# Preserving the Open Internet; Final Rule

Federal Communications Commission, Sept. 23, 2011

I. Preserving the Free and Open Internet

In this Order the Commission takes an important step to preserve the Internet as an open platform for innovation, investment, job creation, economic growth, competition, and free expression. To provide greater clarity and certainty regarding the continued freedom and openness of the Internet, we adopt three basic rules that are grounded in broadly accepted Internet norms, as well as our own prior decisions:

i. *Transparency*. Fixed and mobile broadband providers must disclose the network management practices, performance characteristics, and terms and conditions of their broadband services;

ii. *No blocking*. Fixed broadband providers may not block lawful content, applications, services, or non-harmful devices; mobile broadband providers may not block lawful Web sites, or block applications that compete with their voice or video telephony services; and

iii. *No unreasonable discrimination*. Fixed broadband providers may not unreasonably discriminate in transmitting lawful network traffic.

We believe these rules, applied with the complementary principle of reasonable network management, will empower and protect consumers and innovators while helping ensure that the Internet continues to flourish, with robust private investment and rapid innovation at both the core and the edge of the network. ***

Mobile broadband is at an earlier stage in its development than fixed broadband and is evolving rapidly. For that and other reasons discussed below, we conclude that it is appropriate at this time to take measured steps in this area. Accordingly, we require mobile broadband providers to comply with the transparency rule, which includes enforceable disclosure obligations regarding device and application certification and approval processes; we prohibit providers from blocking lawful Web sites; and we prohibit providers from blocking applications that compete with providers' voice and video telephony services. We will closely monitor the development of the mobile broadband market and will adjust the framework we adopt in this Order as appropriate.

These rules are within our jurisdiction over interstate and foreign communications by wire and radio. Further, they implement specific statutory mandates in the Communications Act ("Act") and the Telecommunications Act of 1996 ("1996 Act"), including provisions that direct the Commission to promote Internet investment and to protect and promote voice, video, and audio communications services. ***

II. The Need for Open Internet Protections

In the Open Internet NPRM (FCC 09-93 published at 74 FR 62638, November 30, 2009), we sought comment on the best means for preserving and promoting a free and open Internet. *** We conclude that the benefits of ensuring Internet openness through enforceable, high-level, prophylactic rules outweigh the costs. The harms that could result from threats to openness are significant and likely irreversible, while the costs of compliance with our rules should be small, in large part because the rules appear to be consistent with current industry practices. The rules are carefully calibrated to preserve the benefits of the open Internet and increase certainty for all Internet stakeholders, with minimal burden on broadband providers.

A. The Internet's Openness Promotes Innovation, Investment, Competition, Free Expression, and Other National Broadband Goals

Like electricity and the computer, the Internet is a "general purpose technology" that enables new methods of production that have a major impact on the entire economy. The Internet's founders intentionally built a network that is open, in the sense that it has no gatekeepers limiting innovation and communication through the network.[3] *** The Internet's openness is critical to these outcomes, because it enables a virtuous circle of innovation in which new uses of the network—including new content, applications, services, and devices—lead to increased end-user demand for broadband, which drives network improvements, which in turn lead to further innovative network uses. Novel, improved, or lower-cost offerings introduced by content, application, service, and device providers spur end-user demand and encourage broadband providers to expand their networks and invest in new broadband technologies. Streaming video and e-commerce applications, for instance, have led to major network improvements such as fiber to the premises, VDSL, and DOCSIS 3.0. These network improvements generate new opportunities for edge providers, spurring them to innovate further. Each round of innovation increases the value of the Internet for broadband providers, edge providers, online businesses, and consumers. Continued operation of this virtuous circle, however, depends upon low barriers to innovation and entry by edge providers, which drive end-user demand. Restricting edge providers' ability to reach end users, and limiting end users' ability to choose which edge providers to patronize, would reduce the rate of innovation at the edge and, in turn, the likely rate of improvements to network infrastructure. Similarly, restricting the ability of broadband providers to put the network to innovative uses may reduce the rate of improvements to network infrastructure.

Openness also is essential to the Internet's role as a platform for speech and civic engagement. ***

Unimpeded access to Internet distribution likewise has allowed new video content creators to create and disseminate programs without first securing distribution from broadcasters and multichannel video programming distributors (MVPDs) such as ca-

[3] The Internet's openness is supported by an "end-to-end" network architecture that was formulated and debated in standard-setting organizations and foundational documents. Under the end-to-end principle, devices in the middle of the network are not optimized for the handling of any particular application, while devices at network endpoints perform the functions necessary to support networked applications and services.

ble and satellite television companies. Online viewing of video programming content is growing rapidly. ***

B. Broadband Providers Have the Incentive and Ability to Limit Internet Openness

For purposes of our analysis, we consider three types of Internet activities: providing broadband Internet access service; providing content, applications, services, and devices accessed over or connected to broadband Internet access service ("edge" products and services); and subscribing to a broadband Internet access service that allows access to edge products and services. ***

The record in this proceeding reveals that broadband providers potentially face at least three types of incentives to reduce the current openness of the Internet. First, broadband providers may have economic incentives to block or otherwise disadvantage specific edge providers or classes of edge providers, for example by controlling the transmission of network traffic over a broadband connection, including the price and quality of access to end users. A broadband provider might use this power to benefit its own or affiliated offerings at the expense of unaffiliated offerings.

Today, broadband providers have incentives to interfere with the operation of third-party Internet-based services that compete with the providers' revenue-generating telephony and/or pay-television services. This situation contrasts with the first decade of the public Internet, when dial-up was the primary form of consumer Internet access. Independent companies such as America Online, CompuServe, and Prodigy provided access to the Internet over telephone companies' phone lines. As broadband has replaced dial-up, however, telephone and cable companies have become the major providers of Internet access service. Online content, applications, and services available from edge providers over broadband increasingly offer actual or potential competitive alternatives to broadband providers' own voice and video services, which generate substantial profits. Interconnected Voice-over-Internet-Protocol (VoIP) services, which include some over-the-top VoIP services, "are increasingly being used as a substitute for traditional telephone service," and over-the-top VoIP services represent a significant share of voice-calling minutes, especially for international calls. Online video is rapidly growing in popularity, and MVPDs have responded to this trend by enabling their video subscribers to use the Internet to view their programming on personal computers and other Internet-enabled devices. Online video aggregators such as Netflix, Hulu, YouTube, and iTunes that are unaffiliated with traditional MVPDs continue to proliferate and innovate, offering movies and television programs (including broadcast programming) on demand, and earning revenues from advertising and/or subscriptions. Several MVPDs have stated publicly that they view these services as a potential competitive threat to their core video subscription service. Thus, online edge services appear likely to continue gaining subscribers and market significance, which will put additional competitive pressure on broadband providers' own services. By interfering with the transmission of third parties' Internet-based services or raising the cost of online delivery for particular edge providers, telephone and cable companies can make those services less attractive to subscribers in comparison to their own offerings.

In addition, a broadband provider may act to benefit edge providers that have paid it to exclude rivals (for example, if one online video site were to contract with a broadband provider to deny a rival video site access to the broadband provider's subscribers). End users would be harmed by the inability to access desired content, and this conduct could lead to reduced innovation and fewer new services. Consistent with these concerns, delivery networks that are vertically integrated with content providers, including some MVPDs, have incentives to favor their own affiliated content. If broadband providers had historically favored their own affiliated businesses or those incumbent firms that paid for advantageous access to end users, some innovative edge providers that have today become major Internet businesses might not have been able to survive.

Second, broadband providers may have incentives to increase revenues by charging edge providers, who already pay for their own connections to the Internet, for access or prioritized access to end users. Although broadband providers have not historically imposed such fees, they have argued they should be permitted to do so. A broadband provider could force edge providers to pay inefficiently high fees because that broadband provider is typically an edge provider's only option for reaching a particular end user. Thus broadband providers have the ability to act as gatekeepers.

Broadband providers would be expected to set inefficiently high fees to edge providers because they receive the benefits of those fees but are unlikely to fully account for the detrimental impact on edge providers' ability and incentive to innovate and invest, including the possibility that some edge providers might exit or decline to enter the market. The unaccounted-for harms to innovation are negative externalities, and are likely to be particularly large because of the rapid pace of Internet innovation, and wide-ranging because of the role of the Internet as a general purpose technology. Moreover, fees for access or prioritized access could trigger an "arms race" within a given edge market segment. If one edge provider pays for access or prioritized access to end users, subscribers may tend to favor that provider's services, and competing edge providers may feel that they must respond by paying, too.

Fees for access or prioritization to end users could reduce the potential profit that an edge provider would expect to earn from developing new offerings, and thereby reduce edge providers' incentives to invest and innovate. In the rapidly innovating edge sector, moreover, many new entrants are new or small "garage entrepreneurs," not large and established firms. These emerging providers are particularly sensitive to barriers to innovation and entry, and may have difficulty obtaining financing if their offerings are subject to being blocked or disadvantaged by one or more of the major broadband providers. In addition, if edge providers need to negotiate access or prioritized access fees with broadband providers, the resulting transaction costs could further raise the costs of introducing new products and might chill entry and expansion.

Some commenters argue that an end user's ability to switch broadband providers eliminates these problems. But many end users may have limited choice among broadband providers, as discussed below. Moreover, those that can switch broadband providers may not benefit from switching if rival broadband providers charge edge providers similarly for access and priority transmission and prioritize each edge provider's service similarly. Further, end users may not know whether charges or service levels their broadband provider is imposing on edge providers vary from those of alternative broadband providers, and even if they do have this information may find it costly to switch. For these reasons, a dissatisfied end user, observing that some edge provider services are subject to low transmission quality, might not switch broadband providers (though they may switch to a rival edge provider in the hope of improving quality).

Some commenters contend that, in the absence of open Internet rules, broadband providers that earn substantial additional revenue by assessing access or prioritization charges on edge providers could avoid increasing or could reduce the rates they charge broadband subscribers, which might increase the number of subscribers to the broadband network. Although this scenario is possible, no broadband provider has stated in this proceeding that it actually would use any revenue from edge provider charges to offset subscriber charges. In addition, these commenters fail to account for the likely detrimental effects of access and prioritization charges on the virtuous circle of innovation described above. Less content and fewer innovative offerings make the Internet less attractive for end users than would otherwise be the case. Consequently, we are unable to conclude that the possibility of reduced subscriber charges outweighs the risks of harm described herein.

Third, if broadband providers can profitably charge edge providers for prioritized access to end users, they will have an incentive to degrade or decline to increase the quality of the service they provide to non-prioritized traffic. This would increase the gap in quality (such as latency in transmission) between prioritized access and non-prioritized access, induce more edge providers to pay for prioritized access, and allow broadband providers to charge higher prices for prioritized access. Even more damaging, broadband providers might withhold or decline to expand capacity in order to "squeeze" non-prioritized traffic, a strategy that would increase the likelihood of network congestion and confront edge providers with a choice between accepting low-quality transmission or paying fees for prioritized access to end users.

Moreover, if broadband providers could block specific content, applications, services, or devices, end users and edge providers would lose the control they currently have over whether other end users and edge providers can communicate with them through the Internet. Content, application, service, and device providers (and their investors) could no longer assume that the market for their offerings included all U.S. end users. And broadband providers might choose to implement undocumented practices for traffic differentiation that undermine the ability of developers to create generally usable applications without having to design to particular broadband providers' unique practices or business arrangements.

All of the above concerns are exacerbated by broadband providers' ability to make fine-grained distinctions in their handling of network traffic as a result of increasingly sophisticated network management tools. Such tools may be used for beneficial purposes, but they also increase broadband providers' ability to act on incentives to engage in network practices that would erode Internet openness.

Although these threats to Internet-enabled innovation, growth, and competition do not depend upon broadband providers having market power with respect to end users,[27] most would be exacerbated by such market power. A broadband provider's incentive to favor affiliated content or the content of unaffiliated firms that pay for it to do so, its incentive to block or degrade traffic or charge edge providers for access to end users, and its incentive to squeeze non-prioritized transmission will all be greater if end users are less able to respond by switching to rival broadband providers. The risk of market power is highest in markets with few competitors, and most residential end users today have only one or two choices for wireline broadband Internet access service. As of December 2009, nearly 70 percent of households lived in census tracts where only one or two wireline or fixed wireless firms provided advertised download speeds of at least 3 Mbps and upload speeds of at least 768 Kbps—the closest observable benchmark to the minimum download speed of 4 Mbps and upload speed of 1 Mbps that the Commission has used to assess broadband deployment. About 20 percent of households are in census tracts with only one provider advertising at least 3 Mbps down and 768 Kbps up. For Internet service with advertised download speeds of at least 10 Mbps down and upload speeds of at least 1.5 Mbps up, nearly 60 percent of households lived in census tracts served by only one wireline or fixed wireless broadband provider, while nearly 80 percent lived in census tracts served by no more than two wireline or fixed wireless broadband providers.

Including mobile broadband providers does not appreciably change these numbers. The roll-out of next generation mobile services is at an early stage, and the future of competition in residential broadband is unclear. The record does not enable us to make a predictive judgment that the future will be more competitive than the past. Although wireless providers are increasingly offering faster broadband services, we do not know, for example, how end users will value the trade-offs between the benefits of wireless service (e.g., mobility) and the benefits of fixed wireline service (e.g., higher download and upload speeds). We note that the two largest mobile broadband providers also offer wireline or fixed service; this could dampen their incentive to compete aggressively with wireline (or fixed) services.

In addition, customers may incur significant costs in switching broadband providers because of early termination fees; the inconvenience of ordering, installation, and

[27] Because broadband providers have the ability to act as gatekeepers even in the absence of market power with respect to end users, we need not conduct a market power analysis.

set-up, and associated deposits or fees; possible difficulty returning the earlier broadband provider's equipment and the cost of replacing incompatible customer-owned equipment; the risk of temporarily losing service; the risk of problems learning how to use the new service; and the possible loss of a provider-specific e-mail address or Web site.

C. Broadband Providers Have Acted To Limit Openness

These dangers to Internet openness are not speculative or merely theoretical. Conduct of this type has already come before the Commission in enforcement proceedings. As early as 2005, a broadband provider that was a subsidiary of a telephone company paid $15,000 to settle a Commission investigation into whether it had blocked Internet ports used for competitive VoIP applications. In 2008, the Commission found that Comcast disrupted certain peer-to-peer (P2P) uploads of its subscribers, without a reasonable network management justification and without disclosing its actions. Comparable practices have been observed in the provision of mobile broadband services. After entering into a contract with a company to handle online payment services, a mobile wireless provider allegedly blocked customers' attempts to use competing services to make purchases using their mobile phones. A nationwide mobile provider restricted the types of lawful applications that could be accessed over its 3G mobile wireless network.

There have been additional allegations of blocking, slowing, or degrading P2P traffic. We do not determine in this Order whether any of these practices violated open Internet principles, but we note that they have raised concerns among edge providers and end users, particularly regarding lack of transparency. For example, in May 2008 a major cable broadband provider acknowledged that it had managed the traffic of P2P services. In July 2009, another cable broadband provider entered into a class action settlement agreement stating that it had "ceased P2P Network Management Practices," but allowing the provider to resume throttling P2P traffic. There is evidence that other broadband providers have engaged in similar degradation. In addition, broadband providers' terms of service commonly reserve to the provider sweeping rights to block, degrade, or favor traffic. For example, one major cable provider reserves the right to engage, "without limitation," in "port blocking, * * * traffic prioritization and protocol filtering." Further, a major mobile broadband provider prohibits use of its wireless service for "downloading movies using peer-to-peer file sharing services" and VoIP applications. And a cable modem manufacturer recently filed a formal complaint with the Commission alleging that a major broadband Internet access service provider has violated open Internet principles through overly restrictive device approval procedures.

These practices have occurred notwithstanding the Commission's adoption of open Internet principles in the *Internet Policy Statement*; enforcement proceedings against Madison River Communications and Comcast for their interference with VoIP and P2P traffic, respectively; Commission orders that required certain broadband providers to adhere to open Internet obligations; longstanding norms of Internet openness;

and statements by major broadband providers that they support and are abiding by open Internet principles.

D. The Benefits of Protecting the Internet's Openness Exceed the Costs

Widespread interference with the Internet's openness would likely slow or even break the virtuous cycle of innovation that the Internet enables, and would likely cause harms that may be irreversible or very costly to undo. For example, edge providers could make investments in reliance upon exclusive preferential arrangements with broadband providers, and network management technologies may not be easy to change. If the next revolutionary technology or business is not developed because broadband provider practices chill entry and innovation by edge providers, the missed opportunity may be significant, and lost innovation, investment, and competition may be impossible to restore after the fact. Moreover, because of the Internet's role as a general purpose technology, erosion of Internet openness threatens to harm innovation, investment in the core and at the edge of the network, and competition in many sectors, with a disproportionate effect on small, entering, and noncommercial edge providers that drive much of the innovation on the Internet. Although harmful practices are not certain to become widespread, there are powerful reasons for immediate concern, as broadband providers have interfered with the open Internet in the past and have incentives and an increasing ability to do so in the future. Effective open Internet rules can prevent or reduce the risk of these harms, while helping to assure Americans unfettered access to diverse sources of news, information, and entertainment, as well as an array of technologies and devices that enhance health, education, and the environment.

By comparison to the benefits of these prophylactic measures, the costs associated with the open Internet rules adopted here are likely small. Broadband providers generally endorse openness norms—including the transparency and no blocking principles—as beneficial and in line with current and planned business practices (though they do not uniformly support rules making them enforceable). Even to the extent rules require some additional disclosure of broadband providers' practices, the costs of compliance should be modest. In addition, the high-level rules we adopt carefully balance preserving the open Internet against avoiding unduly burdensome regulation. Our rules against blocking and unreasonable discrimination are subject to reasonable network management, and our rules do not prevent broadband providers from offering specialized services such as facilities-based VoIP. In short, rules that reinforce the openness that has supported the growth of the Internet, and do not substantially change this highly successful status quo, should not entail significant compliance costs.

Some commenters contend that open Internet rules are likely to reduce investment in broadband deployment. We disagree. There is no evidence that prior open Internet obligations have discouraged investment; and numerous commenters explain that, by preserving the virtuous circle of innovation, open Internet rules will increase incentives to invest in broadband infrastructure. Moreover, if permitted to deny access, or charge edge providers for prioritized access to end users, broadband providers may have incentives to allow congestion rather than invest in expanding network capacity. And as described in Part III, below, our rules allow broadband providers sufficient flexibility to address legitimate congestion concerns and other network management considerations. Nor is there any persuasive reason to believe that in the absence of open Internet rules broadband providers would lower charges to broadband end users, or otherwise change their practices in ways that benefit innovation, investment, competition, or end users. ***

III. Open Internet Rules

To preserve the Internet's openness and broadband providers' ability to manage and expand their networks, we adopt high-level rules embodying four core principles: transparency, no blocking, no unreasonable discrimination, and reasonable network management. These rules are generally consistent with, and should not require significant changes to, broadband providers' current practices, and are also consistent with the common understanding of broadband Internet access service as a service that enables one to go where one wants on the Internet and communicate with anyone else online.

A. Scope of the Rules

We find that open Internet rules should apply to "broadband Internet access service," which we define as:

*A mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up Internet access service. This term also encompasses any service that the Commission finds to be providing a functional equivalent of the service described in the previous sentence, or that is used to evade the protections set forth in this Part.*

The term "broadband Internet access service" includes services provided over any technology platform, including but not limited to wire, terrestrial wireless (including fixed and mobile wireless services using licensed or unlicensed spectrum), and satellite.

"Mass market" means a service marketed and sold on a standardized basis to residential customers, small businesses, and other end-user customers such as schools and libraries. For purposes of this definition, "mass market" also includes broadband Internet access services purchased with the support of the E-rate program that may be customized or individually negotiated. The term does not include enterprise service offerings, which are typically offered to larger organizations through customized or individually negotiated arrangements.

"Broadband Internet access service" encompasses services that "provide the capability to transmit data to and receive data from all or substantially all Internet endpoints." To ensure the efficacy of our rules in this dynamic market, we also treat as a "broadband Internet access service" any service the Commission finds to be providing a functional equivalent of the service described in the previous sentence, or that is used to evade the protections set forth in these rules.

A key factor in determining whether a service is used to evade the scope of the rules is whether the service is used as a substitute for broadband Internet access service. For example, an Internet access service that provides access to a substantial subset of Internet endpoints based on end users preference to avoid certain content, applications, or services; Internet access services that allow some uses of the Internet (such as access to the World Wide Web) but not others (such as e-mail); or a "Best of the Web" Internet access service that provides access to 100 top Web sites could not be used to evade the open Internet rules applicable to "broadband Internet access service." Moreover, a broadband provider may not evade these rules simply by blocking end users' access to some Internet endpoints. Broadband Internet access service likely does not include services offering connectivity to one or a small number of Internet endpoints for a particular device, *e.g.*, connectivity bundled with e-readers, heart monitors, or energy consumption sensors, to the extent the service relates to the functionality of the device. Nor does broadband Internet access service include virtual private network services, content delivery network services, multichannel video programming services, hosting or data storage services, or Internet backbone services (if those services are separate from broadband Internet access service). These services typically are not mass market services and/or do not provide the capability to transmit data to and receive data from all or substantially all Internet endpoints.

Although one purpose of our open Internet rules is to prevent blocking or unreasonable discrimination in transmitting online traffic for applications and services that compete with traditional voice and video services, we determine that open Internet rules applicable to fixed broadband providers should protect all types of Internet traffic, not just voice or video Internet traffic. This reflects, among other things, our view that it is generally preferable to neither require nor encourage broadband providers to examine Internet traffic in order to discern which traffic is subject to the rules. Even if we were to limit our rules to voice or video traffic, moreover, it is unlikely that broadband providers could reliably identify such traffic in all circumstances, particularly if the voice or video traffic originated from new services using uncommon protocols. Indeed, limiting our rules to voice and video traffic alone could spark a costly and wasteful cat-and-mouse game in which edge providers and end users seeking to obtain the protection of our rules could disguise their traffic as protected communications.

We recognize that there is one Internet (although it is comprised of a multitude of different networks), and that it should remain open and interconnected regardless of the technologies and services end users rely on to access it. However, for reasons discussed in Part III.E below related to mobile broadband—including the fact that it is at an earlier stage and more rapidly evolving—we apply open Internet rules somewhat differently to mobile broadband than to fixed broadband at this time. We define "fixed broadband Internet access service" as a broadband Internet access service that serves end users primarily at fixed endpoints using stationary equipment, such as the modem that connects an end user's home router, computer, or other Internet access device to the network. This term encompasses fixed wireless broadband services (including services using unlicensed spectrum) and fixed satellite broadband services. We define "mobile broadband Internet access service" as a broadband Internet access service that serves end users primarily using mobile stations. Mobile broadband Internet access includes services that use smartphones as the primary endpoints for connection to the Internet. The discussion in this Part applies to both fixed and mobile broadband, unless specifically noted. Part III.E further discusses application of open Internet rules to mobile broadband.

*** [T]hese rules apply only to the provision of broadband Internet access service and not to edge provider activities, such as the provision of content or applications over the Internet. *** We also do not apply these rules to dial-up Internet access service because telephone service has historically provided the easy ability to switch among competing dial-up Internet access services. ***

B. Transparency

Promoting competition throughout the Internet ecosystem is a central purpose of these rules. Effective disclosure of broadband providers' network management practices and the performance and commercial terms of their services promotes competition—as well as innovation, investment, end-user choice, and broadband adoption—in at least five ways. First, disclosure ensures that end users can make informed choices regarding the purchase and use of broadband service, which promotes a more competitive market for broadband services and can thereby reduce broadband providers' incentives and ability to violate open Internet principles. Second, and relatedly, as end users' confidence in broadband providers' practices increases, so too should end users' adoption of broadband services—leading in turn to additional investment in Internet infrastructure as contemplated by Section 706 of the 1996 Act and other provisions of the communications laws. Third, disclosure supports innovation, investment, and competition by ensuring that startups and other edge providers have the technical information necessary to create and maintain online content, applications, services, and devices, and to assess the risks and benefits of embarking on new projects. Fourth, disclosure increases the likelihood that broadband providers will abide by open Internet principles, and that the Internet community will identify problematic conduct and suggest fixes. Transparency thereby increases the chances that harmful practices will not occur in the first place and that, if they do, they will be quickly remedied, whether privately or through Commission oversight. Fifth, disclosure will enable the Commission to collect information necessary to assess, report on, and enforce the other open Internet rules. For all of these reasons, most commenters agree that informing end users, edge providers, and the Commission about the network management practices, performance, and commercial terms of broadband Internet access service is a necessary and appropriate step to help preserve an open Internet.

The *Open Internet NPRM* sought comment on what end users and edge providers need to know about broadband service, how this information should be disclosed, when disclosure should occur, and where information should be available. The resulting record supports adoption of the following rule:

A person engaged in the provision of broadband Internet access service shall publicly disclose accurate information regarding the network management practices, performance, and commercial terms of its broadband Internet access services sufficient for consumers to make informed choices regarding use of such services and for content, application, service, and device providers to develop, market, and maintain Internet offerings.

The rule does not require public disclosure of competitively sensitive information or information that would compromise network security or undermine the efficacy of reasonable network management practices. For example, a broadband provider need not publicly disclose information regarding measures it employs to prevent spam practices at a level of detail that would enable a spammer to defeat those measures. ***

Network Practices

- *Congestion Management*: If applicable, descriptions of congestion management practices; types of traffic subject to practices; purposes served by practices; practices' effects on end users' experience; criteria used in practices, such as indicators of congestion that trigger a practice, and the typical frequency of congestion; usage limits and the consequences of exceeding them; and references to engineering standards, where appropriate.[64]
- *Application-Specific Behavior*: If applicable, whether and why the provider blocks or rate-controls specific protocols or protocol ports, modifies protocol fields in ways not prescribed by the protocol standard, or otherwise inhibits or favors certain applications or classes of applications.
- *Device Attachment Rules*: If applicable, any restrictions on the types of devices and any approval procedures for devices to connect to the network. (For further discussion of required disclosures regarding device and application approval procedures for mobile broadband providers, see infra.)
- *Security*: If applicable, practices used to ensure end-user security or security of the network, including types of triggering conditions that cause a mechanism to be invoked (but excluding information that could reasonably be used to circumvent network security).

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[64] We note that the description of congestion management practices provided by Comcast in the wake of the Comcast-BitTorrent incident likely satisfies the transparency rule with respect to congestion management practices. See Comcast, Network Management Update, http://www.comcast.net/terms/network/update; Comcast, Comcast Corporation Description of Planned Network Management Practices to be Deployed Following the Termination of Current Practices, downloads.comcast.net/docs/Attachment_B_Future_Practices.pdf.

Performance Characteristics

- *Service Description*: A general description of the service, including the service technology, expected and actual access speed and latency, and the suitability of the service for real-time applications.
- *Impact of Specialized Services*: If applicable, what specialized services, if any, are offered to end users, and whether and how any specialized services may affect the last-mile capacity available for, and the performance of, broadband Internet access service.

Commercial Terms

- *Pricing*: For example, monthly prices, usage-based fees, and fees for early termination or additional network services.
- *Privacy Policies*: For example, whether network management practices entail inspection of network traffic, and whether traffic information is stored, provided to third parties, or used by the carrier for non-network management purposes.
- *Redress Options*: Practices for resolving end-user and edge provider complaints and questions.

We emphasize that this list is not necessarily exhaustive, nor is it a safe harbor—there may be additional information, not included above, that should be disclosed for a particular broadband service to comply with the rule in light of relevant circumstances. Broadband providers should examine their network management practices and current disclosures to determine what additional information, if any, should be disclosed to comply with the rule. ***

We also expressly exclude from the rule competitively sensitive information, information that would compromise network security, and information that would undermine the efficacy of reasonable network management practices. Third, as discussed below, by setting the effective date of these rules as November 20, 2011, we give broadband providers adequate time to develop cost effective methods of compliance.

A key purpose of the transparency rule is to enable third-party experts such as independent engineers and consumer watchdogs to monitor and evaluate network management practices, in order to surface concerns regarding potential open Internet violations. We also note the existence of free software tools that enable Internet end users and edge providers to monitor and detect blocking and discrimination by broadband providers. Although current tools cannot detect all instances of blocking or discrimination and cannot substitute for disclosure of network management policies, such tools may help supplement the transparency rule we adopt in this Order. ***

### C. No Blocking and No Unreasonable Discrimination

#### 1. No Blocking

The freedom to send and receive lawful content and to use and provide applications and services without fear of blocking is essential to the Internet's openness and to competition in adjacent markets such as voice communications and video and audio programming. Similarly, the ability to connect and use any lawful devices that do not harm the network helps ensure that end users can enjoy the competition and innovation that result when device manufacturers can depend on networks' openness. Moreover, the no-blocking principle has been broadly accepted since its inclusion in the Commission's *Internet Policy Statement*. Major broadband providers represent that they currently operate consistent with this principle and are committed to continuing to do so.

In the *Open Internet NPRM*, the Commission proposed codifying the original three Internet Policy Statement principles that addressed blocking of content, applications and services, and devices. After consideration of the record, we consolidate the proposed rules into a single rule for fixed broadband providers:[73]

*A person engaged in the provision of fixed broadband Internet access service, insofar as such person is so engaged, shall not block lawful content, applications, services, or non-harmful devices, subject to reasonable network management.*

The phrase "content, applications, services" refers to all traffic transmitted to or from end users of a broadband Internet access service, including traffic that may not fit cleanly into any of these categories. The rule protects only transmissions of lawful content, and does not prevent or restrict a broadband provider from refusing to transmit unlawful material such as child pornography.

We also note that the rule entitles end users to both connect and use any lawful device of their choice, provided such device does not harm the network. A broadband provider may require that devices conform to widely accepted and publicly-available standards applicable to its services.

We make clear that the no-blocking rule bars broadband providers from impairing or degrading particular content, applications, services, or non-harmful devices so as to render them effectively unusable (subject to reasonable network management). Such a prohibition is consistent with the observation of a number of commenters that degrading traffic can have the same effects as outright blocking, and that such an approach is consistent with the traditional interpretation of the Internet Policy Statement. The Commission has recognized that in some circumstances the distinction between blocking and degrading (such as by delaying) traffic is merely "semantic."

Some concerns have been expressed that broadband providers may seek to charge edge providers simply for delivering traffic to or carrying traffic from the broadband

[73] As described below, we adopt a tailored version of this rule for mobile broadband providers.

provider's end-user customers. To the extent that a content, application, or service provider could avoid being blocked only by paying a fee, charging such a fee would not be permissible under these rules.

2. No Unreasonable Discrimination

Based on our findings that fixed broadband providers have incentives and the ability to discriminate in their handling of network traffic in ways that can harm innovation, investment, competition, end users, and free expression, we adopt the following rule:

*A person engaged in the provision of fixed broadband Internet access service, insofar as such person is so engaged, shall not unreasonably discriminate in transmitting lawful network traffic over a consumer's broadband Internet access service. Reasonable network management shall not constitute unreasonable discrimination.*

The rule strikes an appropriate balance between restricting harmful conduct and permitting beneficial forms of differential treatment. As the rule specifically provides, and as discussed below, discrimination by a broadband provider that constitutes "reasonable network management" is "reasonable" discrimination. We provide further guidance regarding distinguishing reasonable from unreasonable discrimination:

*Transparency*. Differential treatment of traffic is more likely to be reasonable the more transparent to the end user that treatment is. The Commission has previously found broadband provider practices to violate open Internet principles in part because they were not disclosed to end users. Transparency is particularly important with respect to the discriminatory treatment of traffic as it is often difficult for end users to determine the causes of slow or poor performance of content, applications, services, or devices.

*End-User Control*. Maximizing end-user control is a policy goal Congress recognized in Section 230(b) of the Communications Act, and end-user choice and control are touchstones in evaluating the reasonableness of discrimination. *** Thus, enabling end users to choose among different broadband offerings based on such factors as assured data rates and reliability, or to select quality-of-service enhancements on their own connections for traffic of their choosing, would be unlikely to violate the no unreasonable discrimination rule, provided the broadband provider's offerings were fully disclosed and were not harmful to competition or end users. ***

Some commenters suggest that open Internet protections would prohibit broadband providers from offering their subscribers different tiers of service or from charging their subscribers based on bandwidth consumed. We are, of course, always concerned about anti-consumer or anticompetitive practices, and we remain so here. However, prohibiting tiered or usage-based pricing and requiring all subscribers to pay the same amount for broadband service, regardless of the performance or usage of the service, would force lighter end users of the network to subsidize heavier end users. It would also foreclose practices that may appropriately align incentives to encourage efficient use of networks. The framework we adopt in this Order does not prevent broadband providers from asking subscribers who use the network less to pay less, and subscribers who use the network more to pay more.

*Use-Agnostic Discrimination*. Differential treatment of traffic that does not discriminate among specific uses of the network or classes of uses is likely reasonable. For example, during periods of congestion a broadband provider could provide more bandwidth to subscribers that have used the network less over some preceding period of time than to heavier users. Use-agnostic discrimination (sometimes referred to as application-agnostic discrimination) is consistent with Internet openness because it does not interfere with end users' choices about which content, applications, services, or devices to use. Nor does it distort competition among edge providers.

*Standard Practices*. *** In evaluating unreasonable discrimination, the types of practices we would be concerned about include, but are not limited to, discrimination that harms an actual or potential competitor to the broadband provider (such as by degrading VoIP applications or services when the broadband provider offers telephone service), that harms end users (such as by inhibiting end users from accessing the content, applications, services, or devices of their choice), or that impairs free expression (such as by slowing traffic from a particular blog because the broadband provider disagrees with the blogger's message).

For a number of reasons, including those discussed above in Part II.B, a commercial arrangement between a broadband provider and a third party to directly or indirectly favor some traffic over other traffic in the broadband Internet access service connection to a subscriber of the broadband provider (*i.e.*, "pay for priority") would raise significant cause for concern. First, pay for priority would represent a significant departure from historical and current practice. *** Second this departure from longstanding norms could cause great harm to innovation and investment in and on the Internet. *** Fees imposed on edge providers may be excessive because few edge providers have the ability to bargain for lesser fees, and because no broadband provider internalizes the full costs of reduced innovation and the exit of edge providers from the market. Third, pay-for-priority arrangements may particularly harm non-commercial end users, including individual bloggers, libraries, schools, advocacy organizations, and other speakers, especially those who communicate through video or other content sensitive to network congestion. Even open Internet skeptics acknowledge that pay for priority may disadvantage non-commercial uses of the network, which are typically less able to pay for priority, and for which the Internet is a uniquely important platform. Fourth, broadband providers that sought to offer pay-for-priority services would have an incentive to limit the quality of service provided to non-prioritized traffic. In light of each of these concerns, as a general matter, it is unlikely that pay for priority would satisfy the "no unreasonable discrimination" standard. The practice of a broadband Internet access service provider prioritizing its own content, applications, or services, or those of its affiliates, would raise the same significant concerns and would be subject to the same standards and considerations in evaluating reasonableness as third-party pay-for-priority arrangements. ***

### D. Reasonable Network Management

Since at least 2005, when the Commission adopted *the Internet Policy Statement*, we have recognized that a flourishing and open Internet requires robust, well-functioning broadband networks, and accordingly that open Internet protections require broadband providers to be able to reasonably manage their networks. The open Internet rules we adopt in this Order expressly provide for and define "reasonable network management" in order to provide greater clarity to broadband providers, network equipment providers, and Internet end users and edge providers regarding the types of network management practices that are consistent with open Internet protections.

*** We therefore adopt the following definition of reasonable network management:

*A network management practice is reasonable if it is appropriate and tailored to achieving a legitimate network management purpose, taking into account the particular network architecture and technology of the broadband Internet access service.*

Legitimate network management purposes include: ensuring network security and integrity, including by addressing traffic that is harmful to the network; addressing traffic that is unwanted by end users (including by premise operators), such as by providing services or capabilities consistent with an end user's choices regarding parental controls or security capabilities; and reducing or mitigating the effects of congestion on the network. The term "particular network architecture and technology" refers to the differences across access platforms such as cable, DSL, satellite, and fixed wireless. ***

We also offer guidance in the specific context of the legitimate network management purposes listed above.

*Network Security or Integrity and Traffic Unwanted by End Users*. Broadband providers may implement reasonable practices to ensure network security and integrity, including by addressing traffic that is harmful to the network. *** Some commenters, however, express concern that providers might implement anticompetitive or otherwise problematic practices in the name of protecting network security. We make clear that, for the singling out of any specific application for blocking or degradation based on harm to the network to be a reasonable network management practice, a broadband provider should be prepared to provide a substantive explanation for concluding that the particular traffic is harmful to the network, such as traffic that constitutes a denial-of-service attack on specific network infrastructure elements or exploits a particular security vulnerability.

Broadband providers also may implement reasonable practices to address traffic that a particular end user chooses not to receive. Thus, for example, a broadband provider could provide services or capabilities consistent with an end user's choices regarding parental controls, or allow end users to choose a service that provides access to the Internet but not to pornographic Web sites. ***

*Network Congestion*. Numerous commenters support permitting the use of reasonable network management practices to address the effects of congestion, and we agree that congestion management may be a legitimate network management purpose. For example, broadband providers may need to take reasonable steps to ensure that heavy users do not crowd out others. What constitutes congestion and what measures are reasonable to address it may vary depending on the technology platform for a particular broadband Internet access service. For example, if cable modem subscribers in a particular neighborhood are experiencing congestion, it may be reasonable for a broadband provider to temporarily limit the bandwidth available to individual end users in that neighborhood who are using a substantially disproportionate amount of bandwidth. ***

E. Mobile Broadband

*** [M]obile broadband presents special considerations that suggest differences in how and when open Internet protections should apply. Mobile broadband is an earlier-stage platform than fixed broadband, and it is rapidly evolving. *** Moreover, most consumers have more choices for mobile broadband than for fixed (particularly fixed wireline) broadband. Mobile broadband speeds, capacity, and penetration are typically much lower than for fixed broadband, though some providers have begun offering 4G service that will enable offerings with higher speeds and capacity and lower latency than previous generations of mobile service. In addition, existing mobile networks present operational constraints that fixed broadband networks do not typically encounter. This puts greater pressure on the concept of "reasonable network management" for mobile providers, and creates additional challenges in applying a broader set of rules to mobile at this time. ***

In light of these considerations, we conclude it is appropriate to take measured steps at this time to protect the openness of the Internet when accessed through mobile broadband. We apply certain of the open Internet rules, requiring compliance with the transparency rule and a basic no-blocking rule.

1. Application of Openness Principles to Mobile Broadband

a. Transparency

The wide array of commenters who support a disclosure requirement generally agree that all broadband providers, including mobile broadband providers, should be required to disclose their network management practices. *** The transparency rule will also aid the Commission in monitoring the evolution of mobile broadband and adjusting, as appropriate, the framework adopted in this Order.

Therefore, as stated above, we require mobile broadband providers to follow the same transparency rule applicable to fixed broadband providers. Further, although we do not require mobile broadband providers to allow third-party devices or all third-party applications on their networks, we nonetheless require mobile broadband providers to disclose their third-party device and application certification procedures, if any; to clearly explain their criteria for any restrictions on use of their network; and to expeditiously inform device and application providers of any decisions to deny access to the network or of a failure to approve their particular devices or applications. ***

b. No Blocking

We adopt a no blocking rule that guarantees end users' access to the Web and protects against mobile broadband providers' blocking applications that compete with their other primary service offering—voice and video telephony—while ensuring that mobile broadband providers can engage in reasonable network management:

*A person engaged in the provision of mobile broadband Internet access service, insofar as such person is so engaged, shall not block consumers from accessing lawful Web sites, subject to reasonable network management; nor shall such person block applications that compete with the provider's voice or video telephony services, subject to reasonable network management.*

We understand a "provider's voice or video telephony services" to include a voice or video telephony service provided by any entity in which the provider has an attributable interest. We emphasize that the rule protects any and all applications that compete with a mobile broadband provider's voice or video telephony services. Further, degrading a particular Web site or an application that competes with the provider's voice or video telephony services so as to render the Web site or application effectively unusable would be considered tantamount to blocking (subject to reasonable network management). ***

Situations have arisen in which mobile wireless providers have blocked third-party applications that arguably compete with their telephony offerings. This type of blocking confirms that mobile broadband providers may have strong incentives to limit Internet openness when confronted with third-party applications that compete with their telephony services. ***

The prohibition on blocking applications that compete with a broadband provider's voice or video telephony services does not apply to a broadband provider's operation of application stores or their functional equivalent. In operating app stores, broadband providers compete directly with other types of entities, including device manufacturers and operating system developers, and we do not intend to limit mobile broadband providers' flexibility to curate their app stores similar to app store operators that are not subject to these rules. ***

2. Ongoing Monitoring

Although some commenters support applying the no unreasonable discrimination rule to mobile broadband, for the reasons discussed above, we decline to do so, preferring at this time to put in place basic openness protections and monitor the development of the mobile broadband marketplace. We emphasize that our decision to proceed incrementally with respect to mobile broadband at this time should not suggest that we implicitly approve of any provider behavior that runs counter to general open Internet principles. Beyond those practices expressly prohibited by our rules, other conduct by mobile broadband providers, particularly conduct that would violate our rules for fixed broadband, may not necessarily be consistent with Internet openness and the public interest. ***

## Verizon v. Federal Communications Commission

740 F.3d 623 (D.C. Cir. 2014)

TATEL, Circuit Judge: For the second time in four years, we are confronted with a Federal Communications Commission effort to compel broadband providers to treat all Internet traffic the same regardless of source—or to require, as it is popularly known, "net neutrality." In *Comcast Corp. v. FCC*, 600 F.3d 642 (D.C. Cir. 2010), we held that the Commission had failed to cite any statutory authority that would justify its order compelling a broadband provider to adhere to open network management practices. After *Comcast,* the Commission issued the order challenged here—*In re Preserving the Open Internet,* 25 F.C.C.R. 17905 (2010) ("the *Open Internet Order*")—which imposes disclosure, anti-blocking, and anti-discrimination requirements on broadband providers. As we explain in this opinion, the Commission has established that section 706 of the Telecommunications Act of 1996 vests it with affirmative authority to enact measures encouraging the deployment of broadband infrastructure. The Commission, we further hold, has reasonably interpreted section 706 to empower it to promulgate rules governing broadband providers' treatment of Internet traffic, and its justification for the specific rules at issue here—that they will preserve and facilitate the "virtuous circle" of innovation that has driven the explosive growth of the Internet—is reasonable and supported by substantial evidence. That said, even though the Commission has general authority to regulate in this arena, it may not impose requirements that contravene express statutory mandates. Given that the Commission has chosen to classify broadband providers in a manner that exempts them from treatment as common carriers, the Communications Act expressly prohibits the Commission from nonetheless regulating them as such. Because the Commission has failed to establish that the anti-discrimination and anti-blocking rules do not impose *per se* common carrier obligations, we vacate those portions of the *Open Internet Order.*

I.

Understanding this case requires an understanding of the Internet, the Internet marketplace, and the history of the Commission's regulation of that marketplace.

Four major participants in the Internet marketplace are relevant to the issues before us: backbone networks, broadband providers, edge providers, and end users. Backbone networks are interconnected, long-haul fiber-optic links and high-speed routers capable of transmitting vast amounts of data. See *In re Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control,* 20 F.C.C.R. 18433, 18493 ¶ 110 (2005). Internet users generally connect to these networks—and, ultimately, to one another—through local access providers like petitioner Verizon, who operate the "last-mile" transmission lines. See *Open Internet Order,* 25 F.C.C.R. at 17908, 17915 ¶¶ 7, 20. In the Internet's early days, most users connected to the Internet through dial-up connections over local telephone lines. See *In re Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities,* 17 F.C.C.R.

4798, 4802-03 ¶ 9 (2002) ("*Cable Broadband Order*"). Today, access is generally furnished through "broadband," *i.e.*, high-speed communications technologies, such as cable modem service. See *In re Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion,* 25 F.C.C.R. 9556, 9557, 9558-59 ¶¶ 1, 4 (2010) ("*Sixth Broadband Deployment Report*"); 47 U.S.C. § 1302(d)(1). Edge providers are those who, like Amazon or Google, provide content, services, and applications over the Internet, while end users are those who consume edge providers' content, services, and applications. See *Open Internet Order,* 25 F.C.C.R. at 17910 ¶ 13. To pull the whole picture together with a slightly oversimplified example: when an edge provider such as YouTube transmits some sort of content—say, a video of a cat—to an end user, that content is broken down into packets of information, which are carried by the edge provider's local access provider to the backbone network, which transmits these packets to the end user's local access provider, which, in turn, transmits the information to the end user, who then views and hopefully enjoys the cat.

These categories of entities are not necessarily mutually exclusive. For example, end users may often act as edge providers by creating and sharing content that is consumed by other end users, for instance by posting photos on Facebook. Similarly, broadband providers may offer content, applications, and services that compete with those furnished by edge providers. See *Open Internet Order,* 25 F.C.C.R. at 17915 ¶ 20.

Proponents of net neutrality—or, to use the Commission's preferred term, "Internet openness"—worry about the relationship between broadband providers and edge providers. They fear that broadband providers might prevent their end-user subscribers from accessing certain edge providers altogether, or might degrade the quality of their end-user subscribers' access to certain edge providers, either as a means of favoring their own competing content or services or to enable them to collect fees from certain edge providers. Thus, for example, a broadband provider like Comcast might limit its end-user subscribers' ability to access the *New York Times* website if it wanted to spike traffic to its own news website, or it might degrade the quality of the connection to a search website like Bing if a competitor like Google paid for prioritized access.

Since the advent of the Internet, the Commission has confronted the questions of whether and how it should regulate this communications network, which, generally speaking, falls comfortably within the Commission's jurisdiction over "all interstate and foreign communications by wire or radio." 47 U.S.C. § 152(a). One of the Commission's early efforts occurred in 1980, when it adopted what is known as the *Computer II* regime. The *Computer II* rules drew a line between "basic" services, which were subject to regulation under Title II of the Communications Act of 1934 as common carrier services, *see* 47 U.S.C. §§ 201 et seq., and "enhanced" services, which were not. See *In re Amendment of Section 64.702 of the Commission's Rules and Regulations,* 77 F.C.C.2d 384, 387 ¶¶ 5-7 (1980) ("*Second Computer Inquiry*").

What distinguished "enhanced" services from "basic" services was the extent to which they involved the processing of information rather than simply its transmission. *Id.* at 420-21 ¶¶ 96-97. ***

By virtue of their designation as common carriers, providers of basic services were subject to the duties that apply to such entities, including that they "furnish... communication service upon reasonable request," 47 U.S.C. § 201(a), engage in no "unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services," *id.* § 202(a), and charge "just and reasonable" rates, *id.* § 201(b). ***

It was against this background that Congress passed the Telecommunications Act of 1996, Pub.L. No. 104-104, 110 Stat. 56. Tracking the *Computer II* distinction between basic and enhanced services, the Act defines two categories of entities: telecommunications carriers, which provide the equivalent of basic services, and information-service providers, which provide the equivalent of enhanced services. 47 U.S.C. § 153(24), (50), (51), (53); see *National Cable & Telecommunications Ass'n v. Brand X Internet Services,* 545 U.S. 967, 976-77 (2005). The Act subjects telecommunications carriers, but not information-service providers, to Title II common carrier regulation. 47 U.S.C. § 153(53); *Brand X*, 545 U.S. at 975-76.

Pursuant to the Act, and paralleling its prior practice under the *Computer II* regime, the Commission then classified Digital Subscriber Line (DSL) services—broadband Internet service furnished over telephone lines—as "telecommunications services." See *In re Deployment of Wireline Services Offering Advanced Telecommunications Capability,* 13 F.C.C.R. 24012, 24014, 24029-30 ¶¶ 3, 35-36 (1998) ("*Advanced Services Order*"). DSL services, the Commission concluded, involved pure transmission technologies, and so were subject to Title II regulation. *Id.* at 24030-31 ¶ 35. A DSL provider could exempt its Internet access services, but not its transmission facilities themselves, from Title II common carrier restrictions only by operating them through a separate affiliate (*i.e.*, a quasi-independent ISP). *Id.* at 24018 ¶ 13.

Four years later, however, the Commission took a different approach when determining how to regulate broadband service provided by cable companies. Instead of viewing cable broadband providers' transmission and processing of information as distinct services, the Commission determined that cable broadband providers—even those that own and operate the underlying last-mile transmission facilities—provide a "single, integrated information service." *Cable Broadband Order,* 17 F.C.C.R. at 4824 ¶ 41. Because cable broadband providers were thus not telecommunications carriers at all, they were entirely exempt from Title II regulation. *Id.* at 4802 ¶ 7.

In *National Cable & Telecommunications Ass'n v. Brand X Internet Services*, 545 U.S. 967 (2005), the Supreme Court upheld the Commission's classification of cable broadband providers. The Court concluded that the Commission's ruling represented a reasonable interpretation of the 1996 Telecommunications Act's ambiguous provision defining telecommunications service, see *id.* at 991-92, and that the Commission's determination was entitled to deference notwithstanding its apparent inconsistency with the agency's prior interpretation of that statute, see *id.* at 981, 1000-01.

Following *Brand X,* the Commission classified other types of broadband providers, such as DSL and wireless, which includes those offering broadband Internet service for cellular telephones, as information service providers exempt from Title II's common carrier requirements. See *In re Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities,* 20 F.C.C.R. 14853, 14862 ¶ 12 (2005) ("*2005 Wireline Broadband Order*"); *In re Appropriate Regulatory Treatment for Broadband Access to the Internet Over Wireless Networks,* 22 F.C.C.R. 5901, 5901-02 ¶ 1 (2007) ("*Wireless Broadband Order*"); *In re United Power Line Council's Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service as an Information Service,* 21 F.C.C.R. 13281, 13281 ¶ 1 (2006). Despite calls to revisit these classification orders, see*, e.g., Open Internet Order,* 25 F.C.C.R. at 18046 (concurring statement of Commissioner Copps), the Commission has yet to overrule them.

But even as the Commission exempted broadband providers from Title II common carrier obligations, it left open the possibility that it would nonetheless regulate these entities. *** The Commission did just that when, two years later, several subscribers to Comcast's cable broadband service complained that the company had interfered with their use of certain peer-to-peer networking applications. See *In re Formal Complaint of Free Press and Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications,* 23 F.C.C.R. 13028 (2008) ("*Comcast Order*"). Finding that Comcast's impairment of these applications had "contravene[d] ... federal policy," *id.* at 13052 ¶ 43, the Commission ordered the company to adhere to a new approach for managing bandwidth demand and to disclose the details of that approach, *id.* at 13059-60 ¶ 54. The Commission justified its order as an exercise of what courts term its "ancillary jurisdiction," see *id.* at 13034-41 ¶¶ 14-22, a power that flows from the broad language of Communications Act section 4(i). See 47 U.S.C. § 154(i) ("The Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this chapter, as may be necessary in the execution of its functions."); see generally *American Library Ass'n v. FCC,* 406 F.3d 689, 700-03 (D.C. Cir. 2005). We have held that the Commission may exercise such ancillary jurisdiction where two conditions are met: "(1) the Commission's general jurisdictional grant under Title I covers the regulated subject and (2) the regulations are reasonably ancillary to the Commission's effective performance of its statutorily mandated responsibilities." *American Library Ass'n*, 406 F.3d at 691-92.

In *Comcast,* we vacated the Commission's order, holding that the agency failed to demonstrate that it possessed authority to regulate broadband providers' network management practices. 600 F.3d at 644. Specifically, we held that the Commission had identified no grant of statutory authority to which the *Comcast Order* was reasonably ancillary. *Id.* at 661. The Commission had principally invoked statutory provisions that, though setting forth congressional policy, delegated no actual regulatory authority. *Id.* at 651-58. ***

While the *Comcast* matter was pending, the Commission sought comment on a set of proposed rules that, with some modifications, eventually became the rules at issue here. See *In re Preserving the Open Internet,* 24 F.C.C.R. 13064 (2009). *** Ultimately, however, rather than reclassifying broadband, the Commission adopted the *Open Internet Order* that Verizon challenges here. See 25 F.C.C.R. 17905.

The *Open Internet Order* establishes two sets of "prophylactic rules" designed to "incorporate longstanding openness principles that are generally in line with current practices." 25 F.C.C.R. at 17907 ¶ 4. One set of rules applies to "fixed" broadband providers—*i.e.*, those furnishing residential broadband service and, more generally, Internet access to end users "primarily at fixed end points using stationary equipment."*Id.* at 17934 ¶ 49. The other set of requirements applies to "mobile" broadband providers—i.e., those "serv[ing] end users primarily using mobile stations," such as smart phones. *Id.*

The *Order* first imposes a transparency requirement on both fixed and mobile broadband providers. *Id.* at 17938 ¶ 56. They must "publicly disclose accurate information regarding the network management practices, performance, and commercial terms of [their] broadband Internet access services." *Id.* at 17937 ¶ 54 (fixed providers); see also *id.* at 17959 ¶ 98 (mobile providers).

Second, the *Order* imposes anti-blocking requirements on both types of broadband providers. It prohibits fixed broadband providers from "block[ing] lawful content, applications, services, or non-harmful devices, subject to reasonable network management." *Id.* at 17942 ¶ 63. Similarly, the *Order* forbids mobile providers from "block[ing] consumers from accessing lawful websites" and from "block[ing] applications that compete with the provider's voice or video telephony services, subject to reasonable network management." *Id.* at 17959 ¶ 99. The *Order* defines "reasonable network management" as practices designed to "ensur[e] network security and integrity," "address[] traffic that is unwanted by end users," "and reduc[e] or mitigat[e] the effects of congestion on the network." *Id.* at 17952 ¶ 82. The anti-blocking rules, the *Order* explains, not only prohibit broadband providers from preventing their end-user subscribers from accessing a particular edge provider altogether, but also prohibit them "from impairing or degrading particular content, applications, services, or non-harmful devices so as to render them effectively unusable." *Id.* at 17943 ¶ 66.

Third, the *Order* imposes an anti-discrimination requirement on fixed broadband providers only. Under this rule, such providers "shall not unreasonably discriminate in transmitting lawful network traffic over a consumer's broadband Internet access service. Reasonable network management shall not constitute unreasonable discrimination." *Id.* at 17944 ¶ 68. The Commission explained that "[u]se-agnostic discrimination"—that is, discrimination based not on the nature of the particular traffic involved, but rather, for example, on network management needs during periods of congestion—would generally comport with this requirement. *Id.* at 17945-46 ¶ 73. Although the Commission never expressly said that the rule forbids broadband providers from granting preferred status or services to edge providers who pay for such benefits, it warned that "as a general matter, it is unlikely that pay for priority would satisfy the 'no unreasonable discrimination' standard." *Id.* at 17947 ¶ 76. Declining to impose the same anti-discrimination requirement on mobile providers, the Commission explained that differential treatment of such providers was warranted because the mobile broadband market was more competitive and more rapidly evolving than the fixed broadband market, network speeds and penetration were lower, and operational constraints were higher. See *id.* at 17956-57 ¶¶ 94-95.

As authority for the adoption of these rules, the Commission invoked a plethora of statutory provisions. See *id.* at 17966-81 ¶¶ 115-37. In particular, the Commission relied on section 706 of the 1996 Telecommunications Act, which directs it to encourage the deployment of broadband telecommunications capability. See 47 U.S.C. § 1302(a), (b). According to the Commission, the rules furthered this statutory mandate by preserving unhindered the "virtuous circle of innovation" that had long driven the growth of the Internet. *Open Internet Order,* 25 F.C.C.R. at 17910-11 ¶ 14; see *id.* at 17968, 17972 ¶¶ 117, 123. Internet openness, it reasoned, spurs investment and development by edge providers, which leads to increased end-user demand for broadband access, which leads to increased investment in broadband network infrastructure and technologies, which in turn leads to further innovation and development by edge providers. *Id.* at 17910-11 ¶ 14. If, the Commission continued, broadband providers were to disrupt this "virtuous circle" by "[r]estricting edge providers' ability to reach end users, and limiting end users' ability to choose which edge providers to patronize," they would "reduce the rate of innovation at the edge and, in turn, the likely rate of improvements to network infrastructure." *Id.* at 17911 ¶ 14. ***

II.

The Commission cites numerous statutory provisions it claims grant it the power to promulgate the *Open Internet Order* rules. But we start and end our analysis with section 706 of the 1996 Telecommunications Act, which, as we shall explain, furnishes the Commission with the requisite affirmative authority to adopt the regulations.

Section 706(a) provides:

> The Commission and each State commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment.

47 U.S.C. § 1302(a). Section 706(b), in turn, requires the Commission to conduct a regular inquiry "concerning the availability of advanced telecommunications capability." *Id.* § 1302(b). It further provides that should the Commission find that "advanced telecommunications capability is [not] being deployed to all Americans in a reasonable and timely fashion," it "shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market." *Id.* The statute defines "advanced telecommunications capability" to include "broadband telecommunications capability."*Id.* § 1302(d)(1).

Verizon contends that neither subsection (a) nor (b) of section 706 confers any regulatory authority on the Commission. *** The question, then, is this: Does the Commission's current understanding of section 706(a) as a grant of regulatory authority represent a reasonable interpretation of an ambiguous statute? We believe it does. ***

Section 706(b) has a less tortured history. *** Contrary to Verizon's arguments, we believe the Commission has reasonably interpreted section 706(b) to empower it to take steps to accelerate broadband deployment if and when it determines that such deployment is not "reasonable and timely." **

Verizon *** argues that the *Open Internet Order* regulations will not, as the Commission claims, meaningfully promote broadband deployment, and that even if they do advance this goal, the manner in which they do so is too attenuated from this statutory purpose to fall within the scope of authority granted by either statutory provision.

*** The rules not only apply directly to broadband providers, the precise entities to which section 706 authority to encourage broadband deployment presumably extends, but also seek to promote the very goal that Congress explicitly sought to promote. Because the rules advance this statutory goal of broadband deployment by first promoting edge-provider innovations and end-user demand, Verizon derides the Commission's justification as a "triple-cushion shot." Verizon's Br. 28. ***

To begin with, the Commission has more than adequately supported and explained its conclusion that edge-provider innovation leads to the expansion and improvement of broadband infrastructure. The Internet, the Commission observed in the *Open Internet Order,* is, "[l]ike electricity and the computer," a "'general purpose technology' that enables new methods of production that have a major impact on the entire economy."*Open Internet Order,* 25 F.C.C.R. at 17909 ¶ 13. Certain innovations—the lightbulb, for example—create a need for infrastructure investment, such as in power generation facilities and distribution lines, that complement and further drive the development of the initial innovation and ultimately the growth of the economy as a whole. The rise of streaming online video is perhaps the best and clearest example the Commission used to illustrate that the Internet constitutes one such technology: higher-speed residential Internet connections in the late 1990s "stimulated" the development of streaming video, a service that requires particularly high bandwidth, "which in turn encouraged broadband providers to increase network speeds." *Open Internet Order,* 25 F.C.C.R. at 17911 ¶ 14 n. 23. The Commission's emphasis on this connection between edge-provider innovation and infrastructure development is uncontroversial. ***

The Commission's finding that Internet openness fosters the edge-provider innovation that drives this "virtuous cycle" was likewise reasonable and grounded in substantial evidence. Continued innovation at the edge, the Commission explained, "depends upon low barriers to innovation and entry by edge providers," and thus restrictions on edge providers' "ability to reach end users ... reduce the rate of innovation." *Open Internet Order,* 25 F.C.C.R. at 17911 ¶ 14. *** For one prominent illustration of the relationship between openness and innovation, the Commission cited the invention of the World Wide Web itself by Sir Tim Berners-Lee, who, although not working for an entity that operated the underlying network, was able to create and disseminate this enormously successful innovation without needing to make any changes to previously developed Internet protocols or securing "any approval from network operators." *Open Internet Order,* 25 F.C.C.R. at 17910 ¶ 13 (citing, *inter alia,*TIM BERNERS-LEE, WEAVING THE WEB 16 (2000)). It also highlighted the comments of Google and Vonage—both innovative edge providers—who emphasized the importance of the Internet's open design to permitting new content and services to develop at the edge. ***

Equally important, the Commission has adequately supported and explained its conclusion that, absent rules such as those set forth in the *Open Internet Order,* broadband providers represent a threat to Internet openness and could act in ways that would ultimately inhibit the speed and extent of future broadband deployment. First, nothing in the record gives us any reason to doubt the Commission's determination that broadband providers may be motivated to discriminate against and among edge providers. The Commission observed that broadband providers—often the same entities that furnish end users with telephone and television services—"have incentives to interfere with the operation of third-party Internet-based services that compete with the providers' revenue-generating telephone and/or pay-television services." *Open Internet Order,* 25 F.C.C.R. at 17916 ¶ 22. As the Commission noted, Voice-over-Internet-Protocol (VoIP) services such as Vonage increasingly serve as substitutes for traditional telephone services, *id.,* and broadband providers like AT&T and Time Warner have acknowledged that online video aggregators such as Netflix and Hulu compete directly with their own "core video subscription service," *id.* at 17917 ¶ 22 & n. 54. Broadband providers also have powerful incentives to accept fees from edge providers, either in return for excluding their competitors or for granting them prioritized access to end users. See *id.* at 17918-19 ¶¶ 23-24. Indeed, at oral argument Verizon's counsel announced that "but for [the *Open Internet Order*] rules we would be exploring those commercial arrangements." Oral Arg. Tr. 31. And although broadband providers might not adopt pay-for-priority agreements or other similar arrangements if, according to the Commission's analysis, such agreements would ultimately lead to a decrease in end-user demand for broadband, the Commission explained that the resultant harms to innovation and demand will largely constitute "negative externalities": any given broadband provider will "receive the benefits of … fees but [is] unlikely to fully account for the detrimental impact on edge providers' ability and incentive to innovate and invest." *Open Internet Order,* 25 F.C.C.R. at 17919-20 ¶ 25 & n. 68. ***

Moreover, as the Commission found, broadband providers have the technical and economic ability to impose such restrictions. Verizon does not seriously contend otherwise. ***

To be sure, if end users could immediately respond to any given broadband provider's attempt to impose restrictions on edge providers by switching broadband providers, this gatekeeper power might well disappear. *** For example, a broadband provider like Comcast would be unable to threaten Netflix that it would slow Netflix traffic if all Comcast subscribers would then immediately switch to a competing broadband provider. But we see no basis for questioning the Commission's conclusion that end users are unlikely to react in this fashion. According to the Commission, "end users may not know whether charges or service levels their broadband provider is imposing on edge providers vary from those of alternative broadband providers, and even if they do have this information may find it costly to switch." *Id.* at 17921 ¶ 27. ***

Furthermore, the Commission established that the threat that broadband providers would utilize their gatekeeper ability to restrict edge-provider traffic is not, as the Commission put it, "merely theoretical." *Open Internet Order,* 25 F.C.C.R. at 17925 ¶ 35. In support of its conclusion that broadband providers could and would act to limit Internet openness, the Commission pointed to four prior instances in which they had done just that. These involved a mobile broadband provider blocking online payment services after entering into a contract with a competing service; a mobile broadband provider restricting the availability of competing VoIP and streaming video services; a fixed broadband provider blocking VoIP applications; and, of course, Comcast's impairment of peer-to-peer file sharing that was the subject of the *Comcast Order.* ***

Finally, Verizon argues that the *Open Internet Order* rules will necessarily have the opposite of their intended effect because they will "harm innovation and deter investment by increasing costs, foreclosing potential revenue streams, and restricting providers' ability to meet consumers' evolving needs." Verizon's Br. 52. In essence, Verizon believes that any stimulus to edge-provider innovation, as well as any consequent demand for broadband infrastructure, produced by the *Open Internet Order* will be outweighed by the diminished incentives for broadband infrastructure investment caused by the new limitations on business models broadband providers may employ to reap a return on their investment. ***

The record, however, also contains much evidence supporting the Commission's conclusion that, "[b]y comparison to the benefits of [its] prophylactic measures, the costs associated with the open Internet rules ... are likely small." *Open Internet Order,*25 F.C.C.R. at 17928 ¶ 39. This is, in other words, one of those cases—quite frequent in this circuit—where "the available data do[] not settle a regulatory issue and the agency must then exercise its judgment in moving from the facts and probabilities on the record to a policy conclusion." *State Farm,* 463 U.S. at 52. Here the Commission reached its "policy conclusion" by emphasizing, among other things, (1) the absence of evidence that similar restrictions of broadband providers had discouraged infrastructure investment, and (2) the strength of the effect on broadband investment that it anticipated from edge-provider innovation, which would benefit both from the preservation of the "virtuous circle of innovation" created by the Internet's openness and the increased certainty in that openness engendered by the Commission's rules. *Open Internet Order,* at 17928-31 ¶¶ 40-42. In so doing, the Commission has offered "a rational connection between the facts found and the choice made," *State Farm,* 463 U.S. at 52 (internal quotation marks omitted), and Verizon has given us no persuasive reason to question that judgment.

III.

Even though section 706 grants the Commission authority to promote broadband deployment by regulating how broadband providers treat edge providers, the Commission may not, as it recognizes, utilize that power in a manner that contravenes any specific prohibition contained in the Communications Act. According to Verizon, the Commission has done just that because the anti-discrimination and anti-blocking rules "subject[] broadband Internet access service ... to common carriage regulation, a result expressly prohibited by the Act." Verizon's Br. 14.

We think it obvious that the Commission would violate the Communications Act were it to regulate broadband providers as common carriers. Given the Commission's still-binding decision to classify broadband providers not as providers of "telecommunications services" but instead as providers of "information services," see *supra* at 630-31, such treatment would run afoul of section 153(51): "A telecommunications carrier shall be treated as a common carrier under this [Act] only to the extent that it is engaged in providing telecommunications services." 47 U.S.C. § 153(51). Likewise, because the Commission has classified mobile broadband service as a "private" mobile service, and not a "commercial" mobile service, see *Wireless Broadband Order,* 22 F.C.C.R. at 5921 ¶ 56, treatment of mobile broadband providers as common carriers would violate section 332: "A person engaged in the provision of a service that is a private mobile service shall not, insofar as such person is so engaged, be treated as a common carrier for any purpose under this [Act]." 47 U.S.C. § 332(c)(2); see *Cellco,* 700 F.3d at 538 ("[M]obile-data providers are statutorily immune, perhaps twice over, from treatment as common carriers."). ***

A.

Offering little guidance as to the meaning of the term "common carrier," the Communications Act defines that phrase, somewhat circularly, as "any person engaged as a common carrier for hire." 47 U.S.C. § 153(11). Courts and the Commission have therefore resorted to the common law to come up with a satisfactory definition. See *FCC v. Midwest Video Corp.*, 440 U.S. 689, 701 n. 10 (1979) ("*Midwest Video II*").

In the Nineteenth Century, American courts began imposing certain obligations—conceptually derived from the traditional legal duties of innkeepers, ferrymen, and others who served the public—on companies in the transportation and communications industries. See *Cellco,* 700 F.3d at 545. As the Supreme Court explained in *Interstate Commerce Commission v. Baltimore & Ohio Railroad Co.*, 145 U.S. 263, 275 (1892), "the principles of the common law applicable to common carriers... demanded little more than that they should carry for all persons who applied, in the order in which the goods were delivered at the particular station, and that their charges for transportation should be reasonable." Congress subsequently codified these duties, first in the 1887 Interstate Commerce Act, ch. 104, 24 Stat. 379, then the Manns-Elkins Act of 1910, ch. 309, 36 Stat. 539, and, most relevant here, the Communications Act of 1934, ch. 652, 48 Stat. 1064.

Although the nature and scope of the duties imposed on common carriers have evolved over the last century, the core of the common law concept of common carriage has remained intact. In *National Association of Regulatory Utility Commissioners v. FCC*, 525 F.2d 630, 642 (D.C. Cir. 1976) ("*NARUC I*"), we identified the basic characteristic that distinguishes common carriers from "private" carriers—i.e., entities that are not common carriers—as "[t]he common law requirement of holding oneself out to serve the public indiscriminately." "[A] carrier will not be a common carrier," we further explained, "where its practice is to make individualized decisions, in particular cases, whether and on what terms to deal." *Id.* at 641. Similarly, in *National Association of Regulatory Utility Commissioners v. FCC*, 533 F.2d 601, 608 (1976) ("*NARUC II*"), we concluded that "the primary *sine qua non* of common carrier status is a quasi-public character, which arises out of the undertaking to carry for all people indifferently." (Internal quotation marks omitted).

For our purposes, perhaps the seminal case applying this notion of common carriage is *Midwest Video II.* At issue in *Midwest Video II* was a set of regulations compelling cable television systems to operate a minimum number of channels and to hold certain channels open for specific users. 440 U.S. at 692-93. *** [T]he Supreme Court held that the Commission had no power to regulate cable operators in this fashion. ***

In *Cellco,* we recently confronted the similar question of whether a Commission regulation compelling mobile telephone companies to offer data roaming agreements to one another on "commercially reasonable" terms impermissibly regulated these providers as common carriers. 700 F.3d at 537. *** [W]e concluded that the data roaming rule imposed no *per se*common carriage requirements because it left "substantial room for individualized bargaining and discrimination in terms." *Cellco*, 700 F.3d at 548. ***

B.

The Commission's explanation in the *Open Internet Order* for why the regulations do not constitute common carrier obligations and its defense of those regulations here largely rest on its belief that, with respect to edge providers, broadband providers are not "carriers" at all. Stating that an entity is not a common carrier if it may decide on an individualized basis "'whether and on what terms to deal' with potential *customers,*" the Commission asserted in the *Order* that "[t]he customers at issue here are the end users who subscribe to broadband Internet access services." *Open Internet Order,* 25 F.C.C.R. at 17950-51 ¶ 79 (quoting *NARUC I,* 525 F.2d at 641) (emphasis added). It explained that because broadband providers would remain able to make "individualized decisions" in determining on what terms to deal with end users, the*Order* permitted the providers the "flexibility to customize service arrangements for a particular customer [that] is the hallmark of private carriage." *Id.* at 17951 ¶ 79. Here, the Commission reiterates that "as long as [a broadband provider] is not required to serve end users indiscriminately, rules regarding blocking or charging edge providers do not create common carriage." Commission's Br. 61. We disagree.

It is true, generally speaking, that the "customers" of broadband providers are end users. But that hardly means that broadband providers could not also be carriers with respect to edge providers. "Since it is clearly possible for a given entity to carry on many types of activities, it is at least logical to conclude that one may be a common carrier with regard to some activities but not others." *NARUC II,* 533 F.2d at 608. Because broadband providers furnish a service to edge providers, thus undoubtedly functioning as edge providers' "carriers," the obligations that the Commission imposes on broadband providers may well constitute common carriage *per se* regardless of whether edge providers are broadband providers' principal customers. This is true whatever the nature of the preexisting commercial relationship between broadband providers and edge providers. In contending otherwise, the Commission appears to misunderstand the nature of the inquiry in which we must engage. The question is not whether, absent the *Open Internet Order,* broadband providers would or did act as common carriers with respect to edge providers; rather, the question is whether, given the rules imposed by the *Open Internet Order,* broadband providers are *now* obligated to act as common carriers. See *Midwest Video II,* 440 U.S. at 701-02.

In support of its understanding of common carriage, the Commission first invokes section 201(a), which provides that it is the "duty of every common carrier ... to furnish ... communication service upon reasonable request therefor." 47 U.S.C. § 201(a). No one disputes that a broadband provider's transmission of edge-provider traffic to its end-user subscribers represents a valuable service: an edge provider like Amazon wants and needs a broadband provider like Comcast to permit its subscribers to use Amazon.com. According to the Commission, however, because edge providers generally do not "request" service from broadband providers, and may have no direct relationship with end users' local access providers, broadband providers cannot be common carriers with respect to such edge providers. But section 201(a) describes a "duty" of a common carrier, not a prerequisite for qualifying as a common carrier in the first place. More important, the *Open Internet Order* imposes this very duty on broadband providers: given the *Open Internet Order*'s anti-blocking and anti-discrimination requirements, *if* Amazon were now to make a request for service, Comcast *must* comply. That is, Comcast must now "furnish... communication service upon reasonable request therefor." 47 U.S.C. § 201(a).

Similarly flawed is the Commission's argument that because the Communications Act defines a "common carrier" as a "common carrier *for hire,*" 47 U.S.C. § 153(11) (emphasis added), a common carrier relationship may exist only with respect to those customers who purchase service from the carrier. As Verizon aptly puts it in response, the fact that "broadband providers... generally have not charged edge providers for access or offered them differentiated services ... has no legal significance because the avowed purpose of the rules is to deny providers the discretion to do so now and in the future." Verizon's Reply Br. 5 n. 3. In other words, but for the *Open Internet Order,* broadband providers could freely impose conditions on the nature and quality of the service they furnish edge providers, potentially turning certain edge providers—currently able to "hire" their service for free—into paying customers. The Commission may not claim that the *Open Internet Order* imposes no common carrier obligations simply because it compels an entity to continue furnishing service at no cost.

Likewise, the Commission misses the point when it contends that because the Communications Act "imposes non-discrimination requirements on many entities that are not common carriers," the *Order's* requirements cannot "transform[] providers into common carriers." Commission's Br. 66-67. In support, the Commission cites 47 U.S.C. § 315(b), which requires that broadcasters charge political candidates nondiscriminatory rates if broadcasters permit them to use their stations, as well as 47 U.S.C. § 548(c)(2)(B), which prohibits satellite programming vendors owned in part or in whole by a cable operator from discriminating against other cable operators in the delivery of programming. Commission's Br. 66-67. But Congress has no statutory obligation to avoid imposing common carrier obligations on those who might not otherwise operate as common carriers, and thus the extent to which the cited provisions might regulate those entities as such is irrelevant. The Commission, on the other hand, has such an obligation with respect to entities it has classified as statutorily exempt from common carrier treatment, and the issue here is whether it has nonetheless "relegated [those entities], *pro tanto,* to common-carrier status." *Midwest Video II*, 440 U.S. at 700-01.

In these respects, *Midwest Video II* is indistinguishable. *** The regulations here accomplish the very same sort of transfer of control: whereas previously broadband providers could have blocked or discriminated against the content of certain edge providers, they must now carry the content those edge providers desire to transmit.

The only remaining question, then, is whether the *Open Internet Order*'s rules have so limited broadband providers' control over edge providers' transmissions that the regulations constitute common carriage *per se.* It is to that question that we now turn.

C.

We have little hesitation in concluding that the anti-discrimination obligation imposed on fixed broadband providers has "relegated [those providers], *pro tanto,* to common carrier status." *Midwest Video II*, 440 U.S. at 700-01. In requiring broadband providers to serve all edge providers without "unreasonable discrimination," this rule by its very terms compels those providers to hold themselves out "to serve the public indiscriminately." *NARUC I,* 525 F.2d at 642.

Having relied almost entirely on the flawed argument that broadband providers are not carriers with respect to edge providers, the Commission offers little response on this point. *** Significantly for our purposes, the Commission never argues that the *Open Internet Order*'s "no unreasonable discrimination" standard somehow differs from the nondiscrimination standard applied to common carriers generally—the argument that salvaged the data roaming requirements in *Cellco.* In a footnote in the *Order* itself, the Commission suggested that it viewed the rule's allowance for "reasonable network management" as establishing treatment that was somehow inconsistent with *per se* common carriage. See *Open Internet Order,* 25 F.C.C.R. at 17951 ¶ 79 n. 251. But the Commission has forfeited this argument by failing to raise it in its briefs here.

In any event, the argument is without merit. The *Order* defines the "reasonable network management" concept as follows: "A network management practice is reasonable if it is appropriate and tailored to achieving a legitimate network management purpose, taking into account the particular network architecture and technology of the broadband Internet access service." *Open Internet Order,* 25 F.C.C.R. at 17952 ¶ 82. This provision, the Commission explained, would permit broadband providers to do two things, neither of which conflict with *per se* common carriage. First, "the reasonable network management" exception would permit broadband providers to "address[] traffic that is unwanted by end users ... such as by providing services or capabilities consistent with an end user's choices regarding parental controls or security capabilities." *Id.* Because the relevant service broadband providers furnish to edge providers is the ability to access end users if those end users so desire, a limited exception permitting *end users* to direct broadband providers to block certain traffic by no means detracts from the common carrier nature of the obligations imposed on broadband providers. Second, the *Order* defines "reasonable network management" to include practices designed to protect the network itself by "addressing traffic that is harmful to the network" and "reducing or mitigating the effects of congestion." *Id.* at 17952 ¶ 82. As Verizon correctly points out, however, this allowance "merely preserves a common carrier's traditional right to 'turn[] away [business] either because it is not of the type normally accepted or because the carrier's capacity has been exhausted.'" Verizon's Br. 20 (quoting *NARUC I,* 525 F.2d at 641). Railroads have no obligation to allow passengers to carry bombs on board, nor need they permit passengers to stand in the aisles if all seats are taken. It is for this reason that the Communications Act bars common carriers from engaging in "*unjust or unreasonable* discrimination," not *all* discrimination. 47 U.S.C. § 202 (emphasis added).

The Commission has provided no basis for concluding that in permitting "reasonable" network management, and in prohibiting merely "unreasonable" discrimination, the*Order's* standard of "reasonableness" might be more permissive than the quintessential common carrier standard. See *Cellco,* 700 F.3d at 548 (characterizing the "just and reasonable" standard as being that "applicable to common carriers"). To the extent any ambiguity exists regarding how the Commission will apply these rules in practice, we think it is best characterized as ambiguity as to *how* the common carrier reasonableness standard applies in this context, not *whether* the standard applied is actually the same as the common carrier standard. Unlike the data roaming requirement at issue in *Cellco,* which set forth a "commercially reasonable" standard, see *id.* at 537, the language of the *Open Internet Order*'s anti-discrimination rule mirrors, almost precisely, section 202's language establishing the basic common carrier obligation not to "make any unjust or unreasonable discrimination." 47 U.S.C. § 202. Indeed, confirming that the two standards are equivalent, the Commission responded to commenters who argued that the "no unreasonable discrimination" requirement was too vague by quoting another commenter who observed that "[s]eventy-five years of experience have shown [the 'unreasonable' qualifier in Section 202] to be both administrable and indispensable to the sound administration of the nation's telecommunications laws." *Open Internet Order,* 25 F.C.C.R. at 17949 ¶ 77 n. 240. Moreover, unlike the data roaming rule in *Cellco*—which spelled out "sixteen different factors plus a catchall ... that the Commission must take into account in evaluating whether a proffered roaming agreement is commercially reasonable," thus building into the standard "considerable flexibility," *Cellco*, 700 F.3d at 548—the *Open Internet Order* makes no attempt to ensure that its reasonableness standard remains flexible. Instead, with respect to broadband providers' potential negotiations with edge providers, the *Order* ominously declares: "it is unlikely that pay for priority would satisfy the 'no unreasonable discrimination' standard." *Open Internet Order,* 25 F.C.C.R. at 17947 ¶ 76. If the Commission will likely bar broadband providers from charging edge providers for using their service, thus forcing them to sell this service to all who ask at a price of $0, we see no room at all for "individualized bargaining." *Cellco*, 700 F.3d at 548.

Whether the *Open Internet Order's* anti-blocking rules, applicable to both fixed and mobile broadband providers, likewise establish *per se* common carrier obligations is somewhat less clear. According to Verizon, they do because they deny "broadband providers discretion in deciding which traffic from ... edge providers to carry," and deny them "discretion over carriage terms by setting a uniform price of zero." Verizon's Br. 16-17. This argument has some appeal. The anti-blocking rules establish a minimum level of service that broadband providers must furnish to all edge providers: edge providers' "content, applications [and] services" must be "effectively []usable." *Open Internet Order,* 25 F.C.C.R. at 17943 ¶ 66. The *Order* also expressly prohibits broadband providers from charging edge providers any fees for this minimum level of service. *Id.* at 17943-44 ¶ 67. In requiring that all edge providers receive this minimum level of access for free, these rules would appear on their face to impose *per se* common carrier obligations with respect to that minimum level of service.

At oral argument, however, Commission counsel asserted that "[i]t's not common carriage to simply have a basic level of required service if you can negotiate different levels with different people." Oral Arg. Tr. 86. This contention rests on the fact that under the anti-blocking rules broadband providers have no obligation to actually provide any edge provider with the minimum service necessary to satisfy the rules. If, for example, all edge providers' "content, applications [and] services" are "effectively usable," *Open Internet Order,* 25 F.C.C.R. at 17943 ¶ 66, at download speeds of, say, three mbps, a broadband provider like Verizon could deliver all edge providers' traffic at speeds of at least four mbps. Viewed this way, the relevant "carriage" broadband providers furnish might be access to end users more generally, not the minimum required service. In delivering this service, so defined, the anti-blocking rules would permit broadband providers to distinguish somewhat among edge providers, just as Commission counsel contended at oral argument. For example, Verizon might, consistent with the antiblocking rule—and again, absent the antidiscrimination rule—charge an edge provider like Netflix for high-speed, priority access while limiting all other edge providers to a more standard service. In theory, moreover, not only could Verizon negotiate separate agreements with each individual edge provider regarding the level of service provided, but it could also charge similarly-situated edge providers completely different prices for the same service. Thus, if the relevant service that broadband providers furnish is access to their subscribers generally, as opposed to access to their subscribers at the specific minimum speed necessary to satisfy the antiblocking rules, then these rules, while perhaps establishing a lower limit on the forms that broadband providers' arrangements with edge providers could take, might nonetheless leave sufficient "room for individualized bargaining and discrimination in terms" so as not to run afoul of the statutory prohibitions on common carrier treatment. *Cellco*, 700 F.3d at 548.

Whatever the merits of this view, the Commission advanced nothing like it either in the underlying *Order* or in its briefs before this court. Instead, it makes no distinction at all between the anti-discrimination and anti-blocking rules, seeking to justify both types of rules with explanations that, as we have explained, are patently insufficient. ***

The disclosure rules are another matter. Verizon does not contend that these rules, on their own, constitute *per se* common carrier obligations, nor do we see any way in which they would. Also, because Verizon does not direct its First Amendment or Takings Clause claims against the disclosure obligations, we have no need to address those contentions here. ***

IV.

For the forgoing reasons, although we reject Verizon's challenge to the *Open Internet Order*'s disclosure rules, we vacate both the anti-discrimination and the anti-blocking rules. We remand the case to the Commission for further proceedings consistent with this opinion.

*So ordered.*

SILBERMAN, Senior Circuit Judge, concurring in part and dissenting in part: *** I quite agree with the majority that the relevant statutory language is § 706 of the Communications Act. 47 U.S.C. § 1302. *** To sum up, § 706 requires the Commission to identify a "barrier[] to infrastructure investment" or a measure that "promote[s] competition" in the *broadband* market—which it has not. ***

Verizon alternatively argue that, even assuming that § 706 grants the Commission its claimed authority, the regulation is arbitrary and capricious because its findings—such as they are—lack substantial evidence. I agree. ***

The Commission purports to fear that broadband providers might discriminate against, or even block, the Internet traffic of specific edge providers or classes of edge providers, perhaps because broadband providers offer some competing services or because they might charge certain edge providers for premium services. *** That a party "may" do something is hardly a finding—at least in American law—that a party has done or will do something. Moreover, whether or not the "triple cushion shot" theory is rational economics (and I have my doubts), it rests, as I have noted, on a false factual premise—that the evidence supports a finding that broadband providers across the board, in all markets, enjoy sufficient economic clout to take the above actions.

The Commission asserts—and the majority accepts—that broadband providers act as "gatekeepers" because each one has a so-called "terminating monopoly" over access to particular end users. These are terms, largely invented, the economic significance of which the Commission does not explain. All retail stores, for instance, are "gatekeepers." The term is thus meaningful only insofar as the gatekeeper by means of a powerful economic position vis-a-vis consumers gains leverage over suppliers. The Commission made no effort to construct an analytic framework to measure this supposed gateway advantage—it is a rather slippery concept—nor did it adduce evidence to establish the economic power it would supposedly afford all broadband providers against all edge providers.

Without broadband provider market power, consumers, of course, have options; they can go to another broadband provider if they want to reach particular edge providers or if their connections to particular edge providers have been degraded. The Commission implicitly recognizes this, because it justifies exempting dial-up Internet providers from the *Order* by noting that "telephone service has historically provided the easy ability to switch among competing dial-up Internet access services." 25 F.C.C.R. at 17935 ¶ 51. The Commission also exempts "backbone" Internet providers—which interconnect between broadband providers—obviously for the same reason. On the other hand, the Commission asserts that broadband customers may have few alternatives or they may be locked into long-term contracts with early-termination fees. To be sure, some difficulty switching broadband providers is certainly a factor that might contribute to a firm's having market power, but that itself is not market power. There are many industries in which switching between competitors is not instantly achieved, but those industries may still be heavily disciplined by competitive forces because consumers will switch unless there are real barriers. By pointing to potential difficulties consumers may encounter switching broadband providers, the Commission is simply implying that broadband providers have market power (market power lite?), without actually examining if and where they do. ***

The majority does contend that four possible instances of broadband providers restricting users' access to certain edge providers are sufficient evidence of broadband providers' "incentives and ability to restrict Internet traffic." Majority Op. at 649. That the Commission was able to locate only four potential examples of such conduct is, frankly, astonishing. In such a large industry where, as Verizon notes, billions of connections are formed between users and edge providers each year, one would think there should be ample examples of just about any type of conduct. But even if examples of such conduct were more numerous, it would still not be evidence that broadband providers are economically capable of restricting consumer choice. And, as the Commission noted, there are potentially efficient, pro-consumer reasons that an individual broadband provider might wish to restrict access to some edge providers. The Commission's anecdotes then do not show that any broadband providers are capable of actually causing the harm about which the Commission is concerned.

My view, then, is that the Commission's failure to conduct a market power analysis is fatal to its attempt to regulate, because it means that there is inadequate evidence to support the lynchpin of the Commission's economic theory. The Commission actually recognized that a finding of market power would enhance its theory. 25 F.C.C.R. at 17923 ¶ 32. Indeed! But such a finding would, of course, have to be made market to market (indeed the statute specifically references *local* telecommunications markets), and if so, it would be a finding of a barrier to broadband investment without the mental gymnastics of the triple cushion shot. If one (or two) broadband providers have market power in any particular market and thereby could raise prices while restricting supply, the Commission could well conclude that was a barrier to broadband investment.

Of course, before the Commission could determine whether a particular broadband provider possesses market power, it would have to first define the relevant market. Instead, the Commission, in this case, simply cited a 2009 study that found that "nearly 70 percent of households lived in census tracts where only one or two wireline or fixed wireless firms provided advertised download speeds of at least 3 Mbps and upload speeds of at least 768 Kbps." 25 F.C.C.R. at 17923 ¶ 32. Why are these speeds relevant? Because the Commission has previously, as part of its statutory duty to assess the state of broadband deployment, defined "broadband" to mean download speeds of at least 4 Mbps and upload speeds of at least 1 Mbps. *Sixth Broadband Deployment Report,* 25 F.C.C.R. 9556, 9559 ¶ 5 (2010). According to the Commission, it is the minimum speed necessary to stream high quality video while simultaneously browsing the Internet and using email. *Id.* I don't dispute the legitimacy of that definition. Yet, while the Commission is free to rely on technical considerations in defining the statutory term "broadband," such considerations are irrelevant when it comes to defining the market in economic terms. A broadband provider offering a 2 Mbps connection is not, according to the FCC, really offering broadband. But it is quite likely that consumers, in deciding which Internet service to purchase, will compare products at varying speeds and price points. Slower service providers can still exert competitive pressure on faster service providers. So, too, can mobile broadband providers. Before the Commission can conclude that a market is concentrated, it must first define that market. It has made no effort to do so.

The Commission, moreover, does not address whether the trend in the broadband market is towards more or less competition. Obviously the deployment of broadband infrastructure is a capital-intensive process, and it should not be surprising if, during a period of expansion, some areas are served by fewer competitors than others. But there is no evidence in the record suggesting that broadband providers are carving up territory or avoiding head-to-head competition. At least anecdotally, the opposite seems to be true. Google has now entered the broadband market as a direct competitor *** .

*** The Commission did postulate one other economic theory supposedly establishing a "barrier to infrastructure investment" that does not depend on the broadband providers possessing market power. It argued, essentially, that innovation among edge providers is a public good in that every broadband provider benefits from an open Internet, but each broadband provider has an individual incentive to charge edge providers for service because, if broadband providers were to forego that revenue stream, they would be unable to internalize all of the supposed benefits to innovation. 25 F.C.C.R. at 17919 ¶ 25. In short, the Commission speculates that the *Open Internet Order*prevents a classic "tragedy of the commons"—a situation in which each economic actor, behaving in his own self-interest, contributes to the destruction of a public good. See Garrett Hardin, *The Tragedy of the Commons,* 162 SCIENCE 1243 (1968). In such a situation, each actor would be better off if a central regulator prevented them from doing what would be in their private interest if they were acting unilaterally. Again, however, the Commission fails to make any real economic findings regarding whether these rules are actually necessary to prevent such a situation. As such, it is the sheerest of fanciful speculation.

Indeed, if a tragedy of the commons were likely in the broadband market, then one would expect Verizon and other broadband providers to support the *Open Internet Order,* because such a situation would be economically harmful to them in the long run. By the same token, when firms oppose, on antitrust grounds, the merger of competing firms, it is generally a reliable indicator that the merger is pro-competitive. Firms can generally be relied upon to know their own best interest.

Perhaps most troubling, the Commission fails to appreciate the long-term impact of its own regulations. An unwarranted government interference in a functioning market is likely to persist indefinitely, whereas a failure to intervene, even when regulation would be helpful, is likely to be only temporarily harmful because new innovations are constantly undermining entrenched industrial powers.

Nevertheless, the Commission justifies its aggressive, prophylactic regulation by asserting that the negative consequences of regulation (preserving the status quo) are likely to be minor, while the consequences of allowing the broadband market to evolve without regulation could be drastic and permanent. 25 F.C.C.R. at 17909 ¶ 12. I think this is quite wrong, but in any event, the agency's judgment about the propriety of leaping before looking cannot displace the judgment of Congress which, in enacting § 706, did not so broadly empower the Commission. Rather, Congress required the agency to identify an actual barrier to infrastructure investment or a threat to competition, and the agency must have evidence that the barrier or threat exists. ***

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This regulation essentially provides an economic preference to a politically powerful constituency, a constituency that, as is true of typical rent seekers, wishes protection against market forces. The Commission does not have authority to grant such a favor.

## In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions

FCC, Notice of Proposed Rulemaking, Oct. 2, 2012

Introduction

*** Building off of the National Broadband Plan, the FCC has worked to free up spectrum for wireless broadband use through traditional approaches such as auctions, including clearing and reallocating government spectrum. *** The 2010 National Broadband Plan introduced the idea of incentive auctions as a tool to help meet the Nation's spectrum needs. Incentive auctions are a voluntary, market-based means of repurposing spectrum by encouraging licensees to voluntarily relinquish spectrum usage rights in exchange for a share of the proceeds from an auction of new licenses to use the repurposed spectrum. The incentive auction idea is the latest in a series of world-leading spectrum policies pioneered in the U.S., including unlicensed spectrum uses such as WiFi, Bluetooth, near field communication, and other innovations and the original FCC spectrum auctions in the 1990s. On February 22, 2012, Congress authorized the Commission to conduct incentive auctions, and directed that we use this innovative tool for an incentive auction of broadcast television spectrum.[6]

The purpose of this Notice is to develop a rulemaking record that will enable us to meet the challenges presented by the Spectrum Act's unique grant of authority to the Commission. The broadcast television spectrum incentive auction will be the first such auction ever attempted worldwide. It will be a groundbreaking event for the broadcast television, mobile wireless, and technology sectors of our economy. ***

The incentive auction of broadcast television spectrum will have three major pieces: (1) a "reverse auction" in which broadcast television licensees submit bids to voluntarily relinquish spectrum usage rights in exchange for payments; (2) a reorganization or "repacking" of the broadcast television bands in order to free up a portion of the ultra high frequency (UHF) band for other uses; and (3) a "forward auction" of initial licenses for flexible use of the newly available spectrum. Each of the three pieces presents distinct policy, auction design, implementation and other issues, and the statute in a number of cases imposes specific requirements for each piece. At the same time, all three pieces are interdependent: the amount of spectrum available in the forward auction will depend on reverse auction bids and repacking, winning reverse auction bidders will be paid from the forward auction proceeds, and our repacking methodology will help to determine which reverse auction bids we accept and what channels we assign the broadcast stations that remain on the air. For the incentive auction to succeed, all three pieces must work together.

We seek comment on a variety of different auction design issues, each with its own set of trade-offs. The issues presented by the reverse auction can be divided into the

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[6] *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, §§ 6402, 6403, 125 Stat. 156 (2012) (Spectrum Act).

three broad categories of bid collection, determination of which bids are accepted, and determination of payment amounts to winners. For example, as discussed in detail below, we must determine whether to collect sealed bids or use a multiple round bid collection format such as a descending clock auction.

The determination of winners in the reverse auction depends heavily on the second major piece of the incentive auction of broadcast television spectrum. Repacking involves reorganizing the broadcast television bands so that the television stations that remain on the air after the incentive auction occupy a smaller portion of the UHF band, subject to interference and other constraints imposed by the Spectrum Act and treaties with Canada and Mexico. Repacking will enable us to configure a portion of the UHF band into contiguous blocks of spectrum suitable for flexible use. The repacking methodology we establish will be an essential element in determining which reverse auction bids we accept and the channel assignments of those stations that will continue broadcasting after the incentive auction is completed.

The forward auction will resemble prior competitive bidding systems that the Commission has utilized, but with important differences. Its interdependence with the reverse auction and the repacking mean that we will not know in advance the amount of spectrum we can make available in the forward auction, the specific frequencies that will be available and, perhaps, the geographic locations of such frequencies. Instead of a single band plan with identified frequencies, a set number of spectrum blocks and a uniform set of geographic area licenses, the auction design must provide a framework that is flexible enough to accommodate varying amounts of newly available spectrum in different locations. ***

The discussion that follows begins with an overview of the current UHF band, developments leading to Congress's mandate to conduct the broadcast television spectrum incentive auction, and relevant provisions of the Spectrum Act. We then invite comment on the following issues:

- In the auction design section, we invite comment on auction design choices and the tradeoffs they present. For both the reverse and forward auctions, we invite comment on different procedures to collect bids, determine which bids are accepted, and what each bidder pays or receives in payment. We also seek comment on methodologies for the repacking process, which is part of the process for determining which broadcaster bids will be accepted in the reverse auction. ***
- We interpret the Spectrum Act to limit eligibility to participate in the reverse auction to commercial and noncommercial full power and Class A broadcast television licensees. We also invite comment on whether to establish reverse auction bid options in addition to those identified in the Spectrum Act (to go off the air, to move from a UHF to a VHF television channel, and to share a channel), including bids to voluntarily accept additional interference.

- In the repacking section, we invite comment on how to implement Congress's mandate to make "all reasonable efforts" to preserve the "coverage area and population served" of television stations as of the date of enactment of the Spectrum Act. In particular, we propose to interpret "coverage area" to mean a full power television station's "service area" as defined in section 73.622(e) of the Commission's rules, and we propose several approaches to preserving population served.
- We seek comment on a band plan for reclaimed broadcast television spectrum using 5 megahertz blocks, in which the uplink band would begin at channel 51 (698 MHz) and expand downward toward channel 37 based on the amount of reclaimed spectrum, and the downlink band would begin at channel 36 (608 MHz) and likewise expand downward. We propose establishing 6 megahertz guard bands between mobile broadband use and broadcast use, consistent with the Spectrum Act, and propose to make this spectrum available for unlicensed use. In addition, we seek comment on a number of alternative band plan approaches.
- We invite comment on whether or not to relocate the Radio Astronomy Service and wireless medical telemetry systems now operating on channel 37, and on whether and how to address the post-auction availability of UHF band spectrum for fixed broadcast auxiliary stations, low power auxiliary stations, and unlicensed wireless microphones.
- In the white space and unlicensed operations section, we propose measures that, taken together, would make a substantial amount of spectrum available for unlicensed uses, including a significant portion that would be available on a uniform nationwide basis for the first time. Television white spaces will continue to be available for unlicensed use in the repacked television band. In addition, we propose to make the guard band spectrum in our proposed 600 MHz band plan available for unlicensed use, propose making channel 37 available for such use, and propose making two channels currently designated for wireless microphone use available for white space devices. The measures we propose to promote unlicensed spectrum use are limited by the bounds of our statutory authority.
- In the auction rules section, we propose competitive bidding rules to govern the reverse auction of broadcast television spectrum, and consider changes to our general competitive bidding rules that may be necessary or appropriate to conduct the forward auction of new spectrum licenses for reclaimed broadcast television spectrum.
- We seek comment on how to implement the repacking of broadcast television spectrum and clear the reclaimed spectrum as expeditiously as possible while minimizing disruption to broadcast television stations and their viewers. In particular, we propose streamlined broadcast license modification

> procedures, invite comment on reasonable deadlines for stations to transition to any new channel assignments or cease broadcasting, and propose to allow stations eligible for reimbursement of relocation costs to elect between actual cost-based payments or advance payments based on estimated costs. We also seek comment on what kind of outreach efforts the Commission should undertake in order to ensure an orderly transition and minimize disruptions in service to consumers. Further, we invite comment on a number of post-auction broadcast regulatory issues raised by the incentive auction, as well as on licensing and operating rules for new licenses in the reclaimed spectrum. ***

Background

The broadcast television spectrum incentive auction has the potential to significantly alter the landscape of the broadcast television bands. Therefore, we begin with an overview of the current UHF and VHF bands, including a discussion of broadcast television service and other services that occupy the broadcast television bands. Next, we briefly discuss the development of the Commission's flexible use policy, our competitive bidding authority, and Congress's call for more broadband spectrum. We then summarize the pertinent provisions of the Spectrum Act.

The Current Broadcast Television Bands

The broadcast television bands occupy 294 megahertz of spectrum in five frequency bands that are allocated for broadcasting use. All five bands are allocated principally to broadcast television under Part 73 of the Commission's rules. In addition, the 470-512 MHz band segment (UHF channels 14-20) is allocated for fixed and land mobile services on a co-primary basis with broadcasting.

*Broadcast Television*. Broadcast television stations operate on six-megahertz channels designated 2 to 51. Broadcast television stations provide free video programming that is often highly responsive to the needs and interests of the communities they serve. Among other things, broadcast television stations provide children's educational programming, coverage of community news and events, reasonable access for federal political candidates, closed captioning, and emergency information. A small but significant segment of the Nation's population relies solely on over-the-air broadcast television stations for video programming service.

Although broadcast television continues to be a vital source of local news and information for most Americans, the other offerings in the video programming marketplace have diverted much of broadcast television's over-the-air viewing audience over the years. For example, in 1960 virtually all television households received video programming service by viewing a broadcast television station's over-the-air signal. In contrast, during the 2011-2012 television season, the Nielsen Company estimates that only 10.7 million television households, or approximately 10 percent of the total, rely solely on over-the-air broadcast television service. Nevertheless, 78 percent of Americans say that on a "typical day" they get news from their local broadcast television station (either directly over-the-air, or through cable and satellite services)—more than from newspapers, the Internet, or the radio. Likewise, the three major broadcast network nationwide evening newscasts draw 22 million viewers (either directly over the air, or through cable and satellite services)—five times the number of primetime viewers for the three major cable news networks (CNN, FOX News Channel, and MSNBC). In fact, broadcast content draws such significant viewership that 96 of the top 100 TV shows in the 2011-2012 season originated on broadcast television. In addition, many households that subscribe to other video programming sources rely on over-the-air broadcast signals for some television sets in their homes.

The broadcast television business continues to evolve to keep pace with technological and marketplace changes. Many television broadcasters now pursue a three-screen approach, sharing their programming online and on mobile devices in addition to providing it free over the air. These innovative strategies would not be possible absent the conversion to digital transmission by all full power broadcast television stations, which was completed in June 2009. Among other benefits of the conversion, digital broadcast operations take up less bandwidth than did analog.[22] Due to greater spectrum efficiency, broadcasters can now multicast, providing multiple programming streams on one 6 megahertz channel.[23] Digital broadcast technology also enables broadcasters to offer high definition (HD) television service, Mobile TV, datacasting, and other emerging applications. Among other things, Mobile TV offers the opportunity to enhance the Emergency Alert System, a critical service in the event of natural or man-made disasters.

Not all broadcasters are in a position to take advantage of the opportunities created by the digital transition. For example, as of 2010, roughly 29 percent of commercial broadcast television stations did no multicasting. Only a fraction of broadcasters at this point offer Mobile DTV channels. Those broadcasters that are able to take advantage of these and other opportunities offered by an evolving marketplace have every prospect of continuing successfully to provide the public the benefits of free over-the-air television. For those that cannot, Congress's mandate to conduct a broadcast television spectrum incentive auction creates alternative opportunities. Broadcasters struggling financially and interested in exiting the business entirely, but unable to find a buyer for their facilities, may be able to obtain compensation in an amount acceptable to them by participating in the reverse auction. Their exit from the business would reduce the overall number of broadcast television stations competing for the

[22] As part of the statutorily-mandated transition from analog to digital transmission, 108 megahertz of UHF spectrum at 698-806 MHz was recovered for new uses, including fixed, mobile, and broadcasting, with 24 megahertz of the newly-recovered spectrum set aside for public safety uses.

[23] According to a report from SNL Kagan, based on its analysis of digital TV station programming offerings (including HD programming, multicast channels and mobile television channels), at the end of 2011 the total number of live over-the-air broadcast channels for the 1,726 full-power digital broadcast television stations jumped to 4,552, up 81 percent year over year from the 2,518 delivered at the end of 2010. SNL Kagan, *TV Station Deals Databook* 2012 edition at 6.

same limited pool of advertising revenue. Broadcasters that wish to remain in the business also have an opportunity to strengthen their finances through the cash infusion resulting from a winning reverse auction bid to channel share or to move from a UHF to a VHF channel. ***

Flexible Use Policy, Auctions and Calls for Broadband Spectrum

*** In 1993, Congress authorized the Commission to assign licenses through competitive bidding for the first time. This competitive bidding authority allows the Commission to apply market forces to the assignment of spectrum licenses, helping to ensure that spectrum is put to its most productive use. And as part of the American Recovery and Reinvestment Act of 2009, Congress directed the FCC to develop a "national broadband plan" to ensure that every American has "access to broadband capability."

Incentive auctions are a new aspect of the Commission's efforts to make additional spectrum available for broadband, and are an important part of the spectrum agenda identified in the 2010 National Broadband Plan, which emphasized the indispensable importance of wireless spectrum. As described in the National Broadband Plan, incentive auctions are a voluntary, market-based means of repurposing spectrum by encouraging licensees to voluntarily relinquish spectrum usage rights in exchange for a share of the proceeds from an auction of new licenses to use the repurposed spectrum.

Congress passed the Spectrum Act in early 2012, authorized the Commission to conduct incentive auctions to help meet the increasing demand for spectrum to provide highly valued wireless broadband services, and directed that certain proceeds from the incentive auction must be deposited in the Public Safety Trust Fund to fund a national first responder network, state and local public safety grants, public safety research, and national deficit reduction. The Commission is now moving forward to do so.

The Spectrum Act of 2012

Title VI of the Middle Class Tax Relief and Job Creation Act of 2012, commonly known as the Spectrum Act, addresses public safety communications and electromagnetic spectrum auctions. Section 6402, codified at 47 U.S.C. § 309(j)(8)(G), authorizes the Commission to conduct incentive auctions in which licensees may voluntarily relinquish their spectrum usage rights in order to permit the assignment by auction of new initial licenses subject to flexible use service rules, in exchange for a portion of the resulting auction proceeds. Section 6403 of the Spectrum Act, which is not codified in the Communications Act, requires the Commission to conduct an incentive auction of the broadcast television spectrum and includes specific requirements and safeguards for the required auction.

Section 6403(a) describes the reverse auction to determine the amount of compensation that each broadcast television licensee would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights. Pursuant to that provision, broadcast television licensees may bid in the reverse auction to indicate the amount of compensation that they would accept to relinquish different spectrum usage rights, including the following: (A) "all usage rights with respect to a particular television channel without receiving in return any usage rights with respect to another television channel"; (B) "all usage rights with respect to [a UHF] television channel in return for receiving usage rights with respect to a [VHF] television channel"; or (C) "usage rights in order to share a television channel with another licensee." The amount of the proceeds shared under section 309(j)(8)(G)(i) with each licensee whose bid the Commission accepts may not be less than the amount of the bid. The FCC must "take all reasonable steps necessary to protect the confidentiality of Commission-held data of a licensee participating in the reverse auction," including "withholding the identity of such licensee" until any reassignments and reallocations become effective. Section 6403(a) also protects the carriage rights of broadcasters that participate in the reverse auction, providing that a participating broadcast television licensee that voluntarily relinquishes spectrum usage rights in order to share a television channel, and that previously possessed carriage rights, shall have at its shared location the same carriage rights that it would have at that location if it were not sharing a channel.

Section 6403(b) of the Spectrum Act provides for reorganization of the broadcast television spectrum in conjunction with the incentive auction. Specifically, section 6403(b) directs the Commission to evaluate the broadcast television spectrum, including the spectrum made available through the required reverse auction, and authorizes the FCC, subject to international coordination along the border with Mexico and Canada, to "make such reassignments of television channels as the Commission considers appropriate," and to "reallocate such portions of such spectrum as the Commission determines are available for reallocation." The right of a licensee to protest a proposed order of modification of its license under 47 U.S.C. § 316 does not apply in the case of a modification made under section 6403.

Section 6403 also sets forth limitations for the Commission as it reorganizes or "repacks" broadcast television spectrum. In making any reassignments or reallocations under section 6403(b), "the Commission shall make all reasonable efforts to preserve, as of the date of the enactment of this Act, the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69 of the Office of Engineering and Technology of the Commission." In addition, the Commission may not involuntarily reassign a broadcast television licensee from a UHF to a VHF channel or from a high VHF (174 to 216 MHz) to a low VHF (54 to 88 MHz) channel. Further, during a prescribed period, the Commission may not involuntarily modify a broadcast television licensee's spectrum usage rights or reassign it to another television channel except "(i) in accordance with [section 6403]; or (ii) in the case of a violation by a licensee of the terms of its license or a specific provision of a statute administered by the Commission, or a regulation of the Commission promulgated under any such provision."

These limitations potentially restrict the amount of spectrum that may be freed up for mobile broadband use.

In addition to imposing limits on the FCC's authority to reorganize the broadcast spectrum, section 6403(b) requires that the Commission "reimburse costs reasonably incurred by" broadcast television licensees that are reassigned to new channels, as well as multichannel video programming distributors (MVPDs) that incur costs in order to carry the signals of such reassigned licensees. The reimbursements are for the costs of relocating television service from one channel to the other, not for lost revenues. The maximum amount that may be available for reimbursements is $1.75 billion. The FCC must make any reimbursements within three years of completing the forward auction.

Section 6403(c) directs the Commission to conduct a forward auction in which it assigns licenses for the flexible use of the reallocated broadcast television spectrum. No licenses may be assigned, and no reassignments or reallocations of broadcast television spectrum may become effective, unless the proceeds of the forward auction exceed the sum of (1) the total amount of compensation that the FCC must pay successful reverse auction bidders, (2) the estimated relocation costs the FCC must reimburse, and (3) the costs of conducting the broadcast television spectrum incentive auction. In conducting the forward auction, "the Commission shall consider assigning licenses that cover geographic areas of a variety of different sizes."

The Commission may conduct the reverse auction under section 6403(a), any reassignments or reallocations under section 6403(b), and the forward auction under section 6403(c) at the same time. In addition to the financial requirements noted above, the Spectrum Act directs that no reassignments or reallocations may become effective until the completion of the reverse auction and the forward auction, "and to the extent practicable all such reassignments and reallocations shall become effective simultaneously." The Spectrum Act also designates that certain proceeds from the incentive auction must be deposited in the Public Safety Trust Fund established by section 6413. The Commission may not conduct the reverse auction under section 6403(a) or the forward auction under section 6403(c) after the end of fiscal year 2022. In addition, the Commission may not complete more than one reverse auction under section 6403(a) or more than one reorganization of the broadcast television spectrum under section 6403(b). ***

Proposed Auction Design

In this section, we address auction design issues for the broadcast television spectrum incentive auction. The reverse and forward auctions present different challenges, but both can be discussed in terms of three basic auction design elements: (i) bid collection procedures that determine how bids in the auction are gathered, (ii) assignment procedures that determine which bids are accepted, and (iii) pricing procedures that determine what each bidder pays, or in the case of the reverse auction, receives in payment. The other major component of the incentive auction—the repacking—will help to determine which reverse auction bids we accept and, therefore, is discussed below in connection with reverse auction assignment procedures. ***

Reverse Auction and Broadcaster Repacking

The reverse auction will collect information about the price at which broadcast television spectrum can be cleared. This information, together with information from the forward auction, will enable the FCC to identify a set of bidders that would voluntarily relinquish spectrum usage rights and the compensation each would receive. In economic terms, the reverse auction is the supply side of the market for repurposed broadcast television spectrum. The reverse auction will incorporate the three basic auction design elements identified above: it will collect bids, determine which bids are accepted as winning bids, and determine the payments made for those winning bids. The determination of which bids will be accepted depends, in part, on the repacking, as explained below.

Bid Collection Procedures

Here we discuss two options for the first auction design element, that is, collecting bids to voluntarily relinquish spectrum usage rights in the reverse auction. These relinquishments may include going off the air, sharing a channel, or moving to a lower broadcast television band. The first option is a single round sealed bid procedure, in which bidders would specify, during a single bidding round, the payment they would be willing to accept in exchange for relinquishing various spectrum usage rights.

The second option is a multiple round, or dynamic, procedure in which bidders would indicate their willingness to accept iteratively lower payments in exchange for relinquishing rights. For example, in a descending clock auction prices would start high and decline over time. As the price ticks down, stations would indicate whether they would be willing to relinquish certain spectrum rights at the current prices. Those that would still be willing to relinquish rights would remain active in the clock auction, while those that found the current prices for all the relinquishment options too low would decline all the offers, exit the auction, and continue broadcasting in their pre-auction band. The exit decision would be irreversible. We could also offer bidders the option of submitting a "proxy bid" in advance of the clock auction indicating the minimum payment they would be willing to accept in exchange for relinquishing spectrum rights, making it possible for bidders to submit bids just once. The clock auction would then use the proxy bid to generate and submit bids dynamically on behalf of the bidder.

From the point of view of bidders, a dynamic procedure such as a clock auction with the option of making proxy bids may be preferable to a single round sealed bid procedure. A dynamic format does not require broadcasters to determine an exact bid at the beginning of the auction. They only need to determine their willingness to relinquish rights at the current price, which may make participation simpler and less expensive for bidders. On the other hand, the single round sealed bid procedure may require less complex software than a multiple round auction and thus be easier for the

FCC to implement. We seek comment on these and any other bid collection procedure options commenters may suggest. Commenters advocating a particular option should address its advantages and disadvantages, including cost to bidders and how it would work with the other elements of the reverse auction.

Assignment Procedures

*Assignment Procedures in General*. The second auction design element—the assignment procedures used to decide which bids are accepted and which are rejected, thereby determining which stations remain on the air—is significantly more complicated in this reverse auction than in a typical auction. We must solve a complex engineering problem by determining how stations that retain their current spectrum usage rights are assigned channels ("repacked"), taking into account relinquishment options including channel sharing and moves from a UHF to a VHF channel, and consistent with statutory requirements and other constraints. We consider engineering and other technical aspects of the repacking process in section V below, but here we discuss briefly the repacking process as it relates directly to the assignment procedures.

We must also analyze whether and how to consider factors in addition to bid amounts in determining which bids are accepted and which are rejected. In a reverse auction where bidders are offering the same good, minimizing the cost of procuring that good leads to a straightforward rule for determining winners: the lowest bids win. When the goods being offered are not homogenous, however, bids are sometimes weighted or scored to account for factors in addition to bid amount. The goods offered in the reverse auction of broadcast television spectrum will not be homogenous. For example, some stations have larger coverage areas and serve greater populations than others, affecting both their economic value to broadcasters and the effect of repacking them. Broadcast stations' bids in the reverse auction could be assigned a score incorporating such factors. Bids from stations that would make the repacking more difficult because they would block more potential channel assignments to other stations could receive a lower score, for example, making them more likely to have their bids accepted and, equivalently, less likely to be assigned a channel in their pre-auction band. The score could also be designed to reflect the fact that the value of a broadcasting license depends in part on its population served. For a bid to move to VHF, the score may also account for the scarcity of VHF spectrum in the station's broadcast area. Selecting bids and paying winning bidders in relation to their population served or other indicators of value may reduce the cost of clearing broadcast television spectrum.

*Incorporation of Repacking Into the Assignment Procedures*. Repacking stations, which involves determining whether it is feasible, given the applicable constraints, to assign a collection of stations channels in a particular band, is part of the process for determining which broadcaster bids will be accepted in the reverse auction, which bids will not be accepted and what channel numbers will be assigned to the stations that will remain on the air. It may be helpful to think of the repacking of stations with different service areas and bid values into the broadcast television spectrum as being analogous to the process of packing boxes into a trunk when these boxes have different sizes and values.

We have considered two alternative assignment procedures. The first uses an integer programming "algorithm" (a mathematical recipe for solving a problem). The second uses a simpler mathematical recipe that we will refer to as a "sequential" algorithm. Each involves the application of objective criteria to determine, using the analogy above, the best way to pack the trunk.

*Integer Programming Algorithm Approach to Establishing Assignments*. The first procedure would use computer optimization software to try to find the most efficient way of clearing a specified amount of broadcast television spectrum while satisfying all applicable constraints. Integer programming is a collection of mathematical algorithms that work to find and prove that a feasible solution has the best objective value of all feasible alternatives. In this case the software would, for a specified amount of spectrum to be cleared, minimize the sum of the reverse auction bids accepted and the relocation costs of stations that are reassigned to new channels. Due to the complexity of the problem, an "ideal" or provably optimal repacking solution using an integer programming model may not be feasible in a timely manner. It may be possible, however, to calculate a close approximation to the optimal solution in a reasonable amount of computing time. The approximate repacking solution may be highly efficient–coming close to minimizing the total bids of the cleared stations, given the amount of spectrum cleared–but it may be less than fully transparent, since the results cannot easily be replicated. This procedure also does not generally minimize the FCC's cost of clearing or maximize the amount of spectrum cleared if the pricing rule does not pay winners their bid amounts, or if the pricing rule does pay winners their bid amounts but the bidders recognize their incentives to bid above their true values under this pricing rule.

*Sequential Algorithm Approach to Establishing Assignments*. A second approach whose results may be easier to replicate is to sequentially determine, again based on objective criteria, which stations should be assigned a channel, starting with stations that do not participate in the auction. For stations that do participate in the auction, the determination would be based on the scored bids from highest to lowest, as long as the station can feasibly be assigned a channel. In a descending clock auction, each bidder is faced with a declining sequence of price offers for relinquishing spectrum rights. The bidder can choose to accept an offer, or reject all offers. Once a bidder rejects all offers, it exits the auction and is assigned to its pre-auction band. Prior to each auction round, the auction software determines for each station that has not exited whether it can feasibly be assigned to its pre-auction band, given the assignments of other stations. If a station *cannot* feasibly be assigned to its pre-auction band, its compensation is set at the last price offer it accepted for its last preferred relinquishment option. Each station that *can* be assigned to its pre-auction band (but has not exited) submits a bid indicating its preferred relinquishment option at the (reduced) current prices. The rounds continue until every station has either exited the auction or can no longer be assigned to its pre-auction band. When the rounds stop, every bidder that has not exited receives its last preferred relinquishment option. Bidders that have exited and stations that did not participate are assigned specific channels in their pre-auction bands. This sequential algorithm can also be implemented in a sealed-bid auction. At the beginning of each step of the sequential algorithm, for each station that has not yet exited, it would be determined into which bands the station could be feasibly moved. Among all such feasible moves, the algorithm would implement the move that minimizes cost on a scored basis. The process would continue until either the available spectrum is fully packed or there are no more stations to consider. Stations not selected to remain on the air in their pre-auction band would be paid to voluntarily relinquish their broadcasting rights.

These alternative assignment algorithms present tradeoffs in terms of simplicity, transparency and efficiency that must be considered in determining the auction design. We seek comment on these options.

We further seek comment on whether we should consider in the repacking and assignment procedures whether a given broadcaster going off the air would create areas without any commercial or noncommercial broadcast television service. Adding an additional technical constraint would increase the complexity of the repacking process, possibly requiring additional time and resources and limiting the efficiency of the outcome. How great is the risk of creating "white" or "gray" areas where the population receives little or no over-the-air television service as a result of the reverse auction? Should we seek to address any such risk as an auction design matter or through other steps outside of the incentive auction?

We note that, in June 2010, in conjunction with the National Broadband Plan, the Omnibus Broadband Initiative released Technical Paper No. 3: Options for Broadcast Spectrum, which examined different potential methodologies for repacking broadcast spectrum. Technical Paper No. 3 included a discussion of an Allotment Optimization Model ("AOM"), which applied optimization techniques to assign channels to television stations in a repacking process. The AOM discussed in Technical Paper No. 3 was an "alpha" version based on several simplifying assumptions about broadcast interference; it did not incorporate the methodology in OET Bulletin 69 which the Spectrum Act requires be used in the repacking. Moreover, many of the proposals in this Notice will have a direct bearing on the repacking methodology we adopt. Thus, the AOM in Technical Paper No 3 may have limited or no applicability to this proceeding. ***

Procedures to Determine Payments

The reverse auction must also determine the amount paid to winning bidders for relinquishing their spectrum rights. Some reverse auctions pay the winning bidder the amount of its bid. Another mechanism, known as "threshold" pricing, would pay a winning bidder the highest amount it could have bid and still have had its bid accepted, as illustrated in Appendix C. Threshold pricing gives bidders an incentive to bid its station's value regardless of the bids submitted by others: if it bids an inflated value, it may forfeit the opportunity to be bought out at a price at least as high as the station's value, and if it bids an understated value, it may relinquish its rights at a price below the station's value.

Above we discussed options for conducting the reverse auction in a single round or in a multiple round clock format. We anticipate that in a clock format, a bidder that has its bid to relinquish spectrum rights accepted would be paid the threshold price, which is the prevailing clock price at the time its bid is accepted. In a sealed bid format, we could determine payment either using the bid amount, or the threshold price. In choosing between these payment procedures, we will consider such factors as their likely impact on the cost to the government of clearing spectrum, the efficiency of assignment, whether they would increase the complexity of implementing the assignment process, what impact they may have on bidder incentives, and whether they would encourage participation in the reverse auction. We seek comment on the choices discussed above, the factors we should consider in deciding between them, and on any other considerations we should take into account.

*Reserve Price*. As discussed in more detail in section IX below on proposed auction rules, we also will consider implementing a reserve price, or maximum payment, that would be made to broadcasters relinquishing spectrum usage rights. This reserve price could take the form of a maximum dollar payment to a broadcaster based on characteristics of the station such as population or viewership. We seek comment on the use of a reserve price, and the way it should be calculated.

Forward Auction

The forward auction will identify the prices that potential users of repurposed spectrum would pay for new licenses to use the spectrum. With this information, together with information from the reverse auction, we can determine the winning bidders for new flexible use licenses and the prices those bidders would pay. In economic terms, whereas the reverse auction defines the supply side of the market, the forward auction defines the demand side. The forward auction piece of the broadcast television spectrum incentive auction will differ from the typical spectrum license auction in which a fixed quantity of spectrum is licensed based on a band plan defined in the service rules. The licenses available in the forward auction will depend upon how much spectrum the reverse auction clears in specific geographic areas. That interrelationship may require that the forward auction be conducted in stages, with bids collected for different numbers of potentially available licenses.

The forward auction will incorporate the three basic auction design elements discussed above: bid collection procedures, assignment procedures, and procedures to determine the prices that winning bidders will pay. Options for each of these elements are considered in turn below.

## Bid Collection Procedures

*Items Available For Bid.* The FCC's typical spectrum license auctions have collected bids specific to a frequency block in a geographic area. That is, in auctions with multiple blocks of spectrum available, bids were collected separately for each block in each geographic area. Alternatively, where there are multiple blocks of spectrum available in a geographic area, as we expect to be the case in the forward auction, we could collect bids for one or more "generic" categories of licenses, such as paired or unpaired licenses, in a geographic area. Rather than indicating that a bid is for a specific frequency block in an area, bidders would indicate their interest in, for example, one or more paired 5 megahertz uplink and 5 megahertz downlink ("5 +5") blocks.

*Multiple Round Bidding Formats.* We propose to collect forward auction bids using a dynamic auction design format, for the same reasons that we typically use a multiple round ascending auction design in spectrum license auctions. Multiple rounds permit a process of price discovery, allowing bidders to modify their bidding strategies in response to changes over the course of the auction in the absolute and relative prices of different licenses.

Two dynamic format options for the forward auction are a simultaneous multiple round ascending (SMR) auction and an ascending clock auction. In each, a bidder would indicate the license or licenses it seeks in a series of ascending price rounds, and would be required to satisfy an activity requirement, which provides an incentive for consistent bidding throughout the auction. The two formats differ in several ways.

As indicated above, bidders submit price bids for specific licenses in the SMR design typical of past FCC auctions. At the end of each round the FCC identifies a provisionally winning bidder for each license that has received bids. When the auction closes (typically after a round passes where there are no new bids on any licenses), the provisionally winning bids become final.

In contrast, in an ascending clock auction format the FCC would announce prices for generic licenses in each category in each geographic area, and bidders would submit quantity bids for the number of licenses they seek. Prices may differ across categories and geographic areas, but within each category in each geographic area every license would sell at the same price. If total demand for the licenses in a category exceeds supply, the price would be increased for the next round, but no provisional winners would be chosen. The rounds would continue until demand for licenses no longer exceeds supply. In a clock auction, when prices are increased between rounds, the quantity of licenses sought by bidders could fall so much in a category that instead of exceeding the supply, the demand is less than the supply. This possibility of overshooting can be avoided by permitting intra-round bidding, whereby bidders can indicate their change in demand in each category at specified prices between the opening and closing prices in each round.

Bidding for generic blocks would be expected to speed up the forward auction, reducing the time and, therefore, the cost of bidder participation, since bidders would no longer need to iteratively bid on the least expensive of several specific but substitutable licenses, as in a typical FCC SMR auction. We believe that speed is important to the successful design of the incentive auction for a number of reasons, including the interdependence of the reverse and forward auctions.

*Package Bidding*. Bid collection procedures in the forward auction could include provisions for package bidding—that is, bidders could be permitted to indicate a single, all-or-nothing bid amount that would apply to a group of licenses, such as more than one block in a geographic area or the same block in multiple geographic areas. Package bidding could be particularly helpful to bidders that face a risk of winning certain licenses but losing complementary licenses they consider essential to their business plans. Package bidding options generally complicate an auction, although such complexity can be limited if certain restrictions apply to the ways bidders can group licenses. Package bidding could take a number of specific forms, and its feasibility and potential usefulness to bidders would depend on auction design details. We seek comment on whether bidders are likely to have interests, such as those mentioned above, that may be addressed by package bidding, and on how package bidding options might work with the other auction design elements discussed herein.

Assignment Procedures

For the forward auction, the assignment procedures will determine which bidders win which new licenses to use repurposed broadcast television spectrum, with the number of available licenses in the forward auction depending on the quantity of spectrum recovered from the reverse auction. In general, winning forward auction bidders will be those that place the highest bids on the available licenses. If bidders are allowed to specify packages or other contingencies, the assignment procedures would take those conditions into account in determining a set of best bids that are consistent with our forward auction objective of maximizing the aggregate amount of the bids that we accept for the available licenses.

We anticipate that if generic blocks are made available in the forward auction, the assignment procedures would assign contiguous blocks to bidders that bid for multiple blocks in the same geographic area and could take into account the need to coordinate frequencies across adjacent areas. There could also be an additional auction phase to assign specific frequencies for generic licenses, which could be based on accepting additional bids. The specific frequencies that will be available in each area will be determined by the incentive auction process itself, and bidding on generic blocks facilitates conducting an auction given those interdependencies. Further, as noted above, bidding based on generic blocks will speed completion. We invite comment on these proposals and, alternatively, on how we could conduct an auction that would allow bids on specific frequencies rather than generic blocks

Procedures to Determine License Prices

Generally, under the two forward auction design formats discussed above, the SMR-type auction and a clock auction, final license prices would be the highest amount bid for the license. If there is an additional auction phase to assign specific frequencies for generic licenses, we would need additional procedures to determine license prices. We invite comment on these issues.

Integration – Putting the Reverse and Forward Auction Components Together

The reverse and forward auctions must be integrated to determine how much broadcast television spectrum is to be cleared and licensed for new uses. The timing of the reverse and forward auctions will affect the information available when bidding in each auction, and may also affect the length of the auction process.

An option that would provide reverse and forward auction bidders relevant information from the other side of the market while they are bidding would be to run the reverse and forward auctions concurrently in a series of stages. In each stage, the FCC would specify a provisional quantity of spectrum to be cleared in the reverse auction and a corresponding quantity of new licenses available in the forward auction. The first stage would be conducted with the provisional quantities set at the maximum possible amount of spectrum. We would compare the provisional outcomes of the forward and reverse auctions and determine whether the auction closing conditions had been met —for example, the closing conditions would fail if total clearing costs in the reverse auction were greater than the revenue from the forward auction. If the closing conditions are met, the incentive auction process would end. If not, we continue running the forward auction to see if the closing conditions can be met. If the closing conditions cannot be met, another auction stage would be run, this time using a smaller provisional quantity of cleared spectrum and correspondingly smaller number of licenses available in the forward auction. If closing conditions were met at the end of this stage, the process would end. If not, additional stages would be run with the quantity of spectrum sought to be cleared further reduced, until the auction results met them. In addition to providing both reverse and forward auction participants with relevant information from the other side of the market while they are bidding, this approach is likely to take less time than conducting the auctions sequentially.

If the reverse and forward auctions are run sequentially, conducting the reverse auction first may be preferable, because it would allow greater certainty about the number of licenses available in each geographic area in the forward auction, based on broadcaster participation in the reverse auction. We invite comment on these issues.

*Closing Conditions*. As indicated above, the Spectrum Act requires that the forward auction generate proceeds sufficient to pay successful bidders in the reverse auction, cover the Commission's administrative costs, and cover the estimated costs of reimbursements required by the statute. We seek comment on the best way to implement this statutory requirement, and whether there are additional statutory, policy or other considerations that should be addressed in establishing the closing conditions. ***

*Cost-Effectiveness Analysis*. In connection with our Regulatory Impact Analysis, we also seek comment on the cost-effectiveness of the various auction design elements discussed in this section. In particular, are there auction design choices we can make that would make it significantly less costly for bidders to participate in either the reverse or the forward auction? Are there hidden costs associated with any of the auction design elements of which we should be aware? ***