FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 73

[GN Docket No. 12–268, MB Docket No. 16–306; DA 17–107]

Incentive Auction Task Force and Media Bureau Adopt a Post-Incentive Auction Transition Scheduling Plan

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Media Bureau, in consultation with the Incentive Auction Task Force, the Wireless Telecommunications Bureau, and the Office of Engineering and Technology, adopts a methodology to establish construction deadlines and transitions schedule for full power and Class A television stations that are transitioning to new channels following the incentive auction.

DATES: Effective March 20, 2017.

FOR FURTHER INFORMATION CONTACT: Evan Morris, Video Division, Media Bureau, Federal Communications Commission, (202) 418–1656 or Erin Griffith, Incentive Auction Task Force, Federal Communications Commission, (202) 418–2957.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's document, DA 17–107, in GN Docket No. 12–268 and MB Docket No. 16–306; released on January 27, 2017. The full text of this document, as well as all omitted Illustrations, Figures and Tables are available on the Internet at the Commission's Web site at: *http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0127/DA-17-107A1.pdf;* or by using the search function for GN Docket No. 12–268, MB Docket No. 16–306 on the Commission's Electronic Comment Filing System (ECFS) Web page at *https://www.fcc.gov/ecfs/.* The full text is also available for public inspection and copying from 8:00 a.m. to 4:30 p.m. Eastern Time (ET) Monday through Thursday or from 8:00 a.m. to 11:30 a.m. ET on Fridays in the FCC Reference Information Center, 445 12th Street SW., Room CY–A257, Washington, DC 20554 (telephone: 202–418–0270, TTY: 202–418–2555). To request materials in accessible formats for people with disabilities, send an email to *FCC504@fcc.gov* or call the Consumer & Governmental Affairs Bureau at 202–418–0530 (voice), 202–418–0432 (TTY).

Synopsis

In the *Incentive Auction Report and Order* (*IA R&O*), 79 FR 48441, August 15, 2014, the Federal Communications Commission (Commission or FCC) delegated authority to the Media Bureau (the Bureau) to establish construction deadlines within the 39-month post-auction transition period for television stations that are assigned to new channels in the incentive auction repacking process. In consultation with the Incentive Auction Task Force (IATF), the Wireless Telecommunications Bureau (WTB), and the Office of Engineering and Technology (OET), the Bureau proposed a methodology for establishing deadlines within a ''phased'' transition schedule in the Transition Scheduling Proposal Public Notice. Commenters generally expressed support for the proposal, with some suggested modifications and additional measures to facilitate the transition. Based on the record in this proceeding, the Bureau adopts, with modifications, the phased transition plan proposed in the Transition Scheduling Proposal Public Notice, including use of the Phase Assignment Tool and the Phase Scheduling Tool. Most commenters support efforts to establish a phased transition process and the use of the tools developed to plan and create an orderly schedule. This methodology will be used after final channel reassignments are known in order to establish an orderly schedule that will allow stations, manufacturers, and other vendors and consultants, to coordinate broadcasters' post-auction channel changes. This Public Notice also addresses other matters related to the transition scheduling plan that commenters raised in response to the Transition Scheduling Proposal Public Notice.

Creating the Phased Transition Schedule. Phase Assignment Tool. As soon as possible after the forward auction satisfies the final stage rule and the final channel assignments are determined, the Bureau will use the Phase Assignment Tool to assign a transition phase to each eligible full power and Class A television station that receives a new post-auction channel as a result of the final channel assignment determination procedure. The Bureau has announced that it intends to send each eligible station that will remain on the air after the auction a confidential letter after the final stage rule is met that identifies the station's post-auction channel assignment, technical parameters, and assigned transition phase. We find that developing the final channel assignments and providing the information to affected stations as early as possible after the final stage rule is reached will facilitate early planning and provide additional time for stations to prepare construction permit applications.

We conclude that the information used to create the transition schedule is sufficiently detailed and reliable to establish phased transition deadlines once the final channel reassignments have been established. Launching an organized, phased schedule at the earliest opportunity will provide broadcasters, equipment manufacturers and other vendors and consultants, wireless providers, and television viewers with certainty and stability. This is particularly important as broadcasters prepare their construction permit applications, coordinate with other broadcasters, and begin construction planning. We understand that unforeseen circumstances may arise, and the Bureau will work closely with individual broadcasters, as well as broadcaster associations, during the transition process. However, we conclude that assigning stations to transition phases as soon as possible is necessary to carry out the transition in a timely manner.

We also decline suggestions to collect additional or different information about stations that face difficult approval processes or procurement issues prior to assigning stations to phases. The Phase Assignment Tool already includes a constraint identifying certain stations as ''complicated'' based on data collected by the Bureau. Commenters who advocated additional data collection did not identify a source of additional or different data, or explain how the Phase Assignment Tool should take such information into account. Furthermore, we emphasize that the obstacles faced by individual stations are not the only factor that the Phase Assignment Tool must consider. Regardless of the difficulty of any one station's move, certain stations must move together in the same phase or certain stations must move in one phase before additional stations can move in a subsequent phase because of station dependencies created by interference constraints. The Phase Assignment Tool is designed to organize the transition of all transitioning broadcast stations in an orderly fashion that respects station dependencies and interference constraints in addition to accounting for individual stations complexities, while simultaneously protecting television viewers. The Phase Assignment Tool as proposed strikes the appropriate balance with respect to these elements.

The constraints and objectives we adopt will minimize dependencies

created by interference issues, ensure that the 600 MHz Band is cleared as expeditiously as possible, cluster groups of stations into the same phase to help manage scarce transition resources, and minimize the impact of the transition on television viewers. Solutions identified by the Phase Assignment Tool—that is, assignments of stations to phases—must satisfy all constraints. Of the many possible solutions that meet all the constraints, the tool will use optimization techniques to then select the one that best meets the defined objectives. Each objective is implemented in order of priority. Thus, the higher the objective's priority, the greater its potential impact on the solution. We note that a few commenters specifically requested to be assigned to later phases or in the same phase. We deny such requests. The Phase Assignment Tool uses a holistic approach to assigning stations to phases that balances competing priorities and it is not practical to factor such requests into the optimization.

Constraints. The Bureau adopts eight of the constraints proposed in the *Transition Scheduling Proposal Public Notice.* The constraints are discussed below. Commenters generally support these constraints, as well as the constraints indicating that the tool would not assign stations to temporary channels, and we discuss each one below.

In addition to the eight constraints adopted below, the *Transition Scheduling Proposal Public Notice* proposed as constraints that no Canadian or U.S. station would be assigned to a temporary channel. Although temporary channels could be useful for breaking dependencies, the overwhelming number of commenters agreed with the Bureau's tentative conclusion not to use temporary channels and argued that the use of temporary channels should be permitted, but not required. Therefore, we will not assign any station to a temporary channel as part of the Phase Assignment Tool. While the restriction on temporary channels was included as a constraint in the proposal, it is unnecessary to include this restriction as a constraint in the final tool as the tool will not assign stations to temporary channels even absent such a constraint. As discussed below we will allow stations to voluntarily seek the use of a temporary channel.

Constraint 1. During the post-incentive auction transition, we will allow temporary increased pairwise (station-to-station) interference of up to two percent. As we previously stated, temporary pairwise interference increases of up to two percent could occur at any time during the transition on a station's pre-auction and/or post-auction channels. This constraint is likely to significantly reduce dependencies between stations. The Commission has in the past allowed temporary increases in interference to broadcasters in order to facilitate transitions to new service. Nothing in the Spectrum Act limits the Bureau's authority to permit temporary pairwise interference of up to two percent in order to facilitate the transition to post-auction channels.

In the *Transition Scheduling Proposal Public Notice,* we explained that limited increases in pairwise interference were unlikely to result in significant aggregate interference increases based on staff analysis, which reflects that aggregate interference levels are unlikely to exceed the pairwise limits except for a few cases. However, the Bureau will attempt to find an alternative phase assignment for any station predicted to receive more than five percent temporary aggregate interference, consistent with the constraints and objectives of the Phase Assignment Tool.

Constraints 2 and 3. No Canadian station will be assigned to a transition phase before the third phase. This constraint was developed in consultation with Canada. Additionally we will limit the number of transition phases to 10.

Constraint 4. To minimize consumer disruption during the 39-month transition period, and to promote the efficient use of tower crews, all stations within a DMA will be assigned to no more than two transition phases. This constraint alleviates concerns that viewers will need to complete frequent rescans during the transition. Broadcast commenters put forward a variety of proposals to modify this constraint, but none describe how their respective proposals would affect the overall phase assignments. One commenter proposes that the Commission modify this constraint to a single transition phase in each market. Another commenter supports the two-phase constraint, but urges the Bureau to require that the two phases occur ''back-to-back.'' Likewise, two other commenters suggest that all stations located on the same tower should be assigned to the same transition phase, or that the Commission should limit the number of stations that any one broadcast group has in a given phase. We reject these proposals. Staff analysis reflects that assigning stations within a DMA to two, potentially nonconsecutive phases, is crucial in providing the optimization with the flexibility to satisfy other constraints, such as limiting the number of linked stations per phase and keeping a relatively consistent number of stations assigned to each phase. The commenters' proposals would threaten the Phase Assignment Tool's ability to balance such competing goals.

At the same time, we agree with broadcasters that minimizing viewer disruption and efficiently clearing DMAs are important public interest goals. Accordingly, we adopt below the second objective of ''minimiz[ing] the sum, over all DMAs, of the number of times a DMA must rescan.'' If it is possible to satisfy the optimization's constraints and its first objective, and still assign stations to only one DMA, the optimization will attempt to do so using the second objective. We find that this approach gives the optimization the flexibility to balance competing priorities, including prioritizing television viewers and regional clusters.

Constraints 5 and 6. To balance the number of stations across transition phases, the difference in the number of stations in the largest transition phase and the smallest transition phase will be no more than 30 stations. One commenter suggests that the Bureau treat this constraint as an objective; however, objectives have less effect on the solution than constraints and we find that the benefits of this constraint cannot be achieved by making it an objective. While it is true that the actual makeup of stations within each phase may require varying draws on resources, we conclude that this constraint is the correct approach to ensuring the number of stations will be spread evenly throughout the transition phases. Furthermore, as proposed and adopted below, the Bureau has an objective that will attempt to further reduce the difference in the number of stations in the largest transition phase and the smallest transition phase if it can be accomplished while still satisfying all of the constraints and the objectives that come first in priority to that one. Every transitioning station will also only be assigned to one transition phase. We received no comment objecting to this constraint.

Constraint 7. No transition phase will have more than 125 linked stations as a result of the Phase Assignment Tool. One commenter proposes that the Bureau should treat this constraint as an objective. However, the commenter does not explain what priority such an objective should be given nor how its proposal would affect the overall balancing of the optimization's priorities. We decline to treat this constraint as an objective and find that

this constraint is the cornerstone of managing the breadth of coordination required of any station to complete its transition.

Constraint 8. No station falling into the ''complicated'' category will be assigned to Phase 1 under the Phase Assignment Tool. For the purposes of the Phase Assignment Tool and the Phase Scheduling Tool, ''complicated'' stations are those at locations previously determined as likely to face extraordinary hurdles. *See Auction 1000 Bidding Procedures Public Notice,* 80 FR 61917, Oct. 14, 2015 at paras. 265–75; *Application Procedures for Broadcast Incentive Auction Scheduled to Begin on March 29, 2016; Technical Formulas for Competitive Bidding,* 30 FCC Rcd 11034, 11176 n.9 (WTB 2015) (''Certain towers will require extraordinary means to move a station to a new channel . . . [S]tations at the following locations in the U.S. will be considered extraordinary: Mt. Sutro, Willis Tower, Hancock Building, Empire State Building, Times Square, Mount Mansfield, Lookout Mountain.''). One commenter asks the Bureau to clarify that the least complicated stations will be assigned to earlier transition phases. However, phase assignments hinge on several factors, and in particular must take into account station dependencies. For example, a complicated station may be positioned first in a daisy chain of interdependent stations, requiring that it move before all the other stations in that chain. Additionally, while a less complicated station with no dependencies may be able to move quickly, competing goals such as ensuring that DMAs transition in a limited number of phases and balancing resources across the transition may dictate later phase assignments for a specific station. We therefore decline to adopt the suggestion.

One commenter asks the Bureau to identify as complicated those structures that have the additional characteristics discussed in the *Auction 1000 Bidding Procedures Public Notice.* However, for purposes of the post-auction transition scheduling plan, we identified certain locations where stations are likely to encounter unusually difficult circumstances when completing their transitions. Only stations at locations on this discrete list, which have been identified as facing extraordinary hurdles, will be treated as complicated. As discussed below, however, we note that the transition schedule is based on reasonable assumptions about how long stations—whether they are within the complicated category or not—will need to complete their transitions. The amount of time used to estimate how long stations will need to transition is based on feedback from the industry and the *Widelity Report.* While the time estimates provided for complicated stations are consistent with the *Widelity Report* Case Study IV, to be even more conservative, constraint number eight guarantees that stations identified as complicated for the purpose of the Phase Scheduling Tool will have a minimum of two phases to complete their transitions since such stations will not be assigned to the first transition phase.

We adopt the four objectives and respective priorities proposed in the *Transition Scheduling Proposal Public Notice.* Specifically, the first objective will be to assign U.S. stations whose pre-auction channels are in the 600 MHz Band to earlier phases, while simultaneously assigning all Canadian stations and U.S. stations with pre-auction channels in the remaining television bands to later phases, where possible. The second objective is to minimize the sum, over all DMAs, of the number of times a DMA must rescan. The third objective is to minimize the total number of linked stations. The fourth objective is to minimize the difference between the number of stations in the largest transition phase and the smallest transition phase.

Commenters generally support these objectives; however, broadcast commenters disagree that prioritizing clearing the 600 MHz Band should be the first objective. We emphasize that all phase assignments must satisfy each of the eight constraints adopted above, most of which are designed to protect the interests that the broadcast commenters appear to believe should be of primary consideration. As noted, those constraints will protect broadcast services and television viewers from undue pairwise interference, limit the number of required rescans, minimize the impact of dependencies and thus the need for inter-station coordination, and create an organized phased approach that spreads the transition across 10 phases. The Commission also tasked the Bureau with developing a transition schedule that ''provide[s] certainty to wireless providers and [is] completed as expeditiously as possible.'' We find that the proposed prioritization of the four objectives strikes the appropriate balance and will encourage the expeditious clearing of the 600 MHz Band.

One commenter proposes that ''the two primary objectives be to maximize the health and safety of tower crews and the homes and businesses that are in close proximity to towers and to minimize service disruptions to viewers and users of other services that share broadcast towers.'' That commenter has not explained how we could incorporate such goals into the mathematical optimization model and we are unaware of any mechanism to accomplish the task. However, we note that the Phase Scheduling Tool estimates time periods for construction tasks based on industry information, and we believe that relying on such information is reasonable and will help to promote health and safety.

Phase Scheduling Tool. After the Phase Assignment Tool assigns stations to phases, the Bureau will use the Phase Scheduling Tool to produce an estimate of the average amount of time, in weeks, it will take all stations in a phase to complete their transition. The total number of estimated weeks for phase 10 is the total time estimate for the post-auction transition, based on the Phase Scheduling Tool's simulation. In order to obtain this estimate, the Phase Scheduling Tool uses the time and resource estimates to simulate how long it will take all the stations in each phase to obtain access to limited resources and complete their transitions. In the simulation, a station must complete the activities in the pre-construction and construction stages. If a required resource such as a tower crew is constrained, stations that require the resource will obtain access to it according to a randomly assigned simulation order. In other words, the Phase Scheduling Tool creates a random order within each phase to simulate the sequence in which stations within each phase will have access to limited resources. The output of the tool is the number of weeks it will take all stations in a phase to obtain necessary resources and complete their transition. Because the number of weeks needed may vary depending on the simulation order of the stations in each phase, the Bureau will run the Phase Scheduling Tool 100 times to generate the average time in weeks it takes to complete a phase. One commenter argues that the Bureau should use the longest timing estimates for all stations in a phase. We disagree that the Bureau should always use the longest timing estimate for all stations in a phase to set the phase transition deadline. By generating results for multiple simulation orders, the Phase Scheduling Tool produces a range of estimated completion times for each phase. Using those ranges as a guide will provide the staff with the flexibility it needs to create a reasonable transition schedule within the 39-month timeframe. As described below, the Bureau will use the resulting average of the estimated time required per phase to

guide its determination of the completion dates for each transition phase.

Many commenters agree that the Phase Scheduling Tool is an appropriate mechanism to guide the Bureau in setting deadlines for phases, and no commenter provided an alternative to the simulation tool. A few commenters contend that the tool is unrealistic because broadcasters often use specific vendors, and the vendors have preferred-customer relationships and may manufacture only on a first-come-first serve basis. These commenters argue that stations will not line up in a queue, especially if they risk going dark if they fail to meet their phase deadlines. However, the Phase Scheduling Tool does not mandate that broadcasters use particular vendors or access resources in a particular order in the real world. It is a simulation tool created to assist the Commission in setting reasonable deadlines for phases. Our plan provides flexibility for stations to make their preferred arrangements by starting all 10 transition phases at the same time, so that each station may start planning for its transition as soon as possible. Nevertheless, station and vendor cooperation will be an essential element of the transition plan and we urge all industry participants to be respectful of the overall demands of the transition on limited resources. We strongly encourage stations to be mindful of the overall transition plan when working with their vendors, and we note that we will closely monitor the progress of the transition. Examination of the record reflects that vendors are keenly aware of the need to prioritize projects by phase assignment where possible and would like stations to place orders for equipment as early as possible.

The Pre-Construction Stage will include (1) the time required for antenna equipment to be ordered, manufactured, and delivered and (2) the time required for all other planning and administration activities necessary to prepare for construction. These categories reflect the type of work that stations will need to do before they begin construction on their towers.

Antenna equipment manufacturing and delivery. In order to account for limits on antenna manufacturing and delivery, the Phase Scheduling Tool uses time estimates to simulate how long it will take manufacturers to manufacture and deliver an antenna to each station. The tool assumes that auxiliary antenna manufacturing and delivery will not be a constrained resource during the transition and that 75 percent of all stations will need to install an auxiliary antenna. A few commenters are concerned that manufacturers will not be able to meet the demand for antennas, and particularly auxiliary antennas, during the transition. Although several commenters point out auxiliary antennas will be a significant means of helping stations complete timely transitions, the majority of commenters contend that the manufacturing and availability of auxiliary antennas will not be constrained during the transition. We find that the model properly reflects the availability of antennas, including auxiliary antennas.

Some commenters argue further that manufacturers will not be able to maintain or increase manufacturing capacity throughout the transition. However, the other commenters argue that the vendor industry is ramping up to prepare for the transition. Additionally, the phased transition approach is designed to create a steady stream of work over the course of the transition, which should allow manufacturers to keep pace with demand. On balance, we conclude that the model accurately reflects the manufacturing and delivery capabilities of the vendors throughout the transition.

Administration/Planning. We adopt the estimates proposed in the *Transition Scheduling Proposal Public Notice* for the Administration/Planning component of the Pre-Construction Stage. The Administration/Planning component includes zoning, administration, legal work, and pre-construction alterations to tower and transmitter equipment. One commenter argues that structural tower improvements should not be considered in the Pre-Construction Stage. We disagree. Stations may start making structural tower improvements well before the transition begins in preparation for the transition and tower crews will engage tower work during both the Pre-Construction and Construction Phase. Another commenter notes that structural engineers may become a constrained resource during the process and that the transition plan should consider the availability of structural engineers when setting time estimates. While structural engineers will be needed throughout the transition, we expect that the heaviest strain on structural engineers will be in conjunction with the construction permit application process, and that structural engineers will not be a constrained resource during most of the transition. Commenters generally express two primary concerns with this component, first the amount of time it may take some stations to get through zoning and permitting, and second, the possible procurement issues facing public broadcast stations.

We acknowledge that local zoning authorities and entities such as the FAA, tribal or historic preservation offices, and municipal authorities will likely receive requests for approval during the transition and that these entities have important roles to play within their various jurisdictions. However, we are not persuaded that these procedural requirements necessitate increased time estimates. We conclude that the Widelity case studies will be sufficient for the majority of stations, and we are unconvinced that the time estimates for the transition schedule should be driven by the worst-case scenarios. The Phase Scheduling Tool provides conservative estimates for stations in three categories: Complicated, DTV, and Class A stations. This differentiation captures the varying timelines that the majority of stations in each group may face during Administration/Planning activities. We also note that because all phases will commence at the same time, stations in later phases will actually have significantly more time to complete their Administration/Planning activities than the time estimates provided in the simulation. For example, the Phase Scheduling Tool estimates that a DTV station would need 32 weeks to complete its administrative and planning activities. A station assigned to a later phase will have far more than 32 weeks to complete these tasks. The time estimates in the tool are intended to give each station the minimum time necessary to complete these tasks, but the majority of stations will have more than the minimum amount of time provided by the Tool.

Public television entities are concerned that the adopted timelines do not adequately take into account the needs of public broadcast stations, and they argue that such stations will face significant hurdles with financing and procurement. We conclude that the time estimates for the Administration/Planning component of the Phase Scheduling Tool for all stations are sufficiently conservative. Furthermore, commenters do not indicate how much additional time should be allocated to public stations. Because of the large number and variety of public stations and the case-by-case nature of each station's transition, we conclude that it is not reasonable to provide additional time to all public stations for the purposes of the Phase Scheduling Tool. Stations that anticipate these specific challenges should begin their transition process as early as possible.

The Construction Phase will include (1) the time to complete all general facets of construction (called ''Construction Related Work'') and (2) the time required by tower crews to install equipment on towers. One commenter requests clarity on the definition of ''tower work.,'' argues that tower structural modifications and RF equipment changes should not be separate as both of these activities will need to take place sequentially without any time separation to increase efficiencies and reduce crew movements (rigging and de-rigging), and also states that there are long-lead items for modifications too, such as guy wires, which can take from weeks to months for delivery. We note that the model does not break tasks down as discretely as this commenter suggests. However, the minimum time estimates for Administration/Planning and Construction Related Work provides enough time to complete the consecutive tasks and time to acquire the long lead-time equipment. Some commenters express concern regarding the time saving estimates for work done on the same tower, the number and qualifications of tower crews, and the impact of weather on construction. We adopt proposals for the Construction Phase component as described in the *Transition Scheduling Proposal Public Notice* with slight modifications based on the comments. Specifically, we adjust the time required to complete the work on towers having antennas for multiple stations. In addition, although the proposed time estimates are conservative and should provide enough to time for stations to complete their transitions without separately considering the issue of weather, in response to comments the Bureau will specifically consider the possibility of major weather-related delays when it assigns completion dates to each phase.

Tower work. Several commenters argue that the model overestimates the amount of time-savings that can be achieved by performing multiple installations on the same tower in a single, multi-station job. We find these arguments have merit. Accordingly, we modify our proposed approach to assume that construction on a tower will commence when the first station on that tower is ready to begin its construction work and the total time to complete all construction for all stations on that tower is equal to (a) the time required for the most difficult station (we assign this time to the first station) plus (b) the sum of the time estimates for all stations other than this first station, multiplied by 50 percent. This revised approach addresses the concerns identified by the commenters.

One commenter states that allowing only one week for a tower crew to install an auxiliary antenna is likely to be insufficient. On the other hand, another commenter identified that only three to four 3–5 additional days for this task. Based on the record we conclude that, as a general rule, one week is insufficient. A commenter proposes that the model should take into account special problems and timing needs of broadcasters that operate from ''fully-loaded towers.'' While we agree that fully-loaded (or close to fully-loaded) towers present some unique challenges, most such towers can be identified now and we expect stations on such towers can take mitigating steps now to work around this issue. Another commenter expresses concern that temporary antennas may not be able to solve the problem of fully-loaded towers. We note that while a tower may be fully-loaded today, it is possible that after the incentive auction, a tower may have additional capacity as the result of a station going off-air in the auction. Additionally, stations may have options beyond auxiliary facilities to help facilitate their transitions, and the Bureau is open to assisting stations with creative solutions that do not compromise the overall transition plan.

We find that the tool provides estimates intended to account for the ordinary time necessary to complete various tasks. It does not attempt to assess the specific time for each and every individual hypothetical scenario available, and it would not be possible for any scheduling tool to do so accurately. However, in response to the comments concerning potential coordination with other services (*e.g.,* FM radio or cellular providers) operating on the same tower as the reassigned station, as noted, we have modified the tool to substantially reduce the 'same tower discount' in order to account for the additional coordination that will be required. This reduced discount will more conservatively estimate the total tower work times to account for not only other television broadcasters but also other broadcast and non-broadcast facilities on the tower.

Crew availability and training. Commenters disagree about whether the Construction Phase tower crew estimates are reasonable. The Commission received varying estimates for the number of tower crews that will be available during the transition. Based on the totality of information received, we conclude that the estimated number of tower crews included in the tool for complex stations, DTV stations, and Canadian stations set forth in the *Transition Scheduling Proposal Public Notice* is reasonable. Many commenters have noted that companies are gearing up for the transition and training crews to perform tower work. Further, we disagree with one commenter that tower crews will be unavailable or untrained to work on U.S. towers and that companies will be working on wireless towers. We note that other comments offer a different assessment of crew availability. Nevertheless, the Phase Scheduling Tool includes conservative assumptions and the tool assumes that no Canadian tower crews will work on U.S. towers, and vice versa.

Weather. Although the Phase Scheduling Tool uses conservative estimates that will give most stations ample time to plan their transitions around any anticipated or unanticipated weather conditions, nearly all commenters suggest that the schedule should be more flexible in taking seasonal considerations into account. Commenters are primarily concerned with the impact of winter weather and potential hurricanes. It is not possible to adopt a scheduling plan that prevents the phase completion date of every phases from falling during winter months or hurricane season, even if we limit the restrictions to specific markets. We find that imposing such a restriction would be unnecessarily restrictive and would undermine the transition process, especially because adverse weather conditions may not materialize in all cases. However, in response to commenters, the Bureau intends to examine the output of the Phase Scheduling Tool and adjust the deadlines for early transition phases to accommodate weather. Later transition phases will be less sensitive to the impact of weather because the full transition period will be longer and industry participants will have longer periods to plan for particular weather concerns. As such, we encourage industry participants to anticipate weather-related considerations that might affect their transitions and to plan tower work accordingly in order to utilize the full transition phase. A station facing weather-related challenges may also consider implementing intermediate plans to ensure that it can be off its pre-auction channel while continuing to broadcast during the inclement weather.

The Bureau will use the simulations of the Phase Scheduling Tool to produce an estimate of the average amount of time, in weeks, it will take all stations in a phase to complete their transition. While all transition phases will begin at

the same time, the Bureau will assign each transition phase a completion date based on the average number of weeks determined by the Phase Scheduling Tool. Although the tool produces reasonable time estimates based on the detailed inputs set forth in the Appendix, it does not account specifically for certain factors that may warrant deadline adjustments, such as the relative length of the testing periods for each phase or seasonal considerations. For example, the phase completion date may be moved later if an early phase consisting primarily of stations in northern regions of the United States is projected to end in the middle of winter. Thus, the Bureau may adjust the phase completion dates from the average durations calculated by the tool to take such factors into account, consistent with the overall 39-month transition deadline imposed by the Commission's rules.

Additionally, consistent with the Bureau's proposal each phase will have sequential specified testing periods—defined by a start and end date, with the end date corresponding to the phase completion date. While stations may engage in planning and construction activities at any time prior to their phase completion date, equipment testing on post-auction channels will be confined to the specified testing periods. The wireless industry proposes that stations should be able to begin testing or operating on their post-auction channels outside of their assigned phase testing period. As a general matter, we will not allow stations to test or operate on their post-auction channels until their designated phase testing period. This restriction encourages stations to plan their transition around their particular phase deadline, which will minimize interference, incentivize the distribution of resources across the phases, and encourage stations within a phase to switch to their post-auction channels at roughly the same time, which will minimize confusion to television viewers. While the *Transition Scheduling Proposal Public Notice* contemplated that no stage would have a testing period shorter than four weeks, the Bureau may need to adjust the amount of time given to the testing periods of some phases to accommodate the overall transition schedule, particularly in the early transition phases. The Bureau retains the discretion to modify phase assignments, phase completion dates, and testing period dates as necessary throughout the 39-month transition. This discretion responds to commenters' requests that the Bureau have flexibility to accommodate real-world events. We note that as the transition progresses, the later phases should be better able to accommodate shorter testing periods because they have more time than stations in the early phases to prepare for their transition and complete their work.

While the majority of phase assignments and deadlines will not change once the initial transition schedule is released, in the unlikely event, for instance, that a station is ''unable to construct'' the facility specified in the *Closing and Channel Reassignment Public Notice* (Closing and Reassignment Public Notice), the Bureau may need to modify the transition schedule in order to grant an application filed during the first priority window for an alternate facility or channel. If changes to the transition schedule are necessary, stations impacted by the grant will only be moved to a later phase, not to an earlier phase. A station will not be moved to an earlier phase without its consent. Below we discuss in greater detail how we will evaluate direct requests to modify a station's phase assignment or other requests made after the initial transition schedule is announced in the *Closing and Reassignment Public Notice* that would necessitate a modification to the transition schedule in order to grant.

Other Matters Related to the Transition Scheduling Plan. As recognized in the *Transition Scheduling Proposal Public Notice,* there are various scenarios in which a station may seek to construct an expanded facility or use an alternate channel that differs from the technical parameters assigned to it in the *Closing and Reassignment Public Notice.* Some stations may also request extensions of their construction deadline and seek authority to continue operating on their pre-auction channel after their phase completion date, including a waiver of their phase completion deadline. In evaluating such requests, the Bureau proposed in the *Transition Scheduling Proposal Public Notice* to examine the impact that granting such requests would have on the phased transition schedule. Depending on the requesting station's proximity to Mexico or Canada, coordination may also be required from that particular country. While a station may request an extension of its construction permit deadline as set forth in 47 CFR 73.3700(b)(5), grant of such a request only permits the station additional time to complete its construction on its final channel and does not permit a station to continue operating on its pre-auction channel. In order to do so a licensee must request special temporary authority (STA).

Commenters representing wireless interests agree that any requests for relief from the requirements of the transition plan that could result in a station's transition taking longer than its assigned phase completion date, should be required to meet a high burden of proof and consider the impact on 600 MHz Band licensees. On the other hand, broadcast commenters assert that a heavy burden of proof runs counter to efforts to encourage a successful post-auction transition.

In order to facilitate a timely and orderly transition, we find that we must evaluate on a case-by-case basis requests for modification of any station's facility or transition deadline as set forth in the *Closing and Reassignment Public Notice,* to assess the impact of such requests on the transition schedule. Accordingly, we adopt the method for evaluating such requests proposed in the *Transition Scheduling Proposal Public Notice,* which states, ''[t]he Bureau will view favorably requests that are otherwise compliant with our rules and have little or no impact on the phase assignments or transition schedule. However, any request that the staff determines would be likely to delay or disrupt the transition, such as by causing pairwise interference above two percent to another station, creating additional linked-station sets, necessitating another station move to a different transition phase, or that is likely to cause a drain on limited transition resources required by other stations, will be viewed unfavorably. The Bureau will view requests that have such adverse effects on the transition schedule more favorably if the requesting station demonstrates that it has the approval of all the stations that would be affected if the request were granted, or it agrees to take steps during the transition period to mitigate the impact of the proposed request[.]'' 31 FCC Rcd at 10814–15, para. 27. We find that the proposed approach balances the important goal of clearing the 600 MHz Band within the 39-month transition period, as well as the additional goals of facilitating a smooth transition, limiting viewer impact, and providing broadcasters the flexibility to make requests that are necessary to construct their post-auction facility and address unforeseen circumstances to prevent stations from going dark. Commenters agree that flexibility is vital to facilitating a successful transition.

While the Bureau does not intend to grant requests that would disrupt the transition, our aim is not to discourage stations from proposing alternative

transition solutions that could create efficiencies or resolve unforeseen circumstances that could otherwise force a station to go dark. Indeed, such proposals may reduce reimbursement costs or implement a market-wide transition plan that could allow stations to more efficiently utilize limited resources, facilitate coordination, or reduce the impact of the transition on television viewers. Nonetheless, such proposals should specifically demonstrate that implementation would not interfere with other stations' transition efforts and address how implementation of the proposal may affect the transition schedule. If the Bureau grants such a request after considering such effects, it may choose to modify transition phase assignments and construction deadlines of the requesting station or, if necessary, other stations; however, no other station would be assigned to an earlier transition phase than it was originally assigned without its consent. Should the Bureau deny a request for a station to continue operating on its pre-auction channel past its phase completion date, stations can explore a variety of options to assist with their post-auction transitions, including the use of temporary channels and interim or auxiliary facilities.

In the *Transition Scheduling Proposal Public Notice* we also recognized that individual stations may request changes to their phase assignment, phase completion date, and/or testing period as set forth in the *Closing and Reassignment Public Notice.* We tentatively concluded that we would rely on existing rules and procedures to address such requests, and also sought comment on whether an alternative process should be established and, if changes to the transition plan are permitted, what rules or procedures would need to be waived. Commenters disagree whether existing Commission processes are appropriate for addressing such requests. Commenters that argue there should be different processes neither propose a specific process or explain why the Commission's existing rules would be insufficient. We find existing Commission processes are sufficient to address such requests.

Commenters also suggested that stations should have the flexibility to move to either an earlier or later transition phase. While our decision today does not prohibit stations from making either request, any request to modify a station's phase assignment will be subject to a high burden of proof and reviewed in the manner adopted above for determining the impact of a request on the overall transition schedule. Because earlier phases of the transition are likely to have greater resource constraints while equipment manufacturers and suppliers continue to ramp up capacity, we are less likely to be able to accommodate requests for stations to move into the first or second phase. When resolving a requested phase change we also will consider the impact such a request may have on viewers. As evidenced through our objectives and constraints, we believe viewers will benefit from stations in a given DMA transitioning together. Not only does this limit the total number of channel rescans for viewers, but multiple stations' communications with the public about the timing of a rescan supports education efforts.

We find that the record does not support the creation of any special sanction system related to transitioning stations, despite the call of some commenters to do so. A station that does not comply with the requirements of any Commission order may be subject to action as contemplated by the Commission's rules. A station that is found to have failed to comply with the requirements of any Commission order may be subject to action as contemplated by the rules. *See* 47 CFR 1.80 (forfeiture); 47 CFR 73.3598(e) (automatic forfeiture of an expired construction permit).

Temporary Joint Use of Channels and Temporary Individual Channel Assignments. The transition scheduling plan we adopt today does not mandate the use of temporary channels. However, some commenters have suggested that use of temporary channels may be appropriate on a voluntary basis, especially to prevent stations that are unable to meet their transition deadline from going dark or delaying the transition. Commenters have also suggested that the Commission could permit broadcasters to implement temporary channel sharing arrangements (hereinafter referred to as ''temporary joint use of channels'') to aide in their transition efforts. To the extent that the Commission permits the use of individual temporary channels, low power television interests request that the Commission provide transparency about when and for how long temporary channels will be used and whether a displaced LPTV station can apply for a channel that is slated to be used on a temporary basis. One commenter requests that the Commission limit the assignment of temporary channels to ''truly rare, exceptional and extreme situations,'' due to the hardship such assignments are likely to place on Class A and LPTV stations, as well as viewers.

Although we have concluded that the burdens of assigning temporary channels on a mandatory basis outweigh the benefits, we agree there may be situations in which the voluntary use of either an individual temporary channel or temporary joint use of a channel may aid the transition. We will therefore permit reassigned Class A and full power stations to make a request to operate on a temporary channel either on an individual or joint basis. When seeking authorization to operate on an individual temporary channel or engage in temporary joint use of a channel, a broadcaster must file with the Commission a request for STA proposing the channel it wishes to operate on and including the specific technical parameters. Because STAs are granted for a period of six months, a station may need to file for an extension of its initial STA authorization. Failure to do so while continuing to operate pursuant to the initial authorization would amount to operation without a valid authorization, which is a violation of Section 301 of the Communications Act. *See* 47 U.S.C. 301. Consistent with the requirements of Section 73.1635(a)(4) of the Rules, as part of any extension request an applicant must demonstrate the necessity of such extension and describe the steps that are being taken to resume operation on its post-auction channel assignment. *See* 47 CFR 73.1635(a)(4). Such requests may be made at any time during the transition period and must demonstrate that the proposal both complies with the Commission's technical rules and will not otherwise interfere with the transition. Use of an individual temporary channel or engaging in temporary joint use of a channel must be for purposes of facilitating the transition. To ensure continuity of service to viewers throughout the transition, a station availing itself of one of these voluntary options must maintain signal coverage of its community of license as required by Section 73.625 of the Rules.

A request for use of an individual temporary channel will be restricted to replicating a station's pre-auction coverage area and population served. Because we will evaluate applications requesting use of an individual temporary channel under the standard of review we have adopted for considering all requests during the transition, broadcasters should, at a minimum, evaluate whether their operation would require coordination with neighboring stations that are not already in the same linked-station set, thereby resulting in new linked-station

sets, or whether additional construction that may be required could divert resources from other stations. Temporary channels will also be subject to all applicable interference rules, unless otherwise waived by the Bureau. Furthermore, depending on the station's proximity to Mexico or Canada, coordination approval to operate on a temporary channel may be required from that particular country.

In order to provide maximum flexibility, we will permit a full power or Class A licensee to request authority to operate on an individual temporary channel in the new wireless band during the post-auction transition. Although T-Mobile supports broadcasters voluntarily using temporary channels, it requests that use of individual temporary channels be restricted to channels ''below the new wireless band.'' We believe foreclosing temporary operation in the new wireless band during the transition period would be too conservative an approach and could undercut the benefits of allowing broadcasters to request temporary channels because there may be limited available temporary channels in the television band. However, to balance the interests of wireless operators in starting construction and commencing operations in cleared spectrum, when evaluating requests for individual use of a temporary channel in the new wireless band we will require broadcasters to demonstrate that there is no reasonable alternative to operating in the new wireless band and provide written consent from the wireless licensee(s) of the channel that the broadcaster wishes to temporarily operate on, as well as written consent from any wireless licensee(s) that would otherwise be required to protect the broadcaster's operations under the Commission's inter-service interference (ISIX) rules. Consistent with the policies outlined in the *Broadcast Transition Procedures Public Notice,* no STA may cause impermissible interference to wireless licensees. Additionally, the Bureau will view unfavorably any application or request that the staff determines would be likely to delay or disrupt the transition, including by delaying or disrupting the deployment of new wireless services in the 600 MHz Band.

In the case of a request for temporary joint use of a channel, the applicant (joint user) must include with its request a written authorization from the licensee of the host station. A joint user will continue to be a Commission licensee, and will temporarily operate at variance from its authorized parameters pursuant to an STA. As such, joint users must continue to comply with all requirements under the rules and the Communications Act that would otherwise be required operating on their own channel.

Commercial and noncommercial educational (NCE) stations may request to engage in temporary joint use of a channel. A reserved channel NCE licensee that is granted authority to operate temporarily on a non-reserved channel must continue to operate on an NCE basis. We will evaluate requests by commercial stations for temporary joint use of a channel licensed to an NCE station on a case-by-case basis. We will also consider requests to allow a Class A station to operate under the Part 73 rules governing power levels and interference to jointly use a full power television station's channel on a temporary basis for the purpose of facilitating the Class A station's transition. A full power station requesting to temporarily jointly use a Class A station's channel for the purpose of facilitating the transition will be required to operate under the Part 74 power level and interference rules.

Transition Project Management and Progress Reporting. Commenters offered a number of suggestions on how the Commission should manage its staff and resources to facilitate the transition process. For instance, several commenters recommend that as part of the post-auction transition process, the Commission should consider hiring a third party contractor or a full-time internal project manager to manage the transition. One commenter suggests that the Commission should begin building relationships and working with other federal, state, and local government entities that will likely be involved in the transition, and also recommends that the Commission also establish ''an online resource center'' where service providers and suppliers can list themselves as available to work on the transition. Another commenter suggests that the Commission should designate particular FCC staff who would be familiar with the specific difficulties faced by state and institutional licensees and could be made available for purposes of supporting public broadcasters' efforts. Other commenters recommend the establishment of a ''web portal'' to disseminate transition information to all affected parties. While at this time we are declining to adopt any of the commenter's specific suggestions, we intend to dedicate sufficient resources to monitor the progress of the transition and keep affected parties informed.

Commenters have also recommended that the Commission require reassigned stations to file progress reports so that the Commission and interested parties can monitor the transition progress of reassigned stations, identify problem areas, develop solutions, and, if needed, adjust transition deadlines. In the *Incentive Auction R&O,* the Commission determined that entities receiving reimbursement will be required, on a regular basis, to provide information to the Commission showing how the disbursed funds had been spent and what portion of their construction is complete. The Bureau has developed and set filing deadlines for a progress report (FCC Form 2100 –Schedule 387) that broadcast television stations that are eligible to receive payment of relocation expenses from the Reimbursement Fund will file to track how disbursements have been spent and identify the progress and status of their construction efforts. The Bureau also proposed to require broadcast television stations that are not eligible to receive reimbursement but must transition to new channels as part of the Commission's channel reassignment plan to file the same form on the same schedule during the transition period. The Incentive Auction Task Force and Media Bureau Release Transition Progress Report Form and Filing Requirements for Stations Eligible for Reimbursement From the TV Broadcast Relocation Fund and Seek Comment on the Filing of the Report by Non-Reimbursable Stations, 82 FR 9009, February 2, 2017. As suggested by commenters, the form will allow the Commission to monitor the progress of the transition in real time, identify problem areas, and as needed develop solutions.

Interim and Auxiliary Facilities. We agree with commenters that interim and auxiliary facilities will be an important part of the transition for broadcasters and we will take action as appropriate to facilitate the use of such facilities and equipment. In order for a station to continue operating on its pre-auction channel while its current primary antenna is removed and a new channel antenna installed, we expect many stations will need to utilize auxiliary facilities and equipment. In order to operate an interim or auxiliary facility a station will need to file a request for an STA. In some cases, stations may wish to share auxiliary equipment and facilities, such as broadband antennas, with other stations.

Nothing that we adopt today restricts a station from filing a request for STA to operate on its post-auction channel using an auxiliary facility prior to its phase completion date. While we understand wireless providers' desire that the 600 MHz Band be cleared

expeditiously, we also must maintain an orderly process and respect the interference constraints that the transition presents and that transition scheduling plan is meant to address. We will therefore evaluate such requests in the same manner and subject to the same standard of review that we would a station that seeks to continue operating on its pre-auction channel after its phase completion date. Additionally, as with requests for temporary joint use of a channel, the Media Bureau will view unfavorably any application or request that the staff determines would be likely to delay or disrupt the transition, including by delaying or disrupting the deployment of new wireless services in the 600 MHz Band. We also commit to process all applications in an expeditious manner and will continue to work with interested parties to efficiently process applications, however we decline to commit to adopt specific processing prioritizations for applications as one commenter suggests.

Confidential Letters and Prohibited Communications. Nearly every commenter in this proceeding asked that the Commission restate, clarify, or, if necessary, waive, the auction rules prohibiting certain communications to enable stations to make productive use of channel reassignment information as soon as possible after receiving their channel assignment in the confidential letters that will be sent approximately three to four weeks from the date that the final stage rule was met. The prohibited communications rule prohibits broadcasters and forward auction applicants from communicating any incentive auction applicant's bids or bidding strategies to other parties covered by the relevant rules. Commenters' concern is that the rule prohibits broadcasters from engaging in communications that would be helpful in preparing for the post-auction transition, or that it discourages broadcasters from making such communications to avoid the risk of violating the prohibition. In light of these comments, we now provide guidance on the rule as it pertains to broadcasters and the post-auction transition—particularly their ability to hold discussions with vendors not covered by the rule. The Wireless Telecommunications Bureau intends to address any appropriate waiver of the rule when letters regarding post-auction channel assignments are sent.

As an initial matter, a great many preparations that broadcasters may undertake with respect to the transition to post-auction channel assignments will not involve prohibited communications. For example, broadcasters may communicate with third parties not covered by the prohibition, such as consulting engineers, equipment vendors, and counsel, without violating the prohibition, even if the communication discloses bids and bidding strategies. A broadcaster or other covered party still should take care, however, that the third party to which such communications are made does not convey the information to another covered party, which would violate the prohibition.

In addition, broadcasters may communicate with other covered parties regarding many issues in the post-auction transition without disclosing bids and bidding strategies. For example, broadcasters that did not apply to participate in the auction do not have bids and bidding strategies of their own to disclose and so may communicate regarding their own post-auction transition without violating the prohibition. Such broadcasters must bear in mind, however, that they still are prohibited from communicating any other incentive auction applicant's bids and bidding strategies of which they may have learned, such as a channel sharing partner's bids or bidding strategies. Finally, broadcasters that did apply but kept that fact confidential also may be able to communicate regarding post-auction channel assignments without disclosing bids and bidding strategies.

We recognize that certain broadcasters cannot communicate with other broadcasters regarding post-auction channel assignments without disclosing bids and bidding strategies (though they may communicate with non-covered third parties, as indicated above). For example, a UHF broadcaster with a winning bid to move to a VHF channel cannot communicate its post-auction channel assignment without communicating its bidding strategy. Likewise, a broadcaster that publicly disclosed that it had applied to participate in the auction could implicitly disclose the results of its bidding when it discloses a post-auction channel assignment. Moreover, any communications that disclose a post-auction channel sharing arrangement effectively would disclose the sharee station's bids and bidding strategies in the auction.

Since the final stage rule has been met, bidding in the reverse auction is complete, although forward auction is still ongoing. Accordingly, some relief from the prohibition for communications among broadcasters may be appropriate, particularly where doing so would assist the public interest in a smooth post-auction transition. We are sensitive to the concerns raised by commenters and will address them specifically at the time post-auction channel assignment information is provided to broadcasters.

Matters Outside of the Scope of the Proceeding or Previously Addressed in Other Proceedings. A number of commenters raised concerns regarding the sufficiency of the 39-month transition period. Modification of the length of the 39-month transition period is beyond the Bureau's delegated authority and outside the scope of this proceeding. We note that the 39-month transition period is the subject of a petition for reconsideration that remains pending before the Commission in GN Docket No. 12–268. The purpose of this notice is to carry out the Commission's directive to assign construction deadlines within the 39-month period prescribed by the Commission.

Several parties seek clarification as to the eligibility of certain costs for reimbursement from the TV Broadcaster Relocation Fund (Reimbursement Fund). One commenter states that the Commission should assure broadcasters that any costs associated with voluntary transition plans will be eligible for reimbursement from the Reimbursement Fund. The Commission anticipated the possibility of using temporary channels, as well as interim and auxiliary facilities to facilitate the transition and stated that the reasonably incurred costs of such equipment would be eligible for reimbursement. *See Incentive Auction R&O,* 79 FR 48441 at 48501, para. 451. However, as already made clear by the Commission, reassigned stations constructing alternate or expanded facilities applied for outside of the ''non-priority window'' will only be eligible for reimbursement for the eligible costs of relocating to the channel and facilities specified in the *Closing and Channel Reassignment Public Notice. See id.* 450. Another commenter expressed concern that the cost of carriage of temporary channels should not be borne by MVPDs. As stated in the *Incentive Auction R&O,* MVPDs are eligible for reimbursement when they reasonably incur costs in order to maintain carriage of a broadcast station. Finally, a broadcaster seeks clarification as to who will be financially responsible when other services, such as FM, LMR, wireless, or LPTV, are impacted by the transition. With respect to costs incurred by non-reimbursement-eligible entities, the Commission explained in the *Incentive Auction R&O,* that reimbursement claims from reassigned stations for costs incurred by non-eligible entities would

be limited to instances in which ''the reassigned broadcaster has a contractual obligation to pay these expenses through a contract'' that was entered into on, or before, the release date of the *Incentive Auction R&O,* which was June 2, 2014. *See also id.* at 48497, para. 429.

Thus, reimbursement-eligible entities with such contractual obligations may submit for consideration reimbursement claims only for expenses incurred by non-eligible entities that they are obligated to pay under such timely-entered contracts. To the extent these requests seek an affirmative declaration that certain costs will be reimbursed, we decline to pre-judge the eligibility of particular reimbursement expenses, and we remind parties that whether or not a cost is ''reasonably incurred'' and eligible for reimbursement will be evaluated on a case-by-case basis. Whether or not a specific cost meets the ''reasonably incurred'' standard for reimbursement must be evaluated on a case-by-case basis. *See id.* at 48500, para. 446.

Commenters representing the interests of LPTV and TV translator stations filed comments arguing that the Bureau failed to fully address the impact of the transition scheduling plan on LPTV and translator licensees and that the Bureau should take certain actions to address the impact of the post-incentive auction transition on their stations and interests. Commenters provided several actions the Commission could take to ease the impact of the transition on LPTV and translator stations, including: forbearing from enforcement of Section 312(g) of the Act; extending the minimum distance rule for displaced LPTV and translator stations from 30 miles to 250 miles; specifying in the transition plan when the LPTV displacement window will open; and flexibly waiving rules to minimize the impact of the transition on displaced LPTV and translator stations. We find these proposed actions have already been addressed in other Commission proceedings. We therefore decline to adopt any of these proposals. We remain sensitive, however, to the concerns of the LPTV and TV translator community and will continue to explore measures, as we have already committed to doing, to alleviate the impact of repacking on displaced LPTV and TV translator stations. The Commission also adopted rules to permit channel sharing between LPTV and TV translator stations as an additional means to help displaced stations that have difficulty finding available channels to team with other such stations in the same predicament.

Several commenters also raise issues that are already addressed by our existing rules. As an initial matter, we note that LPTV and TV translator stations that are displaced by full power or Class A stations reassigned a new channel in the repacking process may continue to operate on their current channel until the displacing television station is operational, at which time the LPTV or TV translator must cease operations. We note that a change in frequency, other than for a station that is displaced, is a ''major change'' and that applications for new stations or major changes by LPTV and TV translator stations are currently frozen. One commenter sought clarification as to when displaced LPTV and TV translators may begin operating on their new displacement channel. Because displacement facilities may not cause interference to full power or Class A television stations (either pre-auction, those set forth in the *Closing and Reassignment Public Notice,* or alternative channels and expanded facilities proposed during the applicable filing window), operation will not be contingent on the post-auction transition schedule and stations may begin operating at any time following the grant of the construction permit for their displacement facilities. *See Incentive Auction R&O,* 79 FR 48441 at 48505, para. 475. Finally, several commenters sought clarity concerning the operation of temporary facilities by displaced LPTV and TV translator stations. LPTV and TV translator stations are permitted to apply for special temporary authority to operate the facilities proposed in a pending displacement application so long as the application is acceptable for filing and has appeared on a proposed grant list.

Administrative Matters. Pursuant to the Regulatory Flexibility Act of 1980, as amended, a Final Regulatory Flexibility Analysis (FRFA) relating to the Public Notice is included.

This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4).

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Appendix A: Phase Assignment and Scheduling Tools

This appendix sets forth the methodology for assigning construction deadlines to stations to transition to new channel assignments following the broadcast television spectrum incentive auction. This is necessary because potential ''dependencies,'' or interference relationships, exist between certain television stations on pre-auction and post-auction channels which will impact the transition process. Stations with dependencies must coordinate in order to test equipment or begin operating on their new channels without causing interference to other stations. In many cases such coordination may only involve stations agreeing to operate at lower power or accept increased interference for short periods of time while the stations are performing tests, but dependencies can often involve numerous and/or distant stations, which makes successful coordination more complicated. The methodology adopted by this Public Notice provides a means of breaking dependencies in order to reduce the need for coordination and to make coordination more manageable.

Under this methodology, stations will be assigned to 10 transition phases. The phases will all begin at the same time when channel reassignments are announced in the *Closing and Reassignment Public Notice,* but each phase will have sequential end dates. Equipment testing on post-auction channels will be confined to set ''testing periods.'' With the exception of the first phase, the testing period for subsequent phases will begin on the day after the end of the preceding phase. Every station must cease operating on its pre-auction channel at the end of its assigned phase, also known as the ''phase completion date.''

The methodology will utilize two computer-based tools to assign stations to phases and then to establish phase completion dates for each phase. First, stations will be assigned to phases using the ''Phase Assignment Tool,'' which applies mathematical optimization techniques to identify, among possible solutions that satisfy a set of defined rules or constraints, a solution that best meets a separate set of defined objectives. Section III below discusses the Phase Assignment Tool.

After stations are assigned to phases, the ''Phase Scheduling Tool'' will be used to determine the phase completion date for each phase. The Phase Scheduling Tool estimates the total time

necessary for stations assigned to a phase to perform the tasks required to complete the transition process. In addition to accounting for factors such as transmission power and tower height that are likely to impact the time required for individual stations to complete the transition to a new channel, the Phase Scheduling Tool also accounts for potential delays created by resource limitations that may affect when a station can obtain resources such as new antennas or tower crews. The Phase Scheduling Tool simulates stations completing the transition and outputs the time needed to complete each phase given a random order (called ''simulation order'') in which stations have access to scarce resources. The tool runs 100 simulations, each with a different simulation order to generate the average time in weeks it takes to complete a phase. Based on those results, the Bureau may then exercise limited discretion to modify the phase completion dates from the average durations calculated by the tool to account specifically for certain factors that may warrant deadline adjustments, such as the relative length of the testing periods for each phase or seasonal considerations. For example, the phase completion date may be moved later if an early phase consisting primarily of stations in northern regions of the United States is projected to end in the middle of winter. This exercise of discretion will be done in consultation with Innovation, Science and Economic Development Canada (ISED Canada) as it impacts Canadian stations. In Section IV below, we discuss the Phase Scheduling Tool and its inputs, including the specific tasks required for stations to transition and the estimated time required to complete each task.

The methodology set forth herein differs from that proposed in the September 30 *Transition Scheduling Proposal Public Notice* in several respects. First, in the unlikely event that a station is predicted to incur temporary aggregate interference greater than five percent, the Phase Assignment Tool will be re-run in an attempt to reduce the temporary aggregate interference of all stations below five percent while simultaneously adhering to all constraints and objectives. The second change concerns the Phase Scheduling Tool. The amount of time allocated to tower construction on towers with multiple stations has been increased substantially. These changes were adopted in response to comments regarding the *Transition Scheduling Proposal Public Notice,* and are discussed below and in this Public Notice adopting the post-incentive auction transition scheduling plan.

This Appendix provides interested parties with sufficient information to replicate the methodology for determining the overall transition schedule. The Phase Assignment Tool implements the objectives and constraints using commercially-available optimization software. The Phase Scheduling Tool leverages an open source discrete event simulation software package using inputs described herein. The data presented is the output of applying this methodology to representative final television channel assignment plans for two 84 MHz spectrum clearing scenarios, and also making certain assumptions regarding Canada and Mexico based on ongoing coordination with those countries. The representative examples presented herein are for illustrative purposes only and are based on channel assignments that do not rely on or predict any auction results. The scenarios are ''representative'' in the sense that they are consistent with the plans generated by the Commission's Final Television Channel Assignment Plan determination procedure based on numerous auction simulations conducted by the staff. With the Final Stage Rule now met during Stage 4, the auction will clear 84 MHz. Therefore, we use two 84 MHz scenarios as representative examples. We are not publicly releasing the underlying simulations, which makes assumptions regarding reverse auction participation and outcomes. Interested parties can create their own television channel assignment plans for any spectrum clearing scenario by applying the Assignment Plan determination procedure to auction simulations based on their own assumptions of likely outcomes.

Section II: Dependencies and Means of Breaking Them. Before beginning to operate on their post-auction channels, stations ideally should be able to test equipment on their new channels. During the transition, however, there is a potential for undue interference between stations that are still operating on their pre-auction channels and stations testing or operating on their post-auction channels. The Commission's rules governing interference between stations before and after the post-auction transition will limit interference between stations that are both operating on their pre-auction channels and between stations that are both operating on their post-auction channels, respectively. In adopting a methodology for assigning construction deadlines to transitioning stations, the staff has sought to avoid undue interference while providing as much flexibility as possible for stations to test equipment prior to commencing operations on their new channels. The ''Precedence Daisy-Chain Graph'' (Graph) described in the examples below explicitly captures any interference that may occur between stations operating on their pre-auction and post-auction channels.

The Graph is constructed as follows: nodes are stations and a directed arc connects two nodes (*s* and *s'*) when station *s* cannot transition until station *s'* has transitioned to its post-auction channel because the current channel of station *s'* interferes with the future channel of station *s.* This relationship is called a *dependency.*

Example 1: Dependency. [Illustration Omitted]. In Example 1 above, suppose Station A and Station B have co- and adjacent-channel interference restrictions on all channels. Station A is reassigned from channel 25 to channel 18. Station B is reassigned from channel 45 to channel 26. Station A must vacate channel 25 before Station B can move to channel 26 so that neither station will experience undue interference. Therefore, the Example 1 graphic includes a directed arc from Station A to Station B since Station A must transition before Station B (Station B is *dependent* on Station A in order to transition).

Example 2: Daisy-Chain. [Illustration Omitted]. Multiple dependencies can be connected, forming a *daisy-chain.* Example 2 illustrates a daisy chain of 4 stations. Station A must transition before Station B. Station B must transition before Station C. And Station C must transition before Station D. Thus, Stations A, B, and C all must transition before Station D can transition.

Daisy-chains can involve numerous stations and multiple transition dependencies. Figure 1 below illustrates a single daisy-chain involving 29 stations in the Northeast in a simulated outcome where the Commission repurposes 84 MHz of broadcast spectrum through the incentive auction. [Figure 1 Omitted]

Successful coordination to avoid undue interference among the stations illustrated in Figure 1 will be challenging, given the number of stations involved and their distance from one another. In order to reduce or eliminate the need for coordination, the chain could be broken by assigning stations to transition during different time periods or ''phases.'' At least 29 separate transition phases would be needed to break the chain completely so that every station in the chain could

transition without the need for coordination. A large number of transition phases undercuts other potential transition goals, such as transitioning stations within the same region at the same time and avoiding the need for multiple channel rescans by viewers. Therefore, in order to balance these goals, a certain number of stations within a daisy chain would need to be assigned to the same transition phase, thereby reducing or ''collapsing'' the daisy chain into a more manageable size. For example, the six northern-most stations in the 29 station daisy-chain in Figure 1 above could be assigned to the first transition phase. Each station in this collapsed daisy chain would have to coordinate with one or more of the other stations in the chain in order to test their equipment without undue interference, but such coordination would be more manageable because of the much smaller number of stations, particularly if they are also more localized geographically. However, as illustrated by Example 3 below, the staff's analysis indicates that certain dependencies, known as ''cycles,'' cannot be broken by assigning stations to different transition phases.

Example 3: Cycle. [Illustartion Omitted]. Example 3 shows a cycle consisting of three stations. Station A needs to transition from channel 20 to channel 17; Station B needs to transition from channel 28 to channel 20; and Station C needs to transition from channel 17 to channel 28. Because all three stations cannot operate simultaneously on channels 17, 20, or 28, they must transition from their pre-auction to their post-auction channels simultaneously in order to commence operation on their post-auction channel. They must also coordinate in order to test equipment on their post-auction channels without causing increased interference to one another. In such circumstances, the dependencies between stations cannot be broken by assigning stations to different transition phases and these stations must be assigned to the same phase.

Cycles of much greater complexity than Example 3 are likely to occur during the post-auction transition process. Figure 2 below shows another simulated outcome in which the auction repurposes 84 MHz of broadcast spectrum. The cycle consists of 196 stations and reaches from the Southeast region of the United States through the Northeast and into Canada. [Figure 2 Omitted].

The challenge created by daisy-chains and cycles described above becomes more complicated when all dependencies are considered. Daisy-chains can intersect and overlap, creating a larger and more complicated daisy-chain. A cycle can also be part of a daisy-chain. As a result, hundreds of stations may be inter-dependent and one station may require tens (or even hundreds) of stations to transition first in order to be able to begin operating on its post-auction channel. Figure 3 below shows another simulated 84 MHz outcome with a set of 796 inter-dependent stations. [Figure 3 Omitted].

As indicated above, transition phases are a useful tool to address dependencies between stations. Stations may be assigned to different phases in order to break daisy chains, or to the same phase in order to facilitate coordination by stations involved in a cycle, or to achieve other goals. We refer to inter-dependent stations assigned to the same phase as a ''linked-station set'' and the individual stations in the linked-station set as ''linked stations.'' Stations that are part of a linked-station set must coordinate their testing with other stations in the set so as to avoid undue interference and must transition to their post-auction channel together.

Another means of breaking dependencies is to allow temporary, limited increases in station-to-station (pairwise) interference that exceed the 0.5 percent allowed under the Commission's rules governing pre-auction and post-transition interference relationships. As discussed in the *Transition Scheduling Proposal Public Notice,* allowing temporary, limited increases in pairwise interference will significantly reduce the number of dependencies between stations and in turn reduce the size, number, and complexity of daisy chains and cycles. Additionally, the staff's analysis indicates that allowing temporary, limited increases in pairwise interference will not result in significant aggregate interference increases.

Another means of breaking dependencies would be to assign stations in complicated daisy chains or cycles to operate on temporary channels prior to transitioning to their post-auction channels. Stations assigned to temporary channels would have to ''move'' twice, first to their temporary channels and then to their ultimate post-auction channels. Because the overwhelming majority of commenters were opposed to mandatory temporary moves, the adopted methodology will not require any station to use a temporary channel during the transition. However, as discussed in the *Public Notice,* staff will consider voluntary requests by stations to use either individual temporary channel or temporary joint use of a channel.

Section III—The Phase Assignment Tool. Under the methodology we adopt, stations will be assigned to one of 10 transition phases. Every station in a phase must cease operating on its pre-auction channel at the end of the phase, *i.e.,* the phase completion date. Stations will be assigned to phases using the Phase Assignment Tool. This Section discusses the Phase Assignment Tool as well as the constraints (*i.e.,* rules by which all assignments generated by the tool must abide) and objectives (*i.e.,* goals for creating the assignments). We begin by listing the specific constraints that will be imposed and the objectives used, followed by a discussion of the results of staff analysis illustrating the rationale underlying the procedure. ISED Canada is considering using a similar approach for Canadian stations and specific transition details will be published as part of its domestic process. As a result, the Baseline Results section of this Appendix may change.

Constraints and Objectives. Based on the staff's analysis and the record developed to date, we adopt the following constraints and objectives for assigning stations to phases. Phase assignments must satisfy all of these defined constraints. The objectives will be applied to identify a solution that best satisfies the Commission's transition goals. The Phase Assignment Tool prioritizes the objectives in the sequence listed below. Subsequent objectives are constrained by prior objectives.

Constraints: (1) A station cannot cause more than two percent new interference to another station during the transition. This constraint seeks to avoid undue interference during the transition and to provide stations with as much flexibility as possible to test equipment on their post-auction channels before transitioning. Although in many cases stations may be able to achieve these goals through coordination with affected stations, coordination may not be feasible in situations involving large-scale and complex dependencies among stations. As discussed in more detail in this *Public Notice,* allowing temporary, limited increases in pairwise interference will reduce the number and complexity of dependencies without resulting in significant aggregate interference increases. Doing so is also likely to promote other potential goals, such as reducing the number of channel rescans. Although allowing higher levels of temporary interference—up to five percent—would further reduce dependencies, we will allow no more than two percent as a balance between avoiding undue interference and

achieving the goal of limiting dependencies.

(2) No stations in Canada will be assigned to transition before the third transition phase. Due to dependencies between domestic and Canadian stations, a joint transition plan with Canada was agreed to by the FCC and Innovation, Science and Economic Development Canada (ISED Canada). In keeping with our discussions with ISED Canada, stations in Canada will generally be assigned to later transition phases, and in no case before the third transition phase. This constraint will promote efficient use of cross-border resources and respect the minimum notification periods to Canadian TV stations established in ISED's 600 MHz decision. *See Decision on Repurposing the 600 MHz Band,* August 14, 2015, available at *http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11049.html.*

(3) There will be no more than 10 transition phases. Limiting the number of transition phases to 10 strikes a reasonable balance between decreasing the number of linked-station sets in each phase and other transition goals, such as transitioning stations within the same region at the same time and avoiding the need for multiple channel rescans by viewers. Note that the methodology assumes that all winning bidders affecting the first phase of the transition who have agreed to go off-air completely, or that become a channel sharee of another station with a post-auction channel assignment, will have gone dark before the stations in the first transition phase begin testing of their equipment (*e.g.,* two months before the end of the first transition phase). This assumption is reasonable given the expected timeline for paying winning stations and the estimated time for the first phase to complete. Canadian stations not impeding the transition of U.S. stations or the ability of the U.S. to repurpose the new 600 MHz may be permitted to continue to operate beyond the tenth phase based on rules to be established by ISED Canada.

(4) All stations within a DMA will be assigned to no more than two different transition phases. This DMA constraint provides similar benefits to a purely regional approach. By clustering stations in a particular geographic area into the same transition phase, this constraint will make resource allocation more efficient. Importantly, the constraint will limit the number of rescans consumers will have to complete as a result of the transition. While this constraint potentially limits the ability of the tool to minimize the number and/or size of linked-station sets within a transition phase, on balance we believe that the benefits to consumers and broadcasters outweighs the burden.

(5) The difference in the number of stations in the largest transition phase and the smallest transition phase will be no more than 30 stations. If it is not feasible to assign stations in such a way that the difference in the number of stations in the largest transition phase and the smallest transition phase is less than or equal to 30 stations, then an optimization will be performed minimizing the difference between the largest transition phase and smallest transition phase, and subsequent optimizations will be limited to no more than 1.1 times the number found in this optimization. This strikes an appropriate balance between restricting the difference in size between the largest and smallest transition phases while providing additional flexibility to achieve other objectives.

(6) Every transitioning station will be assigned to one transition phase.

(7) No phase can have more than 125 linked stations. The dependencies created by the interference constraints can affect a large number of stations across large geographic areas. This constraint will limit the effect of those dependencies and, to the extent that coordination is needed, facilitate a manageable transition process for broadcasters. We believe the 125-station limit strikes a balance between minimizing dependencies and other goals. If it is not possible to limit the number of linked stations in a phase to 125, then an optimization will be performed minimizing the maximum number of linked stations in any phase, and constraining the number of linked stations in any phase in subsequent optimization to no more than 1.2 times that maximum number. This strikes an appropriate balance between minimizing the number of linked stations in any phase while providing additional flexibility to achieve other objectives.

(8) No station falling into the ''complicated'' category for purposes of the Phase Scheduling Tool will be assigned to Phase 1. This constraint will help to ensure that the stations facing the most challenging and time-consuming transitions have adequate time, and to avoid the risk of such stations delaying others' transitions in the event of delays.

Objectives: (1) Assign U.S. stations whose pre-auction channels are in the 600 MHz Band to earlier phases in order to clear the 600 MHz Band as quickly as possible, while simultaneously assigning all Canadian stations and U.S. stations whose pre-auction channels are in the remaining television bands (U.S. TV-band stations) to later phases, where possible. This objective promotes a number of goals. It helps to clear the 600 MHz Band expeditiously. It also avoids the problem of Canadian and U.S. stations competing for limited resources and provides Canada with the time needed for its transition. To implement this objective, the Phase Assignment Tool weights assignments for stations transitioning from the 600 MHz Band after transition Phase 8. Similarly, the Phase Assignment Tool weights assignments for Canadian stations and U.S. TV-band stations assigned to any transition phase earlier than Phase 9. The weights for stations not transitioning out of the 600 MHz Band before Phase 9 is significantly higher than the weights for U.S. TV-band stations or Canadian stations transitioning early. We use the following weights when determining assignments: U.S. stations in the 600 MHz Band assigned to phase 9 are assigned a weight of 20; U.S. stations in the 600 MHz Band assigned to phase 10 are assigned a weight of 200; U.S. TV-band stations and Canadian stations assigned before phase 9 are assigned a weight of 1. The Phase Assignment Tool minimizes the sum of all weights incurred by the phase assignments.

(2) Minimize the sum, over all DMAs, of the number of times a DMA must rescan. This objective benefits viewers by minimizing the number of rescans necessary in a market and creates regionalized clusters that will make resource allocation more efficient. As with the fourth constraint above, the use of DMAs attempts to provide similar benefits to those that would flow from a purely regional approach. This DMA-based objective attempts to move all stations within the same DMA into the same phase if such a solution can be found consistent with all constraints and prior objectives.

(3) Minimize the total number of linked stations. Whereas the seventh constraint above limits the total number of linked stations in a phase to 125, this objective minimizes the total number of linked stations throughout all phases of the transition. This objective seeks to provide as many stations as possible with the ability to test their equipment on their post-auction channel while simultaneously broadcasting on their pre-auction channel without the need to coordinate.

(4) Minimize the difference between the number of stations in the largest transition phase and the smallest transition phase. Similar to the fifth constraint above, this objective equalizes the number of assigned

stations in each phase by minimizing this maximum difference. We believe that evening out the number of stations assigned to each transition phase will help manage limited resources by ensuring that they can be spread more evenly across the transition phases.

The Phase Assignment Tool may also be used during the transition to consider proposed changes to and, as appropriate, modify phase assignments where such reassignments will not impact the overall schedule. We recognize that unforeseen events may occur during the transition that may warrant adjustments in order to ensure that the transition proceeds in a timely fashion. If we modify phase assignments during the transition, the Phase Assignment Tool will restrict reassignments to later transition phases in order to provide certainty to stations that any adjustments will not require them to transition earlier than their originally scheduled phase completion date. Any exceptions will require the consent of any station moved to an earlier phase.

Preliminary Results of Staff Analysis. Baseline Results. This Section presents results from running the Phase Assignment Tool using representative final channel assignment plans, for two alternative 84 MHz spectrum clearing scenarios. We have updated these Baseline Results from those used in the *Transition Scheduling Proposal Public Notice* to reflect the fact that higher clearing targets above 84 MHz are no longer relevant given the current status of the incentive auction. In each scenario, all of the constraints above are satisfied and the objectives applied in the order specified above. The joint transition plan will consist of U.S. and Canadian stations. We also assume that Mexican stations will have already completed their transition to their new channels below channel 37 prior to the end of the first phase. The Phase Assignment Tool assumes that Mexican stations will have transitioned to their new channels before the phase completion date of the first transition phase. *See Exchange of Coordination Letters with IFT Regarding DTV Transition and Reconfiguration of 600 MHz Band Spectrum,* U.S.-Mex., July 15, 2015, available at *http://wireless.fcc.gov/incentiveauctions/learn-program/resources.html* (*Mexican Coordination*).

Figures 4 and 5 below present histograms for these two representative 84 MHz scenarios, showing the total number of broadcast stations that transition in each phase and within each phase how many are (a) Canadian stations, (b) U.S. stations whose pre-auction channel is in the new 600 MHz Band and (c) other U.S. stations that nevertheless must change channels. All Canadian stations are included in the simulations. Those Canadian analog stations that will remain on their current analog channel but are required to convert to digital are not currently reflected in the Phase Assignment Tool. However, the final joint transition plan and schedule will include all analog and digital Canadian stations changing channels and/or converting to digital. The figures show that the 600 MHz Band is mostly clear of U.S.-based impairments by the end of Phase 8. Also, the very few Canadian stations that may impede U.S. stations from transitioning are assigned to early transition phases. Table 1 sets forth the number of stations that are part of linked-station sets in each of the two scenarios. Table 2 details the maximum temporary aggregate interference (calculated consistent with the methodology presented in the Aggregate Interference Public Notice) that any station would face during the transition in either of the two 84 MHz scenarios. [Figure 4, Figure 5, Table 1, and Table 2 Omitted].

Section IV: The Phase Scheduling Tool. After stations are assigned to phases by applying the Phase Assignment Tool, we will use the Phase Scheduling Tool to inform the determination of a phase completion date for each phase. The Phase Scheduling Tool estimates the total time necessary for stations within a phase to perform the tasks required to complete the transition process. In this Section, we discuss the Phase Scheduling Tool and its inputs, including the specific tasks required for stations to transition and the estimated time required to complete each task.

The Phase Scheduling Tool models the various processes involved in a station transitioning to its post-auction channel. It is a simulation tool created to assist the Commission in setting reasonable deadlines for phases. It divides these processes into two sequential stages: (1) The ''Pre-Construction Stage'' and (2) the ''Construction Stage.'' While separate processes within a stage may occur concurrently, such as equipment procurement and zoning applications, all processes within the Pre-Construction Stage must be complete before the station is ready to move to the Construction Stage. For example, in the model, the Construction Stage process of installing a new primary antenna cannot occur until after the new antenna is manufactured and delivered during the Pre-Construction Stage. A transition phase cannot end until all stations in the model assigned to that phase have completed both stages and are ready to operate on their post-auction channels.

Some processes require specialized resources that may be in limited supply. The Phase Scheduling Tool models these limited resources by constraining the amount available at any given time. If a station needs a constrained resource to complete a process, and the resource is unavailable because other stations are using it, the model places the station in a queue until the required resource is available. As described in more detail below, the processes within each phase are not designed to be a comprehensive listing of every task required to complete the transition; we have instead separated those processes which need resources that are most limited in supply and therefore likely will have the biggest impact on scheduling.

For each Stage, the Phase Scheduling Tool uses two inputs: (1) The time it would take for a station to complete the tasks required for that stage if all resources are available when needed; and (2) the estimated availability of constrained resources. The Phase Scheduling Tool uses these inputs to calculate how long it will take each station within a transition phase to complete all work associated with both Stages. The output of the tool is the estimated number of weeks from the start of the transition required for all stations assigned to a phase to complete all of the necessary transition tasks, test equipment on their post-auction channels, and be ready to operate on their post-auction channels.

Since it is not possible to know the exact order stations will begin each process, the Phase Scheduling Tool uses discrete event simulation to model this uncertainty. The Phase Scheduling Tool does assume, however, that a station assigned to an earlier phase will begin its Pre-Construction Stage processes requiring a constrained resource (*e.g.,* ordering an antenna) before a station assigned to a later phase. By assigning the station order within a transition phase randomly, called the ''simulation order,'' and simulating the transition processes, the Phase Scheduling Tool provides a single estimate of the time required for all stations assigned to a phase to complete each transition phase. The Phase Scheduling Tool operates by simulating stations completing the transition and outputs the time needed to complete each phase given a simulation order in which stations have access to scarce resources. The tool will run 100 simulations each with a different simulation order. The tool then provides the average time in weeks it

takes to complete a phase. Based on those results, the Bureau may then exercise limited discretion to modify the phase completion dates from the average durations calculated by the tool to account specifically for certain factors that may warrant deadline adjustments, such as the relative length of the testing periods for each phase or seasonal considerations. For example, the phase completion date may be moved later if an early phase consisting primarily of stations in northern regions of the United States is projected to end in the middle of winter.

The Phase Scheduling Tool also enables the staff to analyze the sensitivity of transition phase time estimates based on changes in input data. During the transition, as new information becomes available, the tool can be rerun to assess the potential impact of unforeseen developments on the overall schedule. To give additional certainty to stations, if we decide to use the Phase Scheduling Tool during the transition to modify phase completion dates, we will not move any phase completion date forward without the consent of the impacted station.

The following subsections detail the specific processes or tasks that the Phase Scheduling Tool models for each stage, as well as the estimated time and resource availability for each process. We adopt the estimates provided in the *Transition Scheduling Proposal Public Notice* with the exception of time allocated to tower construction on towers with multiple stations. The revised estimates are based on data contained in the *Widelity Report,* submissions from interested parties, submitted comments, and informational discussions with tower crew companies, other antenna and transmitter manufacturers, and broadcasters. We believe that the estimates are conservative and that they reasonably capture each aspect of the transition. The final subsection below shows sample outputs of the Phase Scheduling Tool for the two baseline Phase Assignment Tool simulation set forth in the prior section.

Modeling the Transition Stages. The individual tasks required for a station to complete its transition have been grouped into two stages: (1) The Pre-Construction Stage and (2) the Construction Stage. In the Pre-Construction Stage, a station completes two tasks: Ordering and delivery of the main and auxiliary antennas; and administration and planning work, which includes zoning, administration, legal, possible structural tower improvements, equipment modifications, and other activities. In the Construction Stage, a station completes two additional tasks: Construction related work and tower crew work. The tasks included in each Stage are shown in Figure 6 below. [Figure 6 Omitted].

The Phase Scheduling Tool groups together all tasks within a stage that can be done regardless of how many other stations are performing similar tasks. However, since there are two constrained resources that are dependent on the actions of others (antenna deliveries and tower crew availability), these tasks are separated out and the model considers how resource availability impacts the total completion time for any station in either stage. We note that there are many other resources that are not specifically identified but are essential to completion of the transition process. Based on the staff's analysis and the record developed to date, resources such as auxiliary antenna manufacturing, transmitter manufacturing, transmission line manufacturing and RF component installers do not affect the time required for a station to complete its transition. The availability and manufacturing capacity of these resources have been identified as being sufficient to fulfill the expected demand during the transition (*i.e.,* these resources have been designated as being ''unconstrained'') and therefore these resources are not broken out separately in the Phase Scheduling Tool. Instead, as illustrated in Figure 6, the tasks related to these unconstrained resources have been grouped into the general tasks of Administration/Planning, which is within the Pre-Construction Stage, and Construction Related Work, which is within the Construction Stage. Other required resources such as RF consultants and structural engineers will need to complete their work by the end of the initial 3-month filing window for construction permit applications, and therefore, also are not considered a constrained resource for purposes of the Phase Scheduling Tool. The Phase Scheduling Tool uses conservative estimates for the time requirements in order to assure that they meet the individual needs of each station.

Pre-Construction Stage Inputs. There are two components to the Pre-Construction Stage: (1) The time required for antenna equipment to be ordered, manufactured and delivered (a significant constraint) and (2) the time required for all other planning and administration activities necessary to prepare for construction (called ''Administration/Planning''). The Administration/Planning component includes zoning, administration, legal work, and pre-construction alterations to tower and transmitter equipment. Since administration and planning activities take place in parallel and the activities of one station are unlikely to impact the ability of others to perform the same activities, the model simply estimates the *total time* needed to complete all of these activities.

The Phase Scheduling Tool categorizes stations based on the difficulty of completing these activities. The Commission used a similar ''bucketing'' approach for categorizing stations in the Final Channel Assignment. Time estimates were derived by taking estimates from Widelity and, where appropriate, adding ''slack'' time so that the overall estimate of the time required would be a conservative one. The *Widelity Report* estimates that Administration/Planning could take up to 72 weeks for ''complicated'' stations (primarily due to zoning), up to 20 weeks for the average DTV station and up to 12 weeks for the average Class A or other lower power station. To be conservative, we added another 12 weeks to the Administration/Planning estimates for the non-complicated stations since these timelines were more aggressive. However, we expect this work will start during the 3-month filing window for construction permits (if not earlier, when each station receives its confidential letter with its final channel assignment). The time estimates are shown in Table 3 below. [Table 3 Omitted].

The Administration/Planning time estimate establishes the *minimum* amount of time required for a station to complete the Pre-Construction Stage. While Administration/Planning work is occurring, stations likely will also place orders for their main antennas. The time estimates for this component of the Pre-Construction Stage include manufacturing and delivery time once the antenna manufacturers receive orders from stations. However, the ability of manufacturers to produce enough antennas may impact the overall schedule. Therefore, the Phase Scheduling Tool includes antenna manufacturing and delivery as a specific resource constraint. The Phase Scheduling Tool considers a station to have completed its Pre-Construction Stage only after all of its Administrative/Planning work is completed and its antenna is delivered.

For purposes of delivery time estimates, stations are divided into two categories, based on the assumption that manufacture and delivery of directional antennas for full power stations will

require more time than for non-directional and Class A antennas (of either type). The time estimates shown in Table 4 are based on the assumption that the antenna manufacturers will begin manufacturing antennas as soon as the orders are received unless they are manufacturing at their current capacity. The time estimates for antenna delivery are generally consistent with, if not more conservative than, those cited in the *Widelity Report,* which estimated 3 months except for deliveries to complicated stations. [Table 4 Omitted].

The Phase Scheduling Tool also includes a specific number of antennas that can be manufactured and delivered at any given time. Based on those numbers, some stations may be able to receive their antennas without waiting for any additional time, but other stations may have to wait for their antennas to be delivered. The Phase Scheduling Tool will place such stations in a queue until the antenna can be delivered, based on the station's assigned number in a simulation order. In addition, the Phase Scheduling Tool will assume that manufacturers have an inventory of 20 antennas at the start of the 39-month transition period, and that capacity will increase over the course of the transition period. These assumptions are listed in Table 5 below. These estimates are based on public statements by manufacturers regarding their planned ramp up in anticipation of the transition and the assumption that these manufacturers plan on maintaining market share. We also assumed a conservative 5 percent growth rate. [Table 5 Omitted].

Construction Stage Inputs. Construction Stage modeling is similar to Pre-Construction Stage modeling and consists of two activities: (1) The time to complete all general facets of construction (called ''Construction Related Work''); and (2) the time required by tower crews to complete installation of equipment on the tower. As with Pre-Construction Stage activities, these activities can occur in parallel but the estimated completion time for the Stage is the time required to complete both these activities. In addition, like the Administration/Planning category in the Pre-Construction Stage, the Construction Related Work category is a catch-all category that incorporates several types of activities. The estimated time for this category includes estimates of the time to complete all construction work and associated management and coordination activities. More specifically, Construction Related Work includes estimates for the time associated with installing the transmitter components, combiners, RF mask filters and the transmission line to the tower base. Construction Related Work also allows time for any possible installation of liquid cooling systems, AC power, and connection to remote control equipment and input signal connections if required. Finally, Construction Related Work includes time required for performing any tower modifications and any final testing of the system. Table 6 lists the estimates of the time to complete all work included in the ''Construction Related Work'' category. Based on Widelity time estimates for the various work streams that fall under Construction Related Work. [Table 6 Omitted].

The Construction Related Work column reflects estimates of the minimum amount of time required for a station to complete the Construction Stage. The other process in the Construction Stage work is tower work. The time required for tower work is both tower and antenna specific. Table 7 lists the different characteristics that determine the amount of time required to perform tower work. These times were based on feedback from industry. This table does not reflect the time to install an auxiliary antenna. [Table 7 Omitted].

If a station did not need to wait for an antenna crew to become available in order to complete its tower work, then the amount of time the station would take to complete the Construction Stage would be the longer of the time estimated for construction related work and the time estimated for the station to complete work on its tower. However, not every station will be able to have a tower crew as soon as needed. When modeling to generate estimates for phase completion times, the Phase Scheduling Tool will place any station that is waiting for a tower crew to become available in a queue until a crew becomes available, based on the station's assigned number in a simulation order. Stations will be removed from the queue according to their simulation order.

We include in the Phase Scheduling Tool specific estimates regarding the number of available tower crews. The record developed to date reflects different estimates as to the number and types of tower crews that will be available. In light of the variance in these estimates, we will place tower crews into three buckets: (1) U.S. crews capable of servicing towers that are particularly difficult to work on due to height or location; (2) U.S. crews that are capable of servicing easier towers; and (3) Canadian crews. U.S. stations on towers that are above 300 feet in height and that are top-mounted or located on a candelabra can only draw from the pool of U.S. crews that can handle such difficult sites. Other U.S. stations can only draw from the other pool of U.S. crews, on the assumption that these difficult site crews will be fully occupied. Canadian stations can only draw from the pool of Canadian crews. It is likely that crews will travel between countries, but separating the crews in this way provides a more conservative estimate of the number of crews available in each country. We expect that the number of crews will increase as the transition proceeds. The specific estimates we will use are set forth below in Table 8. Tower crew estimates were based on feedback from industry and from ISED Canada. We assume a conservative growth rate in U.S. tower crews of 5 percent, but no growth in Canadian crews (which is very conservative). [Table 8 Omitted].

Other assumptions incorporated into the Phase Scheduling Tool are: (1) The estimated time required to complete work on a tower is reduced or discounted if more than one station on the tower is transitioning in the same phase. The Phase Scheduling Tool assumes that antenna installations will be performed by a single tower crew at the same time for all stations located on a given tower that are assigned to the same phase. Based on comments received and the record developed to date, we are adjusting the time upwards for the time required to complete the work on towers with multiple stations. Construction on the tower will commence when the first station on that tower is ready to begin its construction work and the *total time* to complete all construction for all stations on that tower is equal to (a) the time required for the most difficult station (we assign this time to the first station) plus (b) the sum of the time estimates for all stations other than this first station, multiplied by 50 percent. We believe that these revised discounts are appropriately conservative. Staff believes that 50 percent is a reasonable (and conservative) discount between the previously proposed 95 percent discount which was generally supported by American Tower and the 20 percent or 10 percent discount that Cordillera, et al. suggests. Any discount smaller than 50 percent would substantially remove the time savings produced by the same tower efficiencies which American Tower suggests.

(2) The Phase Scheduling Tool assumes that 75 percent of all stations (including those with a licensed auxiliary antenna) will need to install an auxiliary antenna. For each station

requiring an auxiliary antenna, the tool adds one additional week of tower crew time to the tower crew time, which is the maximum time required for an auxiliary in Table 7.

(3) Where the estimated time required to complete an entire transition phase is less than four weeks because much of the work (other than transmission testing on the new channel) has already occurred prior to the start date for the testing period of that transition phase, the testing period window is scaled up to allow four weeks for testing. The four week minimum allows additional flexibility for the Commission to adjust deadlines for stations due to unforeseen circumstances. For example, if many stations in the same phase experience a natural disaster, those stations' deadline could be extended and the multiple subsequent phases testing periods could be shortened to three weeks.

Sample Output. This Section provides sample results of the Phase Scheduling Tool using the baseline Phase Assignment Tool results presented above and the constraints and objectives for simulated auction outcomes involving the two 84 MHz clearing scenarios. Although Tables 9 and 10 below show the average number of weeks from the start of the phase to the phase completion date, each phase completion date will be listed as a specific date when the final transition schedule is released in the *Closing and Reassignment Public Notice.* The outputs of each clearing scenario are represented graphically below in Figures 7 and 8, respectively. As both Figures show, stations within each phase cannot start testing until the prior phase is complete, and all stations within a phase must cease operating on their pre-auction channels by the phase completion date.

Figures 7 and 8 below are a graphical representation of the time estimates from the Phase Scheduling Tool and represent estimates only. Although the tool produces reasonable time estimates based on the detailed inputs discussed, it does not account specifically for certain factors that may warrant deadline adjustments, such as the relative length of the testing periods for each phase or seasonal considerations. For example, the phase completion date may be moved later if an early phase consisting primarily of stations in northern regions of the United States is projected to end in the middle of winter. Thus, the Bureau may adjust the phase completion dates from the average durations calculated by the tool to take such factors into account, consistent with the overall 39-month transition deadline imposed by the Commission's rules. [Table 9, Figure 7, Table 10, and Figure 8 Omitted].

Appendix B: Final Regulatory Flexibility Act Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Transition Scheduling Proposal Public Notice.* The Bureau sought written public comment on the proposals in the *Notice,* including comment on the IRFA. This Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.

Need for, and Objectives of, the Rule Changes. The Federal Communications Commission (Commission) delegated authority to the Media Bureau (Bureau) to establish construction deadlines within the 39-month post-incentive auction transition period for television stations that are assigned to new channels in the incentive auction repacking process. Pursuant to the Commission's direction, the Bureau, in consultation with the Wireless Telecommunications Bureau (WTB), the Office of Engineering and Technology (OET) and the Incentive Auction Task Force (IATF), has developed a plan for a ''phased transition schedule.''

The Bureau will use a Phase Assignment Tool that will use mathematical optimization techniques to assign stations to one of 10 ''transition phases.'' The phases will have sequential testing periods and deadlines or ''phase completion dates.'' The phase completion date is the last day that a station in its assigned phase may operate on its pre-auction channel.

The Bureau will use a Phase Scheduling Tool to estimate the time required for stations in each phase to complete the tasks required to transition to their pre-auction channels in light of resource availability. The Bureau will run the Phase Scheduling Tool with different simulation orders to produce a range of estimated times for each transition phase. The Bureau will use the resulting range of estimated times to guide its determination of a phase completion date for each transition phase.

All transition phases will begin at the same time, but will have sequential phase completion dates. Each phase will have a ''testing period'' defined by a start and end date with the end date corresponding to the phase completion date. While stations may engage in planning and construction activities at any time prior to their phase completion date, equipment testing on post-auction channels will be confined to the specified testing periods in order to minimize interference and facilitate coordination. Other than for the first phase, the testing period will begin on the day after the phase completion date for the prior phase. Whether a station needs to coordinate with other stations during the testing period will depend on whether it is part of a ''linked-station set,'' that is, a set of two or more stations assigned to the same phase with interference relationships or ''dependencies.'' Stations that are not part of a linked-station set may test on their post-auction channels during the testing period without the need for coordination. Stations that are part of a linked-station set must coordinate testing with stations in the set so as to avoid undue interference. Such stations must transition to their post-auction channels simultaneously.

While the Bureau originally contemplated that no stage would have a testing period shorter than four weeks, it concluded that it may adjust the amount of time given to the testing periods of some phases to accommodate the overall transition schedule, particularly in the early transition phases.

The Bureau noted that, after the final stage rule is met, it will send each eligible station that will remain on the air after the auction a confidential letter identifying the station's post-auction channel assignment, technical parameters, and assigned transition phase. After the conclusion of the assignment phase of the forward auction, the Commission will release the Auction Closing and Channel Reassignment Public Notice (*Closing and Reassignment Public Notice*), announcing that the reverse and forward auctions have ended and specifying the effective date of the repacking process. Among other things, the *Closing and Reassignment Public Notice* will provide the post-auction channel assignment and technical parameters of every station eligible for protection in the repacking process that will remain on the air after the incentive auction. The *Closing and Reassignment Public Notice* will also announce the transition phase, phase completion date, testing period for each reassigned station, and whether the station is a part of a ''linked-station set.'' Stations reassigned to new channels will have three months from the *Closing and Reassignment Public Notice* release date to file construction permit applications proposing modified facilities to operate on their post-auction channel facility specified in the *Closing and Reassignment Public Notice.* The Bureau will then issue each station a construction permit, including the phase completion date as the

construction permit deadline for that station.

The Bureau noted that there are various instances in which some stations may seek to construct an expanded facility or alternate channel that differs from the technical parameters assigned in the *Closing and Reassignment Public Notice.* Some stations may also request extensions of their construction deadlines and seek authority to continue operating on their pre-auction channel after their phase completion date, including a waiver of their phase completion deadline. In evaluating such requests, the Bureau announced that it will examine the impact that grant of such requests would have on the phased transition schedule. The Bureau stated that, although it does not intend to grant requests that would disrupt the transition, its aim is not to discourage stations from proposing alternative transition solutions that could create efficiencies or resolve unforeseen circumstances. After evaluation, if the Bureau grants such a request it may choose to modify transition phase assignments and construction deadlines of the requesting station, or if necessary, other stations; however, no other station will be assigned to an earlier transition phase than it was originally assigned to without its consent.

The Bureau concluded that there may be situations in which the voluntary use of either individual temporary channels or temporary joint use of a channel may aid the transition. Therefore, the Bureau will permit reassigned Class A and full power stations to make a request to operate on a temporary channel either on an individual or joint basis. When seeking authorization to operate on an individual temporary channel or engage in temporary joint use of a channel a broadcaster must file with the Commission a request for STA proposing the channel it wishes to operate on and including the specific technical parameters. Such requests may be made at any time during the transition period and must demonstrate that the proposal both complies with the Commission's technical rules and will not otherwise interfere with the transition. A request for use of an individual temporary channel will be restricted to replicating a station's pre-auction coverage area and population served and broadcasters should, at a minimum, evaluate whether their operation would require coordination with neighboring stations that are not already in the same linked-station set, would result in new linked-station sets, or whether significant construction will be required to commence operation, which could divert resources from other stations. Furthermore, depending on the station's proximity to Mexico or Canada, coordination approval to operate on a temporary channel may be required from that particular country.

The Bureau declined to explicitly prohibit a broadcaster from operating during the transition on a temporary channel in the new wireless band that is vacant. However, to balance the interests of wireless operators to start construction and commence operations in cleared spectrum, when evaluating requests for individual use of a temporary channel in the new wireless band we will require broadcasters to demonstrate that there is no reasonable alternative to operating in the new wireless band and provide written consent from the wireless licensee of the channel that broadcaster wishes to temporarily operate, as well any wireless licensee(s) that would otherwise be required to protect the broadcaster's operations under the Commission's inter-service interference (ISIX) rules.

The Bureau concluded that, in the case of a request for temporary joint use of a channel the applicant (joint user) must include with its request a written authorization from the licensee of the host station. A joint user will continue to be a Commission licensee, and will temporarily operate at variance from its authorized parameters pursuant to STA. As such, a joint user must continue to comply with all requirements under the Rules and the Act that they would otherwise be required operating on their own channel. Because joint use of a channel is only temporary and the sharee will ultimately operate on its own channel, the Bureau concluded that it is important for the station to maintain coverage of its community of license and require a sharee to continue to cover its community of license.

The Bureau concluded that interim and auxiliary facilities will be an important part of the transition for broadcasters and that it will take action as appropriate to facilitate the use of such facilities and equipment. In order for a station to continue operation on its pre-auction channel while its current primary antenna is removed and a new channel antenna is installed, the Bureau announced that it expects many stations will need to utilize auxiliary facilities and equipment. The Bureau concluded that nothing it had adopted restricts a station from filing a request for STA to operate on its post-auction channel using an auxiliary facility prior to its phase completion date.

The Transition Scheduling Proposal Public Notice provided guidance on the prohibited communications rule as it pertains to broadcasters and the post-auction transition—particularly their ability to hold discussions with vendors not covered by the rule. A great many of the preparations that broadcasters may undertake with respect to transition to post-auction channel assignments will not involve prohibited communications. For example, broadcasters may communicate with third parties not covered by the prohibition, such as consulting engineers and counsel, without violating the prohibition, even if the communication discloses bids and bidding strategies. A broadcaster or other covered party still should take care, however, that the third party to which such communications are made does not convey the information to another covered party, which would violate the prohibition. In addition, broadcasters may communicate with other covered parties regarding many issues in the post-auction transition without disclosing bids and bidding strategies. For example, broadcasters that did not apply to participate in the auction do not have bids and bidding strategies of their own to disclose and so may communicate regarding their own post-auction transition without violating the prohibition. Such broadcasters must bear in mind, however, that they still are prohibited from communicating any other incentive auction applicant's bids and bidding strategies of which they may learn, such as a channel sharing partner's bids or bidding strategies. Finally, broadcasters that did apply but kept that fact confidential also may be able to communicate regarding post-auction channel assignments without disclosing bids and bidding strategies.

Summary of Significant Issues Raised by Public Comments in Response to the IRFA. Free Access & Broadcast Telemedia, LLC, and EICB–TV East, LLC (FAB/EICB) were the only commenters to file comments directly addressing the IRFA in this proceeding. FAB/EICB argue that, in the IRFA, the Commission failed to consider the impact or costs of its proposal on low power television stations (LPTV). We considered these concerns when composing the Public Notice.

Description and Estimate of the Number of Small Entities to Which the Rules Will Apply. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted. The following small entities, as well as an estimate of the number of such small entities, are discussed in the FRFA: Full power television stations; (2)

Class A TV and LPTV stations; (3) wireless telecommunications carriers (except satellite); (4) wired telecommunications carriers; (5) cable television distribution services; (6) cable companies and systems; (7) cable system operators (Telecom Act standard); and (8) direct broadcast satellite (DBS) service.

Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements. The *Transition Schedule Public Notice* does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4).

Steps Taken to Minimize Significant Impact on Small Entities and Significant Alternatives Considered. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standard; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

In general, alternatives to proposed rules or policies are discussed only when those rules pose a significant adverse economic impact on small entities. In this context, however, the transition plan set forth in the *Transition Schedule Public Notice* generally confers benefits. In particular, the intent of the plan is to ensure that all stations are able to complete a timely transition to their final post-auction channel facilities without delay and without incurring unnecessary costs.

The Bureau declined to adopt a proposal by the National Association of Broadcasters (NAB) to not assign stations to phases until stations have completed necessary structural and engineering studies. Alternatively, NAB suggested that initial phase assignments should be ''preliminary'' and should be re-evaluated after stations have filed their construction permit applications and cost estimates in order to allow the Commission to more fully understand their scope of work and timing for moving to a new channel. The Bureau found that NAB's suggested approach would have a chilling effect on the transition by undermining the incentive for broadcasters, including small entities, to begin preparing for the transition in earnest. The Bureau concluded that information used to create the transition schedule is sufficiently detailed and reliable to establish phased transition deadlines once the final channel reassignments have been established. The Bureau determined that launching an organized, phased schedule at the earliest opportunity will provide broadcasters, equipment manufacturers and other vendors and consultants, wireless providers, and television viewers with certainty and stability. Doing so is particularly important as broadcasters prepare their construction permits, coordinate with other broadcasters, and begin construction planning.

The Bureau also declined suggestions to collect additional or different information about stations that face difficult approval processes or procurement issues prior to assigning stations to phases. The Bureau found that its Phase Assignment Tool already includes a constraint identifying certain stations as complicated based on data collected by the Bureau to date. Regardless of the difficulty of any one stations' move, because of dependencies between stations and interference constraints, the Bureau concluded that certain stations must move together in the same phase or certain stations must move in one phase before additional stations can move in a subsequent phase. The Phase Assignment Tool is designed to organize the transition of over 1,000 broadcast stations in an orderly fashion that respects station dependencies and interference constraints, in addition to accounting for individual stations complexities, while simultaneously protecting television viewers.

The Bureau declined to cap aggregate interference finding that that doing so would provide little benefit while imposing significant costs by dramatically increasing the computational difficulty of the Tool. However, recognizing the potential problems with a cap, NAB suggested as an alternative that, after stations are assigned to phases, the Bureau determine whether any station has greater than five percent aggregate interference, and if so, make appropriate adjustments. Consistent with this suggestion, the Bureau announced that it will attempt to find an alternative phase assignment for any station predicted to receive more than five percent temporary aggregate interference, consistent with the constraints and objectives.

To minimize consumer disruption during the 39-month transition period, and to promote the efficient use of tower crews, the Bureau announced that all stations within a DMA will be assigned to no more than two assignment phases. Broadcast commenters put forward a variety of proposals to modify this constraint, but the Bureau found that none described how their respective proposals would affect the overall phase assignments. Therefore, it rejected those proposals. The Bureau found that assigning stations within a DMA to two, potentially nonconsecutive phases, is crucial in providing the optimization with the flexibility to satisfy other constraints, such as limiting the number of linked stations per phase and keeping a relatively consistent number of stations assigned to each phase. The proposals by broadcast commenters would threaten the Tool's ability to balance competing goals. At the same time, the Bureau agreed with broadcasters that minimizing viewer disruption and efficiently clearing DMAs are laudable goals and, accordingly, the Bureau adopted the objective of minimizing the total number of times a DMA must rescan. If it is possible to satisfy the optimization's constraints and its first objective, and still assign stations to only one DMA, the optimization will attempt to do so using the second objective. The Bureau found that this approach gives the optimization the flexibility to balance competing constraints while continuing to prioritize consumers and regional clusters.

The NAB proposed that the Bureau should treat the ''125 linked stations'' constraint as an objective. The Bureau declined this proposal finding that NAB did not propose a metric for determining how much additional time should be added to a phase with more than 125 linked stations under its proposed approach.

Despite broadcast commenters' objections, the Bureau decided to prioritize clearing the 600 MHz Band as the first objective. The Bureau concluded that phase assignments must satisfy each of the nine constraints it adopted, most of which are designed to protect broadcasters. The Bureau concluded that the four objectives it adopted strikes the appropriate balance and will encourage the expeditious clearing of the 600 MHz Band.

The Bureau also declined Cordillera, et al.'s proposal that the two primary objectives be to maximize the health

and safety of tower crews and the homes and businesses that are in close proximity to towers and to minimize service disruptions to viewers and users of other services that share broadcast towers. The Bureau concluded that Cordillera et al. had not explained how the Bureau could incorporate such goals into the mathematical optimization model and it was unaware of any mechanism to accomplish the task. The Phase Scheduling Tool estimates time periods for construction tasks based on industry information, and the Bureau believed that relying on such information is reasonable and will help to promote health and safety.

The Bureau further declined to adopt Cordillera, et al.'s proposal that additional factual scenarios be given additional time in the Phase Scheduling Tool. The Bureau found that the tool already provides estimates intended to account for the ordinary time necessary to complete various tasks. However, in response to the comments from Cordillera, et al. concerning potential coordination with other services (*e.g.,* FM radio or cellular providers) operating on the same tower as the reassigned station, the Bureau decided to substantially reduce the same tower discount in order to add back some time to account for the additional coordination that will be required. The Bureau found that this new discount will make the total tower work times adequately conservative to account for not only other television broadcasters but also other broadcast and non-broadcast facilities on the tower.

In order to facilitate a timely and orderly transition, the Bureau concluded that it must evaluate on a case-by-case basis requests for modification of any station's facility or transition deadline as set forth in the Closing and Reassignment Public Notice, to assess the impact of such requests on the transition schedule plan. Accordingly, it adopted the method for evaluating such requests proposed in the Transition Scheduling Proposal Public Notice. Although it stated that it does not intend to grant requests that would disrupt the transition, the Bureau stated that its aim is not to discourage stations from proposing alternative transition solutions that could create efficiencies or resolve unforeseen circumstances that could otherwise force a station to go dark. Nonetheless, such proposals should specifically demonstrate that implementation would not interfere with other stations' transition efforts and address how implementation of the proposal may affect the transition schedule. If the Bureau grants such a request after considering such effects, it stated that it may choose to modify transition phase assignments and construction deadlines of the requesting station or, if necessary, other stations; however, no other station would be assigned to an earlier transition phase than it was originally assigned without its consent. NAB and E.W. Scripps supported the establishment of a process by which a station can request a different transition phase, although neither proposed a specific process or explained why the Commission's existing rules would be insufficient. The Bureau found that existing Commission processes are sufficient to address such requests. Commenters also suggested that stations should have the flexibility to move to either an earlier or later transition phase. The Bureau stated that such requests will be subject to a high burden of proof and will be reviewed in its prescribed manner to determine the requests impact on the overall transition schedule as well as viewers. The Bureau also declined AT&T's suggestion that it adopt a special sanction system related to transitioning stations, finding that such a proposal was not supported by the record. In addition, the Bureau concluded that a station that does not comply with the requirements of any Commission order may be subject to action as contemplated by the Commission's rules.

The Bureau determined not to mandate the use of temporary channels which avoided possible additional burdens on stations and MVPDs as well as LPTV and TV translator stations. T-Mobile requested a prohibition of voluntary temporary operation in the new wireless band; however, the Bureau found that entirely foreclosing this option could undercut the benefit of allowing broadcasters to request temporary channels because there may be limited available temporary channels in the TV band.

The Bureau declined to adopt suggestions on how the Commission should manage its staff and resources during the transition period. The Bureau concluded that it will commit to dedicating sufficient resources to monitor the progress of the transition. While commenters representing the interests of LPTV and TV translator stations provided several actions the Commission could take to ease the impact of the transition on LPTV and translator stations, the Bureau found these proposed actions have already been addressed in other Commission proceedings.

Federal Communications Commission.

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