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

In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions GN Docket No. 12-268

REPORT AND ORDER

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By the Commission:

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I. INTRODUCTION

1. This Order adopts rules to implement the broadcast television spectrum incentive auction. The incentive auction is a new tool authorized by Congress to help the Commission meet the Nation’s accelerating spectrum needs.1 Broadcasters will have the unique financial opportunity in the “reverse

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auction” phase of the incentive auction to return some or all of their broadcast spectrum usage rights in exchange for incentive payments. By facilitating the voluntary return of spectrum usage rights and reorganizing the broadcast television bands, we can recover a portion of ultra-high frequency (“UHF”) spectrum for a “forward auction” of new, flexible-use licenses suitable for providing mobile broadband services. Payments to broadcasters that participate in the reverse auction can strengthen broadcasting by funding new content, services, and delivery mechanisms. And by making more spectrum available for mobile broadband use, the incentive auction will benefit consumers by easing congestion on the Nation’s airwaves, expediting the development of new, more robust wireless services and applications, and spurring job creation and economic growth.

2. Our central objective in designing this incentive auction is to harness the economics of demand for spectrum in order to allow market forces to determine its highest and best use. We are also mindful of the other directives that Congress established for the auction, including making all reasonable efforts to preserve, as of the date of the passage of the Spectrum Act, the coverage area and population served of remaining broadcast licensees. The auction affords a unique opportunity for broadcasters who wish to relinquish some or all of their spectrum rights, but we emphasize that a broadcaster’s decision to participate in the reverse auction is wholly voluntary. We are committed to removing barriers to this voluntary participation. In particular, the reverse auction in which broadcasters will have the opportunity to return spectrum rights will be transparent and easy to participate in. In the descending clock auction format we choose, for example, a broadcaster need only decide whether it is willing to accept one or more prices offered to it as the reverse auction proceeds; if at any point the broadcaster decides a price is too low, it may drop out of the reverse auction. No station will be compensated less than the total price that it indicates it is willing to accept.

3. The auction presents a once-in-a-lifetime opportunity for broadcasters, and we are committed to providing them with information about both our process and the financial opportunity the auction represents to enable them to make informed business decisions about whether and how to participate. We have conducted numerous workshops and other direct outreach efforts. We also have developed the Learn Everything About Reverse Auctions Now (“LEARN”) program to provide useful

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2 Spectrum Act § 6403(a)(1) (mandating “a 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 in order to make spectrum available for assignment through a system of competitive bidding under subparagraph (G) of section 309(j)(8) of the Communications Act of 1934, as added by section 6402.”); see § IV.B (Reverse Auction).

3 Spectrum Act § 6403(c)(1) (A) (requiring the FCC to conduct a “forward auction” to assign licenses for the use of spectrum reallocated from broadcast television as part of the incentive auction); see § IV.C (Forward Auction).

4 Spectrum Act § 6403(b)(2).

5 See § IV.B (Reverse Auction).

6 See § III.B.1 (Repacking Process Overview); Spectrum Act § 6403(b).

7 See para. 453.

information and resources.\textsuperscript{9} We anticipate offering demonstrations of the auction bidding system, interactive tutorials, and other opportunities for broadcasters to familiarize themselves with the reverse auction application and bidding processes in advance of the reverse auction. We also recognize the importance of broadcasters that choose not to participate in the reverse auction. To free up a portion of the UHF spectrum band for new, flexible uses, Congress authorized the Commission to reorganize the broadcast television spectrum so that the stations that remain on the air after the incentive auction occupy a smaller portion of the UHF band.\textsuperscript{10} The reorganization (or “repacking”) approach we adopt will avoid unnecessary disruption to broadcasters and consumers and ensure the continued availability of free, over-the-air television service.

4. Ultimately, our actions will benefit consumers of telecommunications services. While minimizing disruption to broadcast television service, we seek to rearrange the UHF spectrum in order to increase its potential to support the changing needs of 21\textsuperscript{st} Century consumers. We recognize that the same individuals may be consumers of television, mobile broadband—using both licensed and unlicensed spectrum—and other telecommunications services. To benefit such consumers, and consistent with the framework of the Spectrum Act, we have strived for balance in our decision-making process between television and wireless services, and between licensed and unlicensed spectrum uses.

5. We adopt a “600 MHz Band Plan” for new services in the reorganized UHF spectrum. By maximizing the spectrum’s value to potential bidders through features such as paired five megahertz “building blocks,” the Band Plan will help to ensure a successful auction. By accommodating variation in the amount of spectrum we recover in different areas, which depends on broadcaster participation and other factors, the Band Plan will ensure that the repurposing of spectrum for the benefit of most consumers nationwide is not limited by constraints in particular markets.\textsuperscript{11} The Band Plan will promote competition and innovation by creating opportunities for multiple license winners and for future as well as current wireless technologies. Because it is composed of a single band of paired spectrum blocks only, our Band Plan also simplifies the forward auction design. We adopt for new licensees flexible-use service rules, and technical rules similar to those governing the adjacent 700 MHz Band, an approach that should speed deployment in the 600 MHz Band. Devices will be required to be interoperable across the entire new 600 MHz Band.

6. Our repacking methodology will ensure an efficient television channel assignment scheme while avoiding unnecessary disruption to broadcasters and consumers. Repacking presents a complex engineering problem that must be solved repeatedly during the course of the reverse auction bidding process: namely, how to determine which channels to assign to stations that will stay on the air, consistent with statutory requirements, as well as the technical requirements that we establish.\textsuperscript{12} For the incentive auction to succeed, we need a methodology capable of solving the problem quickly and with certainty as the reverse auction bidding proceeds. Our repacking methodology will address these needs by simplifying the problem. During the reverse auction bidding process, provisional channel assignments that satisfy applicable requirements will be identified, ensuring that a feasible channel is available for every station that remains on the air. After the reverse auction bidding ends, final channel assignments will be optimized to strive for additional goals, such as minimizing relocation costs for broadcasters

\textsuperscript{9} See http://www.fcc.gov/learn.

\textsuperscript{10} See Spectrum Act § 6403(b)(1) (requiring the FCC, in order to “mak[e] available spectrum to carry out the forward auction,” to “evaluate the broadcast television spectrum,” and authorizing it, “subject to international coordination . . . ,” to “make such reassignments of television channels as the Commission considers appropriate” and “reallocate such portions of such spectrum as the Commission determines are available”).

\textsuperscript{11} Under this framework, we can generally make available for new uses the amount of spectrum we recover in most top markets, while offering different amounts in constrained markets (such as those that border Canada and Mexico) where we may recover less spectrum. See § III.A.2.d (Market Variation).

\textsuperscript{12} See § III.B.1 (Repacking Process Overview).
assigned to new channels. This approach will meet the practical requirements of conducting a successful
auction without sacrificing other objectives.

7. Our repacking approach will also fulfill Congress’s mandate to use “all reasonable efforts
to preserve,” as of the date of the passage of the Spectrum Act, the coverage area and population served
of each remaining broadcast licensee.\textsuperscript{13} In particular, our approach will ensure that each station serves
essentially the same viewers that it served before the incentive auction, and that no station causes more
than a minimal (0.5 percent) amount of new interference to another station.\textsuperscript{14} The statutory mandate
covers facilities operating as of February 22, 2012, but we will extend the same protection to certain
facilities authorized after that date, having determined that the benefits of doing so outweigh the potential
costs to our flexibility in reorganizing the broadcast television spectrum.\textsuperscript{15}

8. In addition to repurposing UHF spectrum for new licensed uses, the rules we adopt in this
Order will make a significant amount of spectrum available for unlicensed use, a large portion of it on a
nationwide basis.\textsuperscript{16} Unlicensed devices complement licensed services, serve a wide range of consumer
needs, and contribute tens of billions of dollars to our economy annually. To prevent harmful interference
between licensed services, our 600 MHz Band Plan includes a number of guard bands, which we intend to
make available for use by unlicensed devices. Moreover, we will allow unlicensed use of channel 37, and
allow television white space (“TVWS”) devices as well as wireless microphones to operate on any unused
television channels following the incentive auction. We also intend to designate one unused channel in
each area following the repacking process for shared use by wireless microphones and TVWS devices.

9. To facilitate broadcaster participation, we are striving for simplicity in designing the
reverse auction. Broadcasters will be able to participate online through an easy-to-use computer interface.
They will have several bid options, including relinquishing their licenses, moving to a lower band, and
sharing a channel. The descending clock format to collect bids will enable broadcasters to gain
information during the bidding, and will not require them to reveal how much compensation they
ultimately would accept; they need indicate only whether they accept the opening price and—if so—any
subsequent prices. If at any point a broadcaster decides prices are too low, it may drop out of the auction.
No station will be compensated less than the total price that it indicates it is willing to accept. We will
evaluate and select bids in conjunction with the repacking process, based on their potential impact on the
recovery of spectrum and other factors. We will keep the identity of broadcasters that participate
confidential, and that period of confidentiality will extend for two years after the incentive auction, except
for winning bidders.\textsuperscript{17}

10. For the incentive auction to succeed, the reverse auction and the repacking process must
work seamlessly with the forward auction of new, flexible-use 600 MHz Band licenses. We are designing
the forward auction for speed, so that reverse auction participants need not await its outcome for weeks or
months. In particular, by conducting bidding for generic or interchangeable spectrum blocks rather than
specific frequencies, we can condense the time required for bidding significantly. We establish a final
stage rule to assure that the forward auction raises enough proceeds to satisfy the minimum proceeds

\textsuperscript{13} See Spectrum Act § 6403(b)(2) (requiring “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”).

\textsuperscript{14} See § III.B.2 (Implementing the Statutory Preservation Mandate).

\textsuperscript{15} See § III.B.3 (Facilities to Be Protected); Spectrum Act § 6403(b)(2).

\textsuperscript{16} See § III.C (Unlicensed Operations).

\textsuperscript{17} See § IV.B.1 (Reverse Auction Pre-Auction Process); Spectrum Act § 6403(a)(3) (requiring “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 the [spectrum] reassignments and reallocations (if any) . . .
become effective”).
requirements that we establish, but bidding will continue as long as demand for wireless licenses in any area exceeds the number available in that area. In the Mobile Spectrum Holdings Report and Order adopted today, we establish a market-based spectrum reserve in the forward auction designed to ensure against excessive concentration in holdings of low-band spectrum, and we adopt certain secondary markets limitations regarding 600 MHz Band licenses.

11. Following the conclusion of the incentive auction, the transition to the reorganized UHF band will be as rapid as possible without causing unnecessary disruption. Television stations that voluntarily turn in their licenses or agree to channel share must transition from their pre-auction channels within three months of receiving their reverse auction payments. The time required for stations reassigned to a new channel to modify their facilities will vary, so we will tailor their construction deadlines to their situations. This approach will ensure that stations transition as quickly as their circumstances allow, and allow coordination of deadlines where, for example, one station must vacate a channel before another can begin operating on its new channel. No station will be allowed to operate on a channel that has been reassigned or repurposed more than 39 months after the repacking process becomes effective. In other words, the repurposed spectrum will be cleared no later than 39 months after the effective date. Most new licensees should have access to 600 MHz spectrum well before then. Consistent with Congress’s mandate, we also establish procedures to reimburse costs reasonably incurred by stations that are reassigned to new channels, as well as by multichannel video programming distributors to continue to carry such stations.

12. As Congress recognized, the incentive auction and the transition that follows require coordination with our cross-border neighbors, Canada and Mexico. Because of these common borders, the Commission has established processes and agreements to protect television and wireless operations in border areas from harmful interference. The FCC staff has used these processes to fully inform Canadian and Mexican officials regarding the incentive auction and, beginning in 2013, formed technical groups to meet routinely to plan for harmonious use of the reorganized UHF band following the incentive auction. Commission leadership has supplemented these efforts, meeting with their Canadian and Mexican counterparts to emphasize the need for and mutual benefits of harmonization. We are confident that the long and successful history of close cooperation with Canada and Mexico regarding the use of radio spectrum along our common borders will continue before, during, and after the incentive auction.

13. We intend to conduct the broadcast television spectrum incentive auction as soon as possible. We must proceed deliberately, however, as the auction will be the first of its kind. We also are committed to an open, transparent process with meaningful public input. The Commissioners and staff have engaged in significant public discourse throughout the course of this proceeding. In addition to the

18 See § IV.C.2 (Forward Auction Bidding Process).
20 See § V.C.2.b (Transition Procedures for Winning License Relinquishment and Channel Sharing Bidders).
21 See § V.C.2.a (Construction Period for Stations with New Channel Assignments). We note that no broadcaster will be required to relocate its transmission facilities. Stations that are reassigned to new channels will have to modify their facilities to operate on the new channels, however.
22 See id. Thirty-nine months includes the thirty-six month construction period provided under current FCC rules, plus three months between the effective date—when the repacking process results are announced—and the deadline for stations to file construction permit applications to modify their facilities.
23 See Spectrum Act § 6403(b)(4)(A); § V.C.5 (Reimbursement of Relocation Costs).
24 See Spectrum Act § 6403(b)(authorizing such reassignments of television channels as the Commission considers appropriate, and reallocation of such spectrum as it determines is available for reallocation, subject to international coordination along the border with Mexico and Canada).
usual comment and reply process, the record reflects more than 400 ex parte meetings, numerous public notices and workshops on specific incentive auction-related issues, and a series of Incentive Auction Task Force presentations at Commission open meetings, which have provided critical input for the decisions we make today. These decisions provide the essential framework for the incentive auction. But they will not, by themselves, enable us to implement the incentive auction. Based on the framework we establish today, we will develop the detailed procedures necessary to govern the auction process, which will be based on additional record input on the remaining, narrower set of important issues, such as auction design and issues arising from our decision to accommodate market variation in the 600 MHz Band Plan.25

14. Our experience with spectrum auctions over the past 20 years supports our conclusion that the public interest is best served by acting now to establish the basic framework for the incentive auction, and thereafter resolving discrete outstanding issues and adopting final auction procedures, through a process that allows additional public input and concludes well in advance of the auction itself. The Commission’s past practice has been to first establish general rules governing spectrum license auctions in reports and orders, and then specific requirements through public notices that provide the opportunity for comment by interested parties, including on critical matters such as bid collection, assignment, and payment procedures and final stage rule. This approach has worked well, and a similar one is all the more necessary for the incentive auction due to its novelty and complexity. Consistent with this approach, today’s Order determines many of the significant elements of the incentive auction, which are set forth in the following Executive Summary.

15. In the coming months, the Commission will solicit public input on final auction procedures by Public Notice (“Incentive Auction Comment PN” or “Comment PN”). This Public Notice will include specific proposals on crucial auction design issues such as opening prices, factors for setting reverse auction prices, and how much market variation to accommodate in the 600 MHz Band Plan. Well in advance of the auction, also by Public Notice, the Commission will resolve these implementation issues, and provide detailed explanations and instructions for potential auction participants (“Incentive Auction Procedures PN” or “Procedures PN”).26 We do not modify the Wireless Telecommunications Bureau’s (“WTB” or “Wireless Bureau”) well-established authority to adopt final auction procedures through a pre-auction public notice process.27 Compared to our typical spectrum auctions, many aspects of the broadcast television spectrum incentive auction are unique, and in this proceeding we intend to establish certain procedures by Commission vote. The WTB may continue to establish final auction procedures in this proceeding concerning those matters that it typically handles under existing delegations of authority.

16. The Commission will resolve outstanding issues that fall outside the rubric of the Comment PN and the Procedures PN, including a methodology for preventing co- and adjacent channel interference between television and wireless services in certain areas, and proposals for an aggregate cap on interference to television stations in the repacking process,28 through a separate process that will conclude in advance of decisions on the final auction procedures. The discussion that follows identifies such issues that are not being resolved in this Order and, where appropriate, delegates authority to one or more of the Commission’s Bureaus and Offices to resolve those issues in accordance with our decisions.


26 We refer generally to the “pre-auction process” in this Order, which includes the Comment PN and Procedures PN. We may seek comment on, and/or resolve, certain final auction procedures in separate public notices if doing so better conduces to the proper dispatch of business. See 47 U.S.C. § 154(j). Any such public notices will be released during the pre-auction process and well in advance of the auction.

27 See 47 C.F.R. § 0.131(c).

II. EXECUTIVE SUMMARY

17. **600 MHz Band Plan.** We adopt a 600 MHz Band Plan with specific paired uplink and downlink bands, comprised of five megahertz “building blocks.” We find that specific uplink and downlink bands that support Frequency Division Duplex (“FDD”) technologies are best suited for the new 600 MHz Band at the present time in light of current technology, the Band’s propagation characteristics, and potential interference issues present in the Band; and that offering paired spectrum blocks will best facilitate the rapid deployment of networks, including by smaller carriers and new entrants. The uplink portion of the Band will begin at channel 51 (698 MHz) and expand downward, followed by a duplex gap and then the downlink portion of the Band. The Band Plan can accommodate variation in the amount of spectrum recovered in different geographic areas in order to prevent the “least common denominator market” from limiting the quantity of spectrum we can offer generally across the nation.29

18. In addition, the Band Plan we adopt incorporates technically reasonable guard bands, including the duplex gap, to prevent harmful interference between licensed services.30 We adopt Partial Economic Areas (“PEAs”) as the service area for the 600 MHz Band, finding that PEAs permit entry by providers that contemplate offering wireless broadband service on a localized basis, yet may be easily aggregated by carriers that plan to provide service on a larger geographic scale. Consistent with the Spectrum Act’s directives, we also adopt “flexible use” service rules for the 600 MHz Band.31

19. **Repacking the Broadcast Television Bands.** In reorganizing the television bands to make spectrum available to carry out the forward auction, the FCC must “make all reasonable efforts to preserve, as of [February 22, 2012], the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69 of the Commission’s Office of Engineering and Technology” (“OET-69”).32 We interpret this mandate to require that we strive to preserve full power and Class A stations’ existing service as of that date without sacrificing the objectives of the incentive auction. While we will use the methodology described in OET-69 to determine the coverage area and population served of each station, we must update the computer software and input values used to implement that methodology. Among other things, doing so will ensure that our software is capable of the rapid, complex calculations necessary to support the reverse auction and the repacking process, and that we are relying on the most accurate population and other data available. We will protect full power stations’ coverage areas based on their “service areas,” and protect the coverage areas of Class A stations, which do not have “service areas” under FCC rules or OET-69, based on their “protected contours.”33 Rather than merely attempting to preserve the same total population served by each station, we will make all reasonable efforts to preserve the same specific viewers it served as of

29 If the 600 MHz Band Plan could not accommodate some market variation, we would be forced to limit the amount of spectrum offered across the nation to what is available in the most constrained market (the “least common denominator”), even if more spectrum could be made available in the vast majority of the country. See § III.A.2.d (Market Variation).

30 See § III.A.2.e (Guard Bands). The size of the guard band between 600 MHz downlink and television depends on how much spectrum is repurposed through the incentive auction. The duplex gap will be 11 megahertz, and the potential size of the guard band between 600 MHz downlink and television is seven to 11 megahertz. If 84 megahertz or more is repurposed, there will be a three-megahertz guard band or bands between 600 MHz operations and channel 37. See id.; § III.D.1 (Channel 37 Services).

31 See § VI.B.2 (600 MHz Band Service Rules); Spectrum Act § 6402 (granting incentive auction authority “to permit the assignment of new initial licenses subject to flexible-use service rules”).

32 Spectrum Act § 6403(b)(2).

33 See § III.B.2.c (Preserving Coverage Area); 47 C.F.R. § 73.622(e); OET-69 at 1.

34 See § III.B.2.c (Preserving Coverage Area); 47 C.F.R. § 73.6010.
February 22, 2012. We will not allow any channel assignments that, considered on a station-to-station basis, would reduce a station’s population served by more than a de minimis (0.5 percent) amount.35

20. **Television Facilities to Be Protected in the Repacking Process.** As Congress required, we will protect full power and Class A facilities that already were operating pursuant to a license (or a pending application for a license to cover a construction permit) on February 22, 2012.36 We also exercise our discretion to protect facilities in addition to those the statute requires us to protect, based on consideration of the potential impact on our flexibility in the repacking process and our auction goals, whether failing to protect would strand investment by broadcasters licensed on a primary basis, the loss of service to existing viewers, and the potential impact on the Class A service’s digital transition. In particular, we will protect:

- the small number of new full power television stations that were authorized, but not constructed or licensed, as of February 22, 2012;

- full power facilities authorized in construction permits issued to effectuate a channel substitution for a licensed station;

- modified facilities of full power and Class A stations that were authorized by construction permits granted on or before April 5, 2013, the date the Media Bureau issued a freeze on the processing of certain applications; and

- minor change facilities authorized to implement Class A stations’ mandated transition to digital operations.37

21. Except in very limited circumstances, we will limit discretionary protection to the above categories. We conclude that protecting other categories of facilities, including low power television (“LTPV”) stations and television translator (“TV translator”) stations, which are secondary in nature and are not entitled to protection from primary services under our current rules, would unduly constrain our flexibility in the repacking process and undermine the likelihood of meeting our objectives for the incentive auction. To help preserve the important services provided by LPTV and TV translator stations, we will open a special filing window for such stations that are displaced to select a new channel and will amend our rules to expedite the process for displaced stations to relocate. We also intend to initiate a rulemaking proceeding after the release of this Order to consider additional means to mitigate the potential impact of the incentive auction and the repacking process on LPTV and TV translator stations.

22. **Unlicensed Operations.** We will make the 600 MHz Band guard bands available for unlicensed use, thereby making spectrum available for unlicensed devices nationwide. Depending on the amount of spectrum repurposed through the incentive auction, we will make a total of 14 to 28 megahertz of guard band spectrum available for unlicensed use. In addition, we will make an additional six megahertz of spectrum available by allowing unlicensed use of channel 37 at locations where it is not in use by channel 37 incumbents, subject to the development of the appropriate technical parameters to protect the incumbent Wireless Medical Telemetry Service (“WMTS”) and Radio Astronomy Service (“RAS”) from harmful interference.38 Following the incentive auction and the post-auction transition,

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35 We will resolve proposals for an additional, aggregate cap on interference to television stations through a separate process that will conclude in advance of decisions on the final auction procedures. See § III.B.2.d (Preserving Population Served).

36 See § III.B.3 (Facilities to Be Protected); Spectrum Act § 6403(b)(2).

37 See § III.B.3 (Facilities to Be Protected); In order to ensure that we have a largely static view of the facilities that will be protected in advance of the repacking process, we generally will limit our discretionary protection to facilities constructed and licensed on or before a Pre-Auction Licensing Deadline to be announced by the Media Bureau. We anticipate that the Public Notice will give stations at least 90 days prior notice of this deadline.

38 See § III.C (Unlicensed Operations). We will initiate a separate rulemaking proceeding to establish technical rules for unlicensed operations in the guard bands and on channel 37.
TVWS devices may continue to operate on channels allocated and assigned for primary television services, consistent with our current rules.\(^\text{39}\) We anticipate that there will be at least one channel not assigned to a television station in all areas at the end of the repacking process,\(^\text{40}\) and we intend, after additional notice and opportunity for public input, to designate one such channel in each area for shared use by wireless microphones and TVWS devices. We expect a significant amount of spectrum to be available for continued TVWS use, particularly outside of the central urban areas of the largest television markets.\(^\text{41}\) Any other unused television channels in a market following the incentive auction will also be available for TVWS device as well as wireless microphone use. We will initiate a rulemaking proceeding after the release of this Order to consider changes to our existing Part 15 rules to facilitate unlicensed use of the television bands, 600 MHz Band guard bands and channel 37.

23. **Other Services.** We will not relocate the WMTS or the RAS from channel 37. To protect these incumbent services from harmful interference, in the 600 MHz Band Plan we adopt guard bands between such services and any new wireless broadband services that may be deployed adjacent to channel 37. Furthermore, we will require coordination with existing RAS facilities so that any new wireless systems can be deployed to cover the broadest area possible with minimal impact to RAS observatories. We will continue to license fixed broadcast auxiliary service (“BAS”) operations on a secondary basis in the post-auction TV bands.

24. We adopt measures to facilitate wireless microphone use of available spectrum in the reorganized UHF band. With regard to the 600 MHz Band guard bands, we will allow broadcasters and cable programming networks to operate licensed wireless microphones in a portion of the duplex gap, and permit users generally to operate wireless microphones in the guard bands on an unlicensed basis.\(^\text{42}\) We will initiate a proceeding to adopt technical standards to govern these uses.\(^\text{43}\) With regard to the remaining television spectrum, while there may no longer be two unused channels for wireless microphones in markets where those channels are currently used for that purpose, as noted above we intend to designate one unused channel in each area following the auction for use by wireless microphones and TVWS devices. We also revise our rules for co-channel operations in the post-auction television bands to expand the areas where wireless microphones may operate. We will continue to permit wireless microphone users of unused television channels to register to obtain needed protection from unlicensed TVWS devices on such channels through the TV bands database registration system, which we plan to improve to make protection more timely and effective. In a companion item that we adopt today, we extend to certain unlicensed wireless microphone users the rights of licensed wireless microphone users.\(^\text{44}\) We will also initiate a proceeding in the near future to find additional spectrum for wireless microphone users in other spectrum bands in order to help address their long-term needs.

25. **Incentive Auction Process: Integration of the Reverse and Forward Auctions.** The reverse and forward auctions will be integrated in a series of stages. Each stage will consist of a reverse

\(^{39}\) See generally 47 C.F.R. Part 15; § III.C (Unlicensed Operations).

\(^{40}\) See III.C (Unlicensed Operations). For engineering reasons, there may be a few areas with no spectrum available in the television bands for unlicensed devices and wireless microphones to share.

\(^{41}\) TVWS devices may continue to operate in portions of the UHF band that will be repurposed until a 600 MHz Band licensee commences operations, and in portions designated for guard band use.

\(^{42}\) See § III.D.3 (Low Power Auxiliary Stations and Unlicensed Wireless Microphones). Wireless microphones may operate throughout the 600 MHz Band during the Post-Auction Transition Period. See § V.D.4 (Transition Procedures for Low Power Auxiliary Stations (LPAS) and Unlicensed Wireless Microphones).

\(^{43}\) See § III.C (Unlicensed Operations).

auction and a forward auction bidding process, and additional stages will be run if necessary. Prior to the first stage, the initial spectrum clearing target will be determined. Broadcasters will indicate through the pre-auction application process their willingness to relinquish spectrum usage rights at the opening prices. Based on broadcasters’ collective willingness, the initial spectrum clearing target will be set. Then the reverse auction bidding process will be run to determine the total amount of incentive payments to broadcasters required to clear that amount of spectrum. The forward auction bidding process will follow the reverse auction bidding process. If the final stage rule is satisfied, the forward auction bidding will continue until there is no excess demand, and then the incentive auction will close. If the final stage rule is not satisfied, additional stages will be run, with progressively lower spectrum targets in the reverse auction and less spectrum for licenses available in the forward auction, until the rule is satisfied.

26. The final stage rule is a reserve price with two components, both of which must be satisfied. The first component requires that the average price per MHz-pop for licenses in the forward auction meets or exceeds a certain price per MHz-pop benchmark. Alternatively, if the spectrum clearing target at a particular stage is greater than a spectrum clearing benchmark, then the first component will be met if the total proceeds of the forward auction exceed the product of the same price benchmark, the spectrum clearing benchmark, and the total number of pops for those licenses. This alternative formulation will allow the auction to close if the incentive auction repurposes a relatively large amount of spectrum for wireless uses, even if the price per-MHz-pop is less than the benchmark price. The price and spectrum clearing benchmarks will be established by the Commission in the Procedures PN, after an opportunity for additional comment. The second component of the final stage rule requires that the proceeds of the forward auction be sufficient to meet mandatory expenses set forth in the Spectrum Act and any Public Safety Trust Fund amounts needed in connection with FirstNet. If the requirements of both components of the reserve price are met, then the final stage rule is satisfied.

27. Reverse Auction Eligibility and Bid Options. Full power and Class A station licensees will be eligible to participate in the reverse auction. They may bid to voluntarily relinquish the spectrum usage rights associated with station facilities that are eligible for protection in the repacking process. Licensees with pending enforcement matters whose bids may result in their holding no broadcast licenses may participate under a streamlined escrow approach that is consistent with current practice in the sales context. Bidders will have the three bid options specified by the Spectrum Act: (1) license relinquishment; (2) reassignment from a UHF to a VHF channel; and (3) channel sharing. UHF-to-VHF bidders may limit their bids to a high (channels 7 to 13) or low (channels 2 to 6) VHF channel. We will favorably consider post-auction waiver requests involving winning UHF-to-VHF and high-VHF-to-low-VHF bidders’ technical operations. Bidders will have the additional option to bid for reassignment from a high VHF channel to a low VHF channel. Channel sharing bidders may propose licensed community changes if they cannot satisfy signal coverage requirements from their new transmitter sites, provided that

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45 The term “MHz-pop” is defined as the product derived from multiplying the number of megahertz associated with a license by the population of the license’s service area.

46 The operation of the final stage rule, including the alternative formulation of the first component, is explained in detail below in § IV.A (Overview and Integration of the Reverse and Forward Auctions). In the pre-auction process, we will consider whether to apply the final stage rule solely to “major markets” and, if so, how to identify such markets. This approach could significantly speed up the determination of whether the final stage rule is satisfied.

47 The Spectrum Act requires that the forward auction generate proceeds sufficient to pay winning bidders in the reverse auction and cover relevant administrative costs of the auction and an estimate of relocation costs subject to reimbursement. See Spectrum Act § 6403(c)(2).

48 We note that the first and second components are not cumulative: the auction need not raise sufficient proceeds to satisfy the first plus the second.
28. **Reverse Auction Pre-Auction Process.** Potential bidders will have to submit certified applications.\(^{50}\) Consistent with the Spectrum Act, we will protect the identity of licensees that apply to participate in the reverse auction.\(^{51}\) Specifically, we will maintain the confidentiality of information submitted by all licensees that apply to participate until the results of the reverse auction and the repacking process are announced. We will maintain the confidentiality of information on non-winning bids for an additional two years. Confidential information will include licensees’ names, channels, call signs, facility identification numbers, network affiliations, and any other information necessary to protect licensees’ identities.

29. **Between the short-form application filing deadline and the announcement of the results of the reverse auction and the repacking process, all full power and Class A licensees will be prohibited from communicating directly or indirectly any reverse or forward auction applicant’s bids or bidding strategies to any other full power or Class A licensee or forward auction applicant.**\(^{52}\) Recognizing that many broadcasters are not familiar with auction processes, we intend to make education regarding the pre-auction application process, including the scope of the prohibition of certain communications, an important part of our broadcaster outreach efforts.

30. **Reverse Auction Bidding Process.** We adopt a descending clock format for the reverse auction. In each bidding round, stations will be offered prices for one or more bid options and will indicate their choices at these prices. The prices offered to each station for options will be adjusted downward as the rounds progress in a way that accounts for the availability of television channels in different bands in the repacking process.\(^{53}\) “Intra-round bidding” will enable bidders to indicate price levels (between the opening- and closing prices in a round) at which they would like to either choose different bid options or drop out of the auction and remain in their home bands. A station will continue to be offered prices for bid options until the station’s voluntary relinquishment of rights becomes needed to meet the current spectrum clearing target. When all remaining active bidders are needed in this way, the reverse auction for the stage will end. If the final stage rule is satisfied in that stage, then the active bidders are winning bidders, and the price paid to each will be at least as high as the last price it agreed to accept.

31. **Forward Auction Pre-Auction Process.** At this time we adopt the same size-based bidding credits for the forward auction as the Commission applied in auctioning 700 MHz Band spectrum: 15 percent for small businesses (defined as entities with average annual gross revenues for the

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\(^{49}\) The Commission’s television allotment priorities implement the policy goals of § 307(b) of the Communications Act. 47 U.S.C. § 307(b). See § IV.B.1.b.iii (Bid Options/Channel Sharing Bid).

\(^{50}\) Potential channel sharers need not submit applications (only sharees), but must certify regarding their channel sharing agreements. “Sharer” refers to a licensee that agrees to share its channel with another licensee, but does not bid to relinquish spectrum usage rights to its channel in the reverse auction. “Sharee” refers to a licensee that bids to relinquish spectrum usage rights to its channel in the auction to share a different channel with another licensee.

\(^{51}\) See Spectrum Act § 6403(a)(3) (“The Commission shall 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 [the repacking process has] become effective . . . .”).

\(^{52}\) The prohibition will apply to all controlling interest holders in the licensee, and all directors and officers of the licensee. The prohibition will not apply to communications between (a) licensees that share a common controlling interest, director or officer (and between a licensee and a forward auction applicant that have similar overlapping interests) and (b) parties to a channel sharing agreement that is disclosed on a reverse auction application. See § IV.B.1.c (Confidentiality and Prohibition on Certain Communications).

\(^{53}\) The more potential for interference a station has, the more assigning it a channel is likely to limit the availability of channels for other stations, increasing the likely value of its bid to voluntarily relinquish spectrum usage rights.
preceding three years not exceeding $40 million) and 25 percent for very small businesses (defined as entities with average annual gross revenues for the preceding three years not exceeding $15 million). Soon we will initiate a separate proceeding to review our Part 1 designated entity rules. As part of that proceeding, we will consider whether any revisions made to the rules should apply to the incentive auction. Forward auction applicants will be subject to our existing Part 1 competitive bidding rules, with modifications we adopt today that, among other things, provide for the selection of generic licenses and prohibit communications with full power and Class A licensees during the auction process.

32. **Forward Auction Bidding Process.** We adopt an ascending clock auction format for the forward auction. Bidders will be able to bid for generic licenses in one or more categories. Intra-round bidding will be allowed. There will be a separate clock price for each category in each geographic area, and bidders will indicate the number of licenses that they demand at the current prices. The prices generally will rise from round to round, as long as the demand for licenses exceeds their availability. Bidders still demanding licenses when the clock prices stop rising in every license category in every area will become winners of those licenses, provided the final stage rule is satisfied. If the rule is not satisfied, those bidders will have an opportunity to make additional bids in an extended bidding round. Once the rule is satisfied, winners may indicate their preferences for frequency-specific licenses in an assignment round or a series of separate bidding rounds. Final license prices will reflect the winning bid amounts from the clock bidding rounds as well as any adjustments from the extended bidding and assignment rounds.

33. **Completion and Effective Dates/Processing of Bid Payments.** Reverse and forward auction “completion,” required for the repacking process to become effective, will occur when the Commission publicly announces that the incentive auction has ended. The repacking process will be “effective,” triggering Commission authority to borrow up to $1 billion from the U.S. Treasury to use toward the payment of relocation costs, when the results of the reverse and forward auctions and the repacking process are announced. We anticipate that the completion and effectiveness announcements will occur simultaneously. As soon as the auction is complete and the repacking process effective, we anticipate borrowing some or all of the available $1 billion from the Treasury for reimbursement of relocation costs. We will share forward auction proceeds with licensees that relinquish rights in the reverse auction as soon as practicable following the successful conclusion of the incentive auction.

34. **Post-Auction Transition.** A public notice will mark the effective date of channel reassignments based on the repacking process and specify any specific channel assignments for television stations that will continue to broadcast. Reassigned stations will have three months to file construction permit applications for any minor changes to their facilities necessary to operate on their new channels. Stations also may request alternate channels or expanded facilities on their new channels. Following the three-month application filing deadline, stations will have up to 36 months to transition to their new channels. Stations may request extensions of time to construct their new facilities, but no station will be allowed to continue operating on a reassigned or reallocated channel more than 39 months after the repacking process becomes effective. Licensees that successfully bid to turn in their licenses or to share a channel will have three months from their receipt of auction proceeds to cease operations on their pre-auction

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54 See § IV.C.1.b (Bidding Credits).

55 See § IV.C.2 (Forward Auction Bidding Process).

56 Spectrum Act § 6403(f)(2).

57 See § V.A (Auction Completion and Effective Date of the Repacking Process).

58 See § V.B (Processing of Bid Payments). We will distribute auction proceeds as they become available.
channels. We also adopt transition requirements for LPTV and TV translator stations, BAS operations, wireless microphones and related services.\(^59\)

35. **Reimbursement of Relocation Costs.** We adopt procedures to reimburse costs reasonably incurred by television stations that are reassigned to new channels in the repacking process, as well as by MVPDs to continue to carry such stations, from the $1.75 billion Reimbursement Fund established by Congress for that purpose.\(^60\) Under these procedures, we intend to issue eligible stations and MVPDs an initial allocation of funds, in designated individual accounts in the United States Treasury, to cover the majority of their estimated costs. The funds will be available for draw down as expenses are incurred. Additional funds will be allocated as necessary prior to the three-year statutory deadline for all reimbursements. We delegate authority to the Media Bureau to establish a list of eligible expenses and estimated costs, and to calculate the amount of the allocations to eligible entities.\(^61\) We adopt measures to minimize administrative burdens and to prevent waste, fraud, and abuse in the reimbursement process.

36. **Post-Auction Broadcast Regulatory Issues.** We will grandfather existing broadcast station combinations that otherwise would no longer comply with the media ownership rules as a result of the reverse auction. We concur with commenters that we should conduct extensive outreach to broadcasters, including minority- and female-owned broadcasters, to ensure that they are fully informed about the incentive auction. The Commission already has made significant efforts to inform broadcasters about the process, and we intend to continue and expand those efforts. To provide guidance to licensees interested in channel sharing and to promote certainty regarding channel sharing relationships following the incentive auction, we will require that channel sharing agreements include certain key provisions regarding licensee rights and responsibilities.\(^62\)

37. **600 MHz Band Technical and Service Rules.** We adopt for new 600 MHz Band licensees flexible use service rules under Part 27 of our rules, and technical rules similar to those governing the adjacent 700 MHz Band in order to speed deployment while protecting incumbent 700 MHz Band licensees from harmful interference. We will require mobile devices to be interoperable across the entire 600 MHz Band. We will require new 600 MHz Band licensees to build out to 40 percent of the population in their service areas within six years and to 75 percent of the population by the end of their initial license terms of 12 years.\(^63\) Subsequent license terms will be 10 years.

### III. THE REORGANIZED UHF BAND

38. The current UHF band consists of 228 megahertz of spectrum divided into 38 six megahertz channels that are primarily licensed to broadcast television service.\(^64\) In the Spectrum Act, Congress authorized the Commission to reorganize the UHF band so that the television stations that will remain on the air after the incentive auction occupy a smaller portion of the band, thereby freeing up a

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\(^{59}\) See § V.D (Transition Procedures for Other Services and Unlicensed Operations).

\(^{60}\) See Spectrum Act § 6403(b)(4)(A); § V.C.5 (Reimbursement of Relocation Costs).

\(^{61}\) In lieu of reimbursement, stations also may request service rule waivers to make flexible use of their spectrum in order to provide non-broadcast services, as long as they continue to broadcast at least one TV program stream. See Spectrum Act § 6403(b)(4)(B); see § V.C.5.e (Service Rule Waiver in Lieu of Reimbursement).

\(^{62}\) See § VI.A.2 (Channel Sharing Operating Rules). We also address in § VI.A.2 termination and assignment or transfer of channel sharing licenses, sharing by stations operating on channels reserved for NCE operations, sharing between full power and Class A stations, the carriage rights of sharing stations, and other issues related to channel sharing relationships.

\(^{63}\) If a licensee fails to meet its interim build-out benchmark, its initial license term will be shortened to 10 years. See § VI.B.2 (License Term, Performance Requirements, Renewal Criteria, and Permanent Discontinuance of Operations).

\(^{64}\) See NPRM, 27 FCC Rcd at 12362-66, paras. 12-22.
For Immediate Release

FCC ADOPTS NEW RULES FOR THE 6 GHz BAND, UNLEASHING 1,200 MEGAHERTZ OF SPECTRUM FOR UNLICENSED USE

Commission Provides a Boost to Wi-Fi and Other Unlicensed Uses While Protecting Incumbent Services in the Band

WASHINGTON, April 23, 2020—The Federal Communications Commission today adopted rules that make 1,200 megahertz of spectrum in the 6 GHz band (5.925–7.125 GHz) available for unlicensed use. These new rules will usher in Wi-Fi 6, the next generation of Wi-Fi, and play a major role in the growth of the Internet of Things. Wi-Fi 6 will be over two-and-a-half times faster than the current standard and will offer better performance for American consumers. Opening the 6 GHz band for unlicensed use will also increase the amount of spectrum available for Wi-Fi by nearly a factor of five and help improve rural connectivity.

The 6 GHz band is currently populated by, among others, microwave services that are used to support utilities, public safety, and wireless backhaul. Unlicensed devices will share this spectrum with incumbent licensed services under rules crafted to protect those licensed services and enable both unlicensed and licensed operations to thrive throughout the band.

The Report and Order authorizes indoor low-power operations over the full 1,200 megahertz and standard-power devices in 850 megahertz in the 6 GHz band. An automated frequency coordination system will prevent standard power access points from operating where they could cause interference to incumbent services.

The Further Notice of Proposed Rulemaking seeks comment on a proposal to permit very low-power devices to operate across the 6 GHz band to support high data rate applications including high-performance, wearable, augmented-reality and virtual-reality devices. The notice also seeks comment on increasing the power at which low-power indoor access points may operate.

Unlicensed devices that employ Wi-Fi and other unlicensed standards have become indispensable for providing low-cost wireless connectivity in countless products used by American consumers. In making broad swaths of the 6 GHz spectrum available for unlicensed use, the FCC envisions new innovative technologies and services that will deliver new devices and applications to American consumers and advance the Commission’s goal of making broadband connectivity available to all Americans, especially those in rural and underserved areas.

ET Docket No. 18-295; GN Docket No. 17-183

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Media Relations: (202) 418-0500 / ASL: (844) 432-2275 / TTY: (888) 835-5322 / Twitter: @FCC / www.fcc.gov

This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v. FCC, 515 F.2d 385 (D.C. Cir. 1974).
STATEMENT OF
CHAIRMAN AJIT PAI

Re:  Unlicensed Use of the 6 GHz Band, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 GHz and 24 GHz, ET Docket No. 18-295 and GN Docket No. 17-183.

The coronavirus pandemic has temporarily changed nearly every aspect of our lives. Most notably, of course, millions of American adults and children are staying at home. Many of those households have multiple connected devices; parents and kids may be using laptops, tablets, and smartphones, all at the same time. That might generate friction, but for the magic of the unlicensed airwaves—better known to most as Wi-Fi. For many of us, Wi-Fi has helped keep us connected to our families and friends, as well as the outside world. It enables children to take part in distance learning while their parents participate in video conferences for work. It allows Americans with medical issues to have virtual doctor’s appointments while those they live with stream *Tiger King* on Netflix.\(^1\) In short, sheltering in place would be a lot more difficult without Wi-Fi.

Of course, even before anyone had heard of COVID-19, Wi-Fi already carried more than half of the Internet’s traffic, and offloading mobile data traffic to Wi-Fi was vital to keeping our cellular networks from being overwhelmed. In a very real sense, Wi-Fi is the fabric that binds together all our digital devices.

And Wi-Fi will be even more important in the years to come. By one estimate, the economic value created by Wi-Fi in the United States is projected to double by 2023—reaching nearly $1 trillion.

To realize that potential, we need faster, stronger Wi-Fi networks. The good news is that the next generation of Wi-Fi, commonly called Wi-Fi 6, has already started rolling out. Wi-Fi 6 will be over two-and-a-half times faster than the current standard, and it will offer better performance for connected devices. But in order to fully take advantage of the benefits of Wi-Fi 6, we need to make more mid-band spectrum available for unlicensed use. It’s been a long, long time since we did that—and consumers deserve it.

So today, we take a bold step to increase the supply of unlicensed spectrum: we’re making the entire 6 GHz band—a massive 1,200 megahertz test bed for innovators and innovation—available for unlicensed use. By doing this, we are effectively increasing the amount of mid-band spectrum available for Wi-Fi by almost a factor of five. This will be a huge benefit to consumers and innovators across the nation. Wi-Fi NOW’s Claus Hetting, a champion of Wi-Fi innovation, said it perfectly: “The truth is that this 6 GHz spectrum boost will launch the Wi-Fi industry into a new growth trajectory. It will boost Wi-Fi’s massive indoor dominance. And surely—with the help of emboldened entrepreneurs everywhere—it will bring low-cost Wi-Fi (and unlicensed) connectivity to places where it has never been.”

Ultimately, I expect that 6 GHz unlicensed devices will become a part of consumers’ everyday lives. And I predict the rules we adopt today will play a major role in the growth of the Internet of Things, connecting appliances, machines, meters, wearables, smart televisions, and other consumer electronics, as well as industrial sensors for manufacturing. At the same time, our approach will ensure that incumbents in the 6 GHz band are protected from harmful interference. The microwave services that already use this band are critical to the operations of utilities, public safety, and wireless backhaul operations. And we are ensuring that those incumbents are protected by requiring the use of automated frequency coordination systems, which will only allow new standard-power operations in areas that will not cause interference to incumbent services, and by placing conservative power limits on low-power indoor operations.

Our decision today will also help us meet the mandate set forth by Congress in RAY BAUM’S Act to make more spectrum available for unlicensed use. It is part of our aggressive and balanced

\(^1\) I admit nothing. But it may be surmised that I have an opinion about Carole.
spectrum strategy: push more licensed and unlicensed spectrum into the commercial marketplace, including a mix of low-band, mid-band, and high-band spectrum. And freeing up this spectrum for unlicensed use will also help advance our nation’s leadership in 5G technologies. In fact, Cisco projects that 59% of mobile data traffic will be offloaded to Wi-Fi by 2022. And cellular operators will have a chance to augment their 5G mobile broadband services by using the 6 GHz band; 3GPP Release 16 will include a 5G New Radio specification for unlicensed, called 5G NR-U. In sum, the gain here to unlicensed users will also be a gain for their licensed counterparts.

In addition to the Report and Order, today’s Further Notice of Proposed Rulemaking explores possibilities for very low power devices in the 6 GHz band. Very low power devices could enable a new and innovative generation of personal area network technologies with low latency, high capacity, and all-day battery life. These very low power devices could include accessibility technology for Americans with disabilities, virtual reality gaming, augmented reality glasses, in-vehicle systems, and other emerging technologies which we can only now dream of. We look forward to compiling a robust record and acting quickly to make 6 GHz available for these very low power uses.

Our decision today benefited greatly from the extensive comments in the record and feedback from a variety of stakeholders. In particular, I’d like to thank broadcasters, wireless Internet service providers, cable operators, content distributors, public safety entities, utilities, and all the various industries that engaged in these issues in good faith and provided constructive feedback on our proposals. In order for the future of the 6 GHz band to be successful, we will need to see continued cooperation and constructive engagement from all these stakeholders.

I’d also like to thank all our hardworking FCC staff. This is one of the most complicated proceedings from an engineering perspective that the Commission has encountered in many years. And we couldn’t have reached this point without Bahman Badipour, Jamie Coleman, Monisha Ghosh, Navid Golshahi, Michael Ha, Ira Keltz, Paul Murray, Nick Oros, Barbara Pavon, Jamison Prime, Ron Repasi, Max Staloff, Hugh VanTuyl, and Aole Wilkinsel from the Office of Engineering and Technology; from the Wireless Telecommunications Bureau, Chris Andes, Ken Baker, Steven Buenzow, Kamran Etemad, John Lambert, Sean Spivey, and Janet Young; from the Office of General Counsel, Deborah Broderson, Mike Carlson, David Horowitz, Tom Johnson, Keith McCrickard, and Bill Richardson; from the Office of Economics and Analytics, Catherine Matraves, and Patrick Sun; from the International Bureau, Jose Albuquerque and Bob Nelson; from the Enforcement Bureau, Matthew Gibson, and Kathy Harvey; from Public Safety and Homeland Security Bureau, Brian Marenco and Michael Wilhelm; and from the Media Bureau, Sean Yun.
Antitrust: Commission fines Google €4.34 billion for illegal practices regarding Android mobile devices to strengthen dominance of Google's search engine

Brussels, 18 July 2018

The European Commission has fined Google €4.34 billion for breaching EU antitrust rules. Since 2011, Google has imposed illegal restrictions on Android device manufacturers and mobile network operators to cement its dominant position in general internet search.

Google must now bring the conduct effectively to an end within 90 days or face penalty payments of up to 5% of the average daily worldwide turnover of Alphabet, Google's parent company.

Commissioner Margrethe Vestager, in charge of competition policy, said: "Today, mobile internet makes up more than half of global internet traffic. It has changed the lives of millions of Europeans. Our case is about three types of restrictions that Google has imposed on Android device manufacturers and network operators to ensure that traffic on Android devices goes to the Google search engine. In this way, Google has used Android as a vehicle to cement the dominance of its search engine. These practices have denied rivals the chance to innovate and compete on the merits. They have denied European consumers the benefits of effective competition in the important mobile sphere. This is illegal under EU antitrust rules."

In particular, Google:
- has required manufacturers to pre-install the Google Search app and browser app (Chrome), as a condition for licensing Google's app store (the Play Store);
- made payments to certain large manufacturers and mobile network operators on condition that they exclusively pre-installed the Google Search app on their devices; and
- has prevented manufacturers wishing to pre-install Google apps from selling even a single smart mobile device running on alternative versions of Android that were not approved by Google (so-called "Android forks").

Google's strategy and the scope of the Commission investigation

Google obtains the vast majority of its revenues via its flagship product, the Google search engine. The company understood early on that the shift from desktop PCs to mobile internet, which started in the mid-2000s, would be a fundamental change for Google Search. So, Google developed a strategy to anticipate the effects of this shift, and to make sure that users would continue to use Google Search also on their mobile devices.

In 2005, Google bought the original developer of the Android mobile operating system and has continued to develop Android ever since. Today, about 80% of smart mobile devices in Europe, and worldwide, run on Android.

When Google develops a new version of Android it publishes the source code online. This in principle allows third parties to download and modify this code to create Android forks. The openly accessible Android source code covers basic features of a smart mobile operating system but not Google's proprietary Android apps and services. Device manufacturers who wish to obtain Google's proprietary Android apps and services need to enter into contracts with Google, as part of which Google imposes a number of restrictions. Google also entered into contracts and applied some of these restrictions to certain large mobile network operators, who can also determine which apps and services are installed on devices sold to end users.

The Commission decision concerns three specific types of contractual restrictions that Google has imposed on device manufacturers and mobile network operators. These have enabled Google to use Android as a vehicle to cement the dominance of its search engine. In other words, the Commission decision does not question the open source model or the Android operating system as such.

Google's dominance

The Commission decision concludes that Google is dominant in the markets for general internet search services, licensable smart mobile operating systems and app stores for the Android.
mobile operating system.

General search services

Google is dominant in the national markets for general internet search throughout the European Economic Area (EEA), i.e. in all 31 EEA Member States. Google has shares of more than 90% in most EEA Member States. There are high barriers to enter these markets. This has also been concluded in the Google Shopping decision of June 2017.

Smart mobile operating systems available for licence

Android is a licensable smart mobile operating system. This means that third party manufacturers of smart mobile devices can license and run Android on their devices.

Through its control over Android, Google is dominant in the worldwide market (excluding China) for licensable smart mobile operating systems, with a market share of more than 95%. There are high barriers to entry in part due to network effects: the more users use a smart mobile operating system, the more developers write apps for that system – which in turn attracts more users. Furthermore, significant resources are required to develop a successful licensable smart mobile operating system.

As a licensable operating system, Android is different from operating systems exclusively used by vertically integrated developers (like Apple iOS or Blackberry). Those are not part of the same market because they are not available for licence by third party device manufacturers.

Nevertheless, the Commission investigated to what extent competition for end users (downstream), in particular between Apple and Android devices, could indirectly constrain Google's market power for the licensing of Android to device manufacturers (upstream). The Commission found that this competition does not sufficiently constrain Google upstream for a number of reasons, including:

- end user purchasing decisions are influenced by a variety of factors (such as hardware features or device brand), which are independent from the mobile operating system;
- Apple devices are typically priced higher than Android devices and may therefore not be accessible to a large part of the Android device user base;
- Android device users face switching costs when switching to Apple devices, such as losing their apps, data and contacts, and having to learn how to use a new operating system; and
- even if end users were to switch from Android to Apple devices, this would have limited impact on Google's core business. That's because Google Search is set as the default search engine on Apple devices and Apple users are therefore likely to continue using Google Search for their queries.

App stores for the Android mobile operating system

Google is dominant in the worldwide market (excluding China) for app stores for the Android mobile operating system. Google's app store, the Play Store, accounts for more than 90% of apps downloaded on Android devices. This market is also characterised by high barriers to entry. For similar reasons to those already listed above, Google's app store dominance is not constrained by Apple's App Store, which is only available on iOS devices.

Breach of EU antitrust rules

Market dominance is, as such, not illegal under EU antitrust rules. However, dominant companies have a special responsibility not to abuse their powerful market position by restricting competition, either in the market where they are dominant or in separate markets.

Google has engaged in three separate types of practices, which all had the aim of cementing Google's dominant position in general internet search.

1) Illegal tying of Google's search and browser apps

Google offers its mobile apps and services to device manufacturers as a bundle, which includes the Google Play Store, the Google Search app and the Google Chrome browser. Google's licensing conditions make it impossible for manufacturers to pre-install some apps but not others.

As part of the Commission investigation, device manufacturers confirmed that the Play Store is a "must-have" app, as users expect to find it pre-installed on their devices (not least because they cannot lawfully download it themselves).

The Commission decision has concluded that Google has engaged in two instances of illegal tying:

- First, the tying of the Google Search app. As a result, Google has ensured that its Google Search app is pre-installed on practically all Android devices sold in the EEA. Search apps represent an important entry point for search queries on mobile devices. The Commission has found this tying conduct to be illegal as of 2011, which is the date Google became dominant in the market for app stores for the Android mobile operating system.
- Second, the **tying of the Google Chrome browser.** As a result, Google has ensured that its mobile browser is pre-installed on practically all Android devices sold in the EEA. Browsers also represent an important entry point for search queries on mobile devices and Google Search is the default search engine on Google Chrome. The Commission found this tying conduct to be illegal as of 2012, which is the date from which Google has included the Chrome browser in its app bundle. Pre-installation can create a *status quo* bias. Users who find search and browser apps pre-installed on their devices are likely to stick to these apps. For example, the Commission has found evidence that the Google Search app is consistently used more on Android devices, where it is pre-installed, than on Windows Mobile devices, where users must download it. This also shows that users do not download competing apps in numbers that can offset the significant commercial advantage derived through pre-installation. For example, in 2016:

- on **Android** devices (with Google Search and Chrome pre-installed) more than 95% of all search queries were made via Google Search; and

- on **Windows Mobile** devices (Google Search and Chrome are not pre-installed) less than 25% of all search queries were made via Google Search. More than 75% of search queries happened on Microsoft's Bing search engine, which is pre-installed on Windows Mobile devices.

Google's practice has therefore reduced the incentives of manufacturers to pre-install competing search and browser apps, as well as the incentives of users to download such apps. This reduced the ability of rivals to compete effectively with Google.

The Commission also assessed in detail Google's arguments that the tying of the Google Search app and Chrome browser were necessary, in particular to allow Google to monetise its investment in Android, and concluded that these arguments were not well founded. Google achieves billions of dollars in annual revenues with the Google Play Store alone, it collects a lot of data that is valuable to Google's search and advertising business from Android devices, and it would still have benefitted from a significant stream of revenue from search advertising without the restrictions.

2) **Illegal payments conditional on exclusive pre-installation of Google Search**

Google granted significant financial incentives to some of the largest device manufacturers as well as mobile network operators on condition that they *exclusively* pre-installed Google Search across their entire portfolio of Android devices. This harmed competition by significantly reducing their incentives to pre-install competing search apps.

The Commission's investigation showed that a rival search engine would have been unable to compensate a device manufacturer or mobile network operator for the loss of the revenue share payments from Google and still make profits. That is because, even if the rival search engine was pre-installed on only some devices, they would have to compensate the device manufacturer or mobile network operator for a loss of revenue share from Google across all devices.

In line with the recent EU court ruling in *Intel*, the Commission has considered, amongst other factors, the conditions under which the incentives were granted, their amount, the share of the market covered by these agreements and their duration.

On this basis, the Commission found Google's conduct to be illegal between 2011 and 2014. In 2013 (after the Commission started to look into this issue), Google started to gradually lift the requirement. The illegal practice effectively ceased as of 2014.

The Commission also assessed in detail Google's arguments that the granting of financial incentives for exclusive pre-installation of Google Search across the entire portfolio of Android devices was necessary. In this regard, the Commission dismissed Google's claim that payments based on exclusivity were necessary to convince device manufacturers and mobile network operators to produce devices for the Android ecosystem.

3) **Illegal obstruction of development and distribution of competing Android operating systems**

Google has prevented device manufacturers from using any alternative version of Android that was not approved by Google (Android forks). In order to be able to pre-install on their devices Google's proprietary apps, including the Play Store and Google Search, manufacturers had to commit not to develop or sell even a single device running on an Android fork. The Commission found that this conduct was abusive as of 2011, which is the date Google became dominant in the market for app stores for the Android mobile operating system.

This practice reduced the opportunity for devices running on Android forks to be developed and sold. For example, the Commission has found evidence that Google's conduct prevented a number of large manufacturers from developing and selling devices based on Amazon's Android fork called "Fire OS".

In doing so, Google has also closed off an important channel for competitors to introduce apps and services, in particular general search services, which could be pre-installed on Android forks. Therefore,
Google's conduct has had a direct impact on users, denying them access to further innovation and smart mobile devices based on alternative versions of the Android operating system. In other words, as a result of this practice, it was Google – and not users, app developers and the market – that effectively determined which operating systems could prosper.

The Commission also assessed in detail Google's arguments that these restrictions were necessary to prevent a "fragmentation" of the Android ecosystem, and concluded that these were not well founded. First, Google could have ensured that Android devices using Google proprietary apps and services were compliant with Google's technical requirements, without preventing the emergence of Android forks. Second, Google did not provide any credible evidence that Android forks would be affected by technical failures or fail to support apps.

The effects of Google's illegal practices

The Commission decision concludes that these three types of abuse form part of an overall strategy by Google to cement its dominance in general internet search, at a time when the importance of mobile internet was growing significantly.

First, Google's practices have denied rival search engines the possibility to compete on the merits. The tying practices ensured the pre-installation of Google's search engine and browser on practically all Google Android devices and the exclusivity payments strongly reduced the incentive to pre-install competing search engines. Google also obstructed the development of Android forks, which could have provided a platform for rival search engines to gain traffic. Google's strategy has also prevented rival search engines from collecting more data from smart mobile devices, including search and mobile location data, which helped Google to cement its dominance as a search engine.

Furthermore, Google's practices also harmed competition and further innovation in the wider mobile space, beyond just internet search. That's because they prevented other mobile browsers from competing effectively with the pre-installed Google Chrome browser. Finally, Google obstructed the development of Android forks, which could have provided a platform also for other app developers to thrive.

Consequences of the decision

The Commission's fine of \textbf{€4 342 865 000} takes account of the duration and gravity of the infringement. In accordance with the Commission's 2006 Guidelines on fines (see press release and MEMO), the fine has been calculated on the basis of the value of Google's revenue from search advertising services on Android devices in the EEA.

The Commission decision requires Google to bring its illegal conduct to an end in an effective manner within 90 days of the decision.

At a minimum, Google has to stop and to not re-engage in any of the three types of practices. The decision also requires Google to refrain from any measure that has the same or an equivalent object or effect as these practices.

The decision does not prevent Google from putting in place a reasonable, fair and objective system to ensure the correct functioning of Android devices using Google proprietary apps and services, without however affecting device manufacturers' freedom to produce devices based on Android forks.

It is Google's sole responsibility to ensure compliance with the Commission decision. The Commission will monitor Google's compliance closely and Google is under an obligation to keep the Commission informed of how it will comply with its obligations.

If Google fails to ensure compliance with the Commission decision, it would be liable for non-compliance
payments of up to 5% of the average daily worldwide turnover of Alphabet, Google's parent company. The Commission would have to determine such non-compliance in a separate decision, with any payment backdated to when the non-compliance started.

Finally, Google is also liable to face civil actions for damages that can be brought before the courts of the Member States by any person or business affected by its anti-competitive behaviour. The new EU Antitrust Damages Directive makes it easier for victims of anti-competitive practices to obtain damages.

**Other Google cases**

In June 2017, the Commission fined Google €2.42 billion for abusing its dominance as a search engine by giving an illegal advantage to Google's own comparison shopping service. The Commission is currently actively monitoring Google's compliance with that decision.

The Commission also continues to investigate restrictions that Google has placed on the ability of certain third party websites to display search advertisements from Google's competitors (the AdSense case). In July 2016, the Commission came to the preliminary conclusion that Google has abused its dominant position in a case concerning AdSense.

**Background**

Today's decision is addressed to Google LLC (previously Google Inc.) and Alphabet Inc., Google's parent company. The Commission opened proceedings concerning Google's conduct as regards the Android operating system and applications in April 2015 and sent a Statement of Objections to Google in April 2016.

Article 102 of the Treaty on the Functioning of the European Union (TFEU) and Article 54 of the EEA Agreement prohibit abuse of a dominant position.

More information on this investigation is available on the Commission’s competition website, in the public case register under the case number 40099.

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**Attachments**
- Google_applications_en.pdf
Google's Android restrictions illegally protect its internet search dominance.

- Requires manufacturers to pre-install Google Search and Google Chrome on Android devices.
- Pays manufacturers and mobile operators to pre-install Google Search exclusively.
- Restricts development of new open source versions of Android.

Fewer operating systems, browsers and search engines for consumers.
If you buy an Android phone, you’re choosing one of the world’s two most popular mobile platforms—one that has expanded the choice of phones available around the world.

Today, the European Commission issued a competition decision against Android, and its business model. The decision ignores the fact that Android phones compete with iOS phones, something that 89 percent of respondents to the Commission’s own market survey confirmed. It also misses just how much choice Android provides to thousands of phone makers and mobile network operators who build and sell Android devices; to millions of app developers around the world who have built their businesses with Android; and billions of consumers who can now afford and use cutting-edge Android smartphones.

Today, because of Android, there are more than 24,000 devices, at every price point, from more than 1,300 different brands, including Dutch, Finnish, French, German, Hungarian,
Android provides choice

The phones made by these companies are all different, but have one thing in common—the ability to run the same applications. This is possible thanks to simple rules that ensure technical compatibility, no matter what the size or shape of the device. No phone maker is even obliged to sign up to these rules—they can use or modify Android in any way they want, just as Amazon has done with its Fire tablets and TV sticks.

To be successful, open-source platforms have to painstakingly balance the needs of everyone that uses them. History shows that without rules around baseline compatibility, open-source platforms fragment, which hurts users, developers and phone makers. Android’s compatibility rules avoid this, and help make it an attractive long-term proposition for everyone.

Creating flexibility, choice and opportunity

Today, because of Android, a typical phone comes preloaded with as many as 40 apps from multiple developers, not just the company you bought the phone from. If you prefer other apps—or browsers, or search engines—to the preloaded ones, you can easily disable or delete them, and choose other apps instead, including apps made by some of the 1.6 million Europeans who make a living as app developers.
In fact, a typical Android phone user will install around 50 apps themselves. Last year, over 94 billion apps were downloaded globally from our Play app store; browsers such as Opera Mini and Firefox have been downloaded more than 100 million times, UC Browser more than 500 million times.

This is in stark contrast to how things used to be in the 1990s and early 2000s—the dial-up age. Back then, changing the pre-installed applications on your computer, or adding new ones, was technically difficult and time-consuming. The Commission’s Android decision ignores the new breadth of choice and clear evidence about how people use their phones today.

A platform built for the smartphone era

In 2007, we chose to offer Android to phone makers and mobile network operators for free. Of course, there are costs involved in building Android, and Google has invested billions of dollars over the last decade to make Android what it is today. This investment makes sense for us because we can offer phone makers the option of pre-loading a suite of popular Google apps (such as Search, Chrome, Play, Maps and Gmail), some of which generate revenue for us, and all of which help ensure the phone ‘just works’, right out of the box. Phone makers don’t have to include our services; and they’re also free to pre-install competing apps alongside ours. This means that we earn revenue only if our apps are installed, and if people choose to use our apps instead of the rival apps.

Good for partners, good for
The free distribution of the Android platform, and of Google’s suite of applications, is not only efficient for phone makers and operators—it’s of huge benefit for developers and consumers. If phone makers and mobile network operators couldn’t include our apps on their wide range of devices, it would upset the balance of the Android ecosystem. So far, the Android business model has meant that we haven’t had to charge phone makers for our technology, or depend on a tightly controlled distribution model.

We’ve always agreed that with size comes responsibility. A healthy, thriving Android ecosystem is in everyone’s interest, and we’ve shown we’re willing to make changes. But we are concerned that today’s decision will upset the careful balance that we have struck with Android, and that it sends a troubling signal in favor of proprietary systems over open platforms.

Rapid innovation, wide choice, and falling prices are classic hallmarks of robust competition and Android has enabled all of them. Today’s decision rejects the business model that supports Android, which has created more choice for everyone, not less. We intend to appeal.

#AndroidWorks

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In July, in our response to the European Commission's competition decision against Android, we said that rapid innovation, wide choice and falling prices are classic hallmarks of robust competition, and that Android has enabled all of them. We believe that Android has created more choice, not less. That's why last week we filed our appeal of the Commission's decision at the General Court of the European Union.

At the same time, we've been working on how to comply with the decision. We have now informed the European Commission of the changes we will make while the appeal is pending.

First, we're updating the compatibility agreements with mobile device makers that set out how Android is used to develop smartphones and tablets. Going forward, Android partners wishing to distribute Google apps may also build non-compatible, or forked, smartphones and tablets for the European Economic Area (EEA).
Second, device manufacturers will be able to license the Google mobile application suite separately from the Google Search App or the Chrome browser. Since the pre-installation of Google Search and Chrome together with our other apps helped us fund the development and free distribution of Android, we will introduce a new paid licensing agreement for smartphones and tablets shipped into the EEA. Android will remain free and open source.

Third, we will offer separate licenses to the Google Search app and to Chrome.

We’ll also offer new commercial agreements to partners for the non-exclusive pre-installation and placement of Google Search and Chrome. As before, competing apps may be pre-installed alongside ours.

These new licensing options will come into effect on October 29, 2018, for all new smartphones and tablets launched in the EEA. We’ll be working closely with our Android partners in the coming weeks and months to transition to the new agreements. And of course, we remain deeply committed to continued innovation for the Android ecosystem.

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An update on Android for search providers in Europe

Earlier this year, we presented Android users with an option to download additional search and browser apps in Google Play. This follows the changes we made to comply with the European Commission’s decision on Android.

Next year, we’ll introduce a new way for Android users to select a search provider to power a search box on their home screen and as the default in Chrome (if installed). Search providers can apply to be part of the new choice screen, which will appear when someone is setting up a new Android smartphone or tablet in Europe.
Choose your search provider

The choice you make below will determine the default in a search box on your home screen and in Google Chrome. If you don't have the provider's app, it will be downloaded from Google Play.

- Qwant
- Ecosia
- Google
- Yahoo
As always, people can continue to customize and personalize their devices at any time after set up. This includes selecting which apps to download, changing how apps are arranged on the screen, and switching the default search provider in apps like Google Chrome.

The application process for search providers opens today and the new choice screen will be introduced to new Android phones in Europe in early 2020. If you are a search provider who would like to participate, please click here to learn more.

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