-oriented discussion in venues like the FCC's Technological Advisory Council (TAC). The early calls for government mandates on device design have faded as stakeholders have come together to understand that such approaches are not the best solution we have to spectrum crowding. Instead, we should allow innovation to deliver remarkable efficiency gains. Experts are now actively working on policy tools that leverage demonstrated successes, like industry-developed standards, and developing new approaches such as interference limits that add receivers to the spectrum management equation. These approaches still need to be captured in greater detail and circulated to industry and government users of spectrum beyond the FCC TAC, but they are a welcome work in progress.

As we work to mitigate interference between the services and receivers in adjacent bands, CEA offers the following principles to guide policymakers and industry:

1. **Reduce Uncertainty**. The ultimate goal of spectrum management should be to make the interference environment more transparent, so that designers have all the information needed to deliver cost-effective products that allow more efficient use of adjacent bands.
2. **Voluntary Performance Practices and Industry Standards, Not Device Mandates**. Instead of adopting static regulations governing receiver design, we believe the Federal Communications Commission (FCC) should outline the environment in which it expects receivers to operate. Inappropriate regulations reduce flexibility for innovation in an area that is inherently vibrant. The FCC should encourage industry, through voluntary standards-setting organizations, to lead efforts to create voluntary receiver performance guidelines based on projected spectrum environments. Technical experts from the

affected parties involved in new band allocations need to be at the table working to balance system requirements before final rules are in place.

3. **Information Collection**. The FCC should continue to carefully inventory what services are operating in each band and identify bands that are likely to be the target of tighter allocation. Further, whenever the FCC takes action to reallocate spectrum, it should take an inventory of what services and receivers are operating in adjacent bands. When reviewing merger and license applications, the FCC should seek public comment regarding existing services and receiver use. Industry and government users have a role to play in helping to understand the types of receivers deployed and their interference immunity characteristics. Better information on fielded equipment is one of the pillars of spectrum policy that needs more attention.
4. **Case-by-Case Analysis**. Any regulatory action regarding spectrum allocations and receiver performance should be narrowly tailored. Further, any such action must be technology neutral and flexible; allowing for technological advancement and a robust marketplace for receivers. Receivers which fully resist interference maybe be technically possible, but they also maybe unaffordable. As much as we would all like a simple, new policy approach to forever preclude incidences of interference, history says that the interactions are too complex to prevent with a single approach.

To conclude, CEA is encouraged by the numerous fresh ideas on spectrum policy and the concerted effort to free up spectrum for much needed commercial use. Every new use of spectrum and re-allocation has some degree of uncertainty as to its future impact. We believe that the right regulatory approach to spectrum management leverages stakeholders' deep understanding of their system capabilities and price points in response to any government-

articulated plans for future allocations. We look forward to reviewing the results of this year's FCC TAC efforts on spectrum efficiency and to actively participating in all regulatory processes.