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April 3, 2019

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, DC 20554

Re: *Written Ex Parte Communication*, GN Docket No. 18-122

Dear Ms. Dortch:

The C-Band Alliance (“CBA”) is pleased to provide, for the Commission’s and industry’s consideration in the above-referenced proceeding, details on how they propose to protect satellite service quality and reliability for their customers in 300 MHz of spectrum. This proposed commitment results from numerous conversations that CBA members have had with customers to understand their transition needs.

In mid-March, Intelsat and SES sent a binding commitment letter (the “Customer Commitment”) to their respective customers where they agreed to “undertake, manage, and complete all necessary actions to effectuate” the customers’ migration following repurposing of a portion of the C-band for mobile terrestrial operations. The Customer Commitment further agreed to “ earmark an amount equal to 120% of the estimated spectrum clearing costs” to pay customer expenses related to the migration. Since then, the companies have further engaged their customers, received valuable feedback, and revised the Customer Commitment to reflect customer comments regarding how the commitment could be enhanced.

The revised Customer Commitment and two of three attachments are provided here. Attachment A, included here, provides a schedule of transition-related expenses that satellite operators will either pay directly on behalf of their customers and the antenna operators, or for which they will reimburse their customers or the antenna operators. As detailed in Attachment A, reimbursable expenses include (but are not limited to) benchmark antenna performance tests, labor costs, and filter and other equipment costs. Attachment B, omitted here, contains customer-specific transition timelines, loading and restoration plans, and terrestrial uplink and operations plans.¹ Attachment C, also included here, sets forth the technical specification for the antenna filter.

¹ Because these plans are specific to individual customers and contain confidential information, Attachment B is not attached here.

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As this exciting opportunity to make spectrum available quickly for 5G progresses, the CBA looks forward to additional work with the Commission and with customers to ensure protection of satellite services.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Henry Gola". The signature is written in a cursive style with a large, looping initial "H".

Henry Gola
Counsel for the C-Band Alliance

Attachments

ATTACHMENTS

[Operator Letterhead]

_____, 2019

Re: Commitments Regarding Customer Transition Plan for C-Band Satellite Services

Dear _____:

[] (“Operator”) and [Customer Name] (“Customer”) are parties to certain agreement(s) related to the provision of C-Band satellite services by Operator to Customer, namely:

[LIST OF AGREEMENTS], dated [DATE]

The above-referenced agreements are collectively referred to herein as the “Agreement(s)”.

As you are aware, the Federal Communications Commission (“FCC”) has initiated a Notice of Proposed Rulemaking in the *Expanding Flexible Use of the 3.7-4.2 GHz Band* proceeding (General Docket No 18-122) (the “Mid-Band Proceeding”) to reassign a portion of the 3700-4200 MHz band (“C-band Downlink”) to mobile terrestrial operations. The results of the Mid-Band Proceeding may inhibit the provision of the service on the transponders currently used to provide service by [Intelsat/SES/Eutelsat/Telesat] under the Agreement(s).

The C-Band Alliance, a consortium representing the interests of [I/S/E/T] and other satellite operators with customers utilizing C-band in the continental U.S., has submitted a proposal to the FCC in response to the Mid-Band Proceeding. This proposal provides a process that will allow the U.S. government to achieve its stated objective of freeing up some C-band spectrum for terrestrial use such as deployment of 5G services while also ensuring sufficient C-Band spectrum remains available to continue providing services to [Customer Name] and other customers currently using C-band services. In support of the C-Band-Alliance’s proposal to the FCC, we are sending you this letter with the attached binding commitment terms, including the binding commitment to our customers, together with a specific Customer Transition Plan and schedule of Reimbursable Expenses attached thereto, which will govern the transition plan for Customer’s service and commit [I/S/E/T] in connection with such transition. The terms contained in the attached documents (the “Commitment”) are intended to supplement the terms of the Agreement(s), but do not otherwise negate any existing contractual terms.

While the C-Band Alliance proposal may not ultimately be adopted by the FCC, we are strongly advocating for its adoption because it is the only mechanism for repurposing the C-band spectrum that allows the continuation of our business to our valued customers. We provide this Commitment in advance of any order to make it evident that we understand the concerns of [Customer Name] and will vigorously work to minimize any disruption and to seamlessly transition your services with no incremental expense to you. Please note that the Commitment is expressly contingent upon the conditions precedent set out in Clause 6.1.0 of the Commitment.

We remain committed to providing services to [Customer Name] under the Agreement(s) and to building on our relationship for the future.

Sincerely,

[Operator]

[Operator letterhead]

OPERATOR COMMITMENT TO CUSTOMER (“THE COMMITMENT”)

Contents

- Overall program management
- Satellite capacity loading and operations
- Satellite uplinks and uplink operations
- Satellite downlink
- Financial Commitment
- General terms and conditions

Attachment A: Schedule of Reimbursable Expenses

Attachment B: Customer Specific Plans

- Customer transition timeline – project plan
- Customer transponder loading & restoration plan
- Customer terrestrial uplink and operations plan (if required)

Attachment C: 5G Rejection Filter Specification

1. Overall program management:

- 1.0 Timing. The timing of the transition of Services under the Agreement(s) will depend on when the FCC issues an Order (as defined in Section 6.1.0 (a)) in the Mid-Band Proceeding. Customer's Services migration process (if applicable) will begin following an FCC Order and will proceed according to the transition timeline set forth in Attachment B. Operator will provide Customer with at least ninety (90) days' prior written notice in advance of the start of any transition or necessary dual illumination period as set out in Section 3.1.0 below or such other notice period as Customer and Operator may agree.
- 2.0 Transition. Operator agrees to undertake, manage, and complete all necessary actions to effectuate the transition of Services identified in Attachment B. For efficiency and consistency, Operator intends to utilize the services of the C-Band Alliance ("CBA") to manage many aspects of the transition; however, the Operator is and will remain obligated to Customer under the terms of this Commitment for this transition. Furthermore, the CBA will qualify and engage independent third parties to implement the transition plan under the coordination of the CBA for which the Operator remains ultimately responsible.
- 3.0 Communication with End Users. In order for Operator to fulfill the Commitment, Customer shall be responsible for informing all end users receiving Customer's transmissions ("End Users") that may be impacted by the transition of Services of the timing and the dual illumination period. Operator shall provide Customer with a communication kit for use in this communication, which will describe the process and the role the CBA will play in the transition. To facilitate this process, Customer shall provide Operator with contact information for each of the End Users that need to be contacted or provide reasonable assistance to the CBA to create a database of End Users that cannot be identified by Customer.
- 4.0 Definitions. Any defined terms used herein (in the cover letter, Operator Commitment to Customer, and the Schedule of Reimbursable Expenses) and not otherwise defined, including but not limited to "Service" and "Service Order" shall have the meaning ascribed to them in the Agreement(s).

2. Satellite capacity loading and satellite operations:

- 1.0 Loading and restoration plan. Each Customer shall have a specific satellite loading and restoration plan, defined in Attachment B. This plan outlines the current and future loading of Customer's transponder Services, consistent with the capacities currently contracted in the Agreement(s). Satellite performance and coverage after service transition will continue to meet the contractual performance specifications.
- 2.0 Satellite Payload Spares and In-Orbit Redundancy. Upon completion of the required Services migration to a new transponder, polarization or satellite (or any combination

thereof), Customer shall maintain the same level of protection as described in the Agreement(s) and shall continue to have access to space amplifiers (a component of space equipment) in case of an in-orbit failure.

- 3.0 Service fee continuity. Service fees for Services during the transition period and the Agreement(s)' term will remain valid and represent the only financial remuneration by Customer to Operator for the Services provided under the Agreement(s). There are no other fees to Customer to facilitate the transfer of its Services to an alternate frequency or Satellite (or both).

3. Satellite uplinks and uplink operations:

- 1.0 Dual illumination. In some cases, Customers may need to dual illuminate transmissions to both the existing and post-transition transponder capacity in order to migrate Services to the new transponder capacity and allow for the required upgrades or revisions in the downlink sites. If dual illumination is required, Customer's Service shall be provided both on Customer's existing transponder and on the post-transition transponder (as indicated in Attachment B) for a period of up to 90 days (or as otherwise set out in Attachment B) at no additional cost to the Customer. Requests for dual illumination for longer than 90 days will be handled with the Operator and will be subject to availability of satellite capacity and migration plan implications.
- 2.0 Uplink for dual illumination. If required, Operator shall provide Customer with uplink services from one of Operator's teleports, a transportable uplink, or a third-party teleport at no additional cost during the dual illumination period. Fiber transport costs (or, where appropriate, satellite turnaround services) to and from Operator or third-party teleport facilities in support of the dual illumination will also be covered by Operator, through the CBA, with evidence of the incremental expense.
- 3.0 Technical Support Costs. Operator will pay Customer for any reasonable time and material costs incurred by Customer for internal activities to prepare facilities, including facilities maintained by third parties contracted for uplink services by Customer, and End User notifications relating to uplinks to support the transition. Customer shall submit appropriate documentation in advance to Operator for review and approval. Once the work is completed, the Customer shall submit appropriate documentation to support any such costs. The required documentation shall be satisfactory to the Operator and reasonableness will be determined in the sole discretion of the Operator.

4. Satellite downlink

- 1.0 Installation of Filters and Additional Equipment. Once Customer's service has been fully transitioned to the post-transition Transponder(s), where applicable and as indicated in Attachment B, Operator, through the CBA, shall deliver and install the necessary 5G rejection filter(s) (the "Filters") compliant with the specification shown in Attachment C

in all affected antennas at all Customer and End User locations. To the extent additional equipment is required to ensure continued provision of Service based on the Operator's reasonable judgment, Operator, through the CBA, will procure and install such equipment at no cost to the Customer or the End User. Customer shall provide best efforts to ensure: (a) reasonable access to Customer and End User facilities, and (b) reasonable cooperation from Customer and End User as necessary for Operator and/or the CBA, to deliver and install the Filters and additional equipment.

- 2.0 Signal Quality at Earth Station Output. The signal degradation at the earth station output will be no greater than 1 dB due solely to the insertion loss of the 5G rejection filter. Downlink adjacent satellite interference and cross-polarization interference will remain within currently allocated margins.
- 3.0 Technical Support and Costs. Operator, either directly or through vendors retained by the CBA, will provide all reasonable technical support and assistance required by Customer and all End Users necessary to implement the transition. Within 30 days of submitting documentation, Operator will pay for directly or reimburse Customer and its End Users for all Reimbursable Expenses, as defined and set forth in the schedule of costs eligible for reimbursement set forth in Attachment A.

Operator will install/upgrade downlink sites based on the registered or known End Users of Customer. If non-registered (or unknown) sites surface, Customer will notify Operator and Operator's obligation is to activate site as quickly as commercially reasonable.

- 4.0 Warranty of Work. Operator, or the CBA, will complete all documentation required to ensure that any Operator or CBA-provided Filters and additional equipment is registered and covered by manufacturer warranty. To the extent that any of the work performed by the Operator, CBA, or other vendor retained to perform work to effectuate the transition fails, Operator will take such corrective action as Operator reasonably deems necessary. The transition work, including any defective installation or equipment will be warranted by Operator for a period of 5 years from the FCC Order. To the extent that the delivery of the Filters or other equipment from the manufacturer is delayed, the timeline for installation as set forth in Attachment B will be extended by the length of delay in Filter and or equipment delivery.
- 5.0 Extended Spares Program. Operator, via the CBA, will negotiate with the various hardware solution providers to provide up to 12% spares for the Filters deployed in the receive sites. The equipment will be held by manufacturers for registered downlink sites for a 5-year period following the completion of the filter deployments to ensure rapid access to replacement equipment in the event of equipment malfunction.

5. Financial Commitments

- 1.0 Earmarked Funds. Pursuant to the consortium agreement among the satellite operators forming the CBA, those proceeds from secondary market agreements that are necessary

to pay expenses required to clear spectrum and other expenses of the consortium prior to any distribution to the satellite operators are to be held in an escrow account. The operators forming the CBA agree to earmark an amount equal to 120% of the estimated spectrum clearing costs related to the Customer and End User operations to satisfy this Commitment to all customers of the satellite operators and such earmarked funds will not be distributed to Operator other than for the purpose of funding the work required under this Commitment. Operator will engage a third-party to audit the clearing budget and to provide a written assessment of its validity, to be issued to Customer.

- 2.0 Completion Fund. Upon a distribution of proceeds to Operator from the escrow account pursuant to the terms of the consortium agreement (other than to pay for spectrum clearing costs and other eligible expenses), Operator agrees to segregate funds as a “completion fund” for a further period of three years to cover any additional clearing expenses that may occur. The completion fund will be equal to 10% of the Operator’s portion of the original amount of proceeds earmarked for spectrum clearing. The funds will be segregated from the general assets of the Operator and may be used only for clearing and related costs. The amount of the completion fund will be decreased by one-third of the original amount of the fund at the end of year one and year two and any remaining amounts will be returned to the Operator at the end of year three.

6. General Terms and Conditions:

- 1.0 Conditions Precedent. The effectiveness of the Commitment is subject to the following conditions precedent (“Conditions Precedent”) being fulfilled:
- (a) adoption by the FCC in a report and order of a mechanism similar enough to the CBA proposal outlined in the comments and reply comments submitted in the Mid-Band Proceeding (“FCC Order”) that the CBA and its member companies voluntarily agree to perform the role of transition facilitator;
 - (b) successful closing of a secondary market transaction with one or more mobile terrestrial operators pursuant to the FCC Order;
 - (c) execution and implementation of Operator’s nominal fleet deployment plan, which may be modified from time to time at the sole discretion of Operator; and
 - (d) cooperation by Customer and End Users as set forth herein.
- 2.0 Miscellaneous. This Commitment, including the letter and all attachments, expresses the entire agreement hereto related to the transition of Services. For the benefit of clarity, the Commitment is binding on the Operator and intended to be incremental to the Agreement terms; however, in all cases the terms of the Agreements shall continue to

apply in all respects to all Service provided to Customer.

SCHEDULE OF REIMBURSABLE COSTS

I. Overview

The C-Band Alliance's (CBA) proposal in the FCC's Mid-Band Proceeding to expand terrestrial use of the 3700-4200 MHz band ("C-band") would establish a market-based approach to allow the satellite operators to enable terrestrial mobile operations in a portion of the C-band by repacking satellite services into the upper 300 MHz. This would make some C-band spectrum available for 5G while critically protecting the wide array of established C-band satellite services and the companies that rely on them. Under the CBA's proposal, the satellite operators would pay for all costs directly associated with repacking satellite services. This includes costs incurred by both our customers ("Customer") and the C-band antenna operators ("End Users") that receive our Customers' transmissions. The CBA would also establish a database portal designed to collect additional necessary information from End Users to ensure that all antennas are adequately addressed in the repacking process. This document sets forth the expenses the operators are committed to reimbursing to ensure that our Customers continue to receive the same high-quality, reliable satellite service they enjoy today.

This Attachment A identifies the details of reimbursable costs under the Commitment. While Operator believes all items to be accurate on the date hereof, Operator may need to issue updates in the event of an error or omission, or to address changes in the technical solutions available during the program. Operator shall inform Customer of such updates in writing.

II. Installation Programs Available

There are two programs planned for the remediation of potential impacts to Customers and End Users:

1. **CBA-LED PROGRAM:** Professional technicians will be hired by the CBA to remediate any of the four impacts noted in Section IV below. The CBA will work with each End User to schedule a time for the technician to complete a job. It is anticipated that most End Users will use this service, in particular those with a single antenna per site.
2. **END USER-LED PROGRAM:** For those End Users who have skilled resources on site and would like to perform the remediation activities themselves, the CBA will compensate reasonable expenses incurred as outlined below. It is anticipated that more complex, regularly staffed sites, such as cable sites, to fall under this program.

The Operator agrees to undertake, manage, and complete all necessary actions to effectuate the transition of Services as identified in this Attachment B. For efficiency and consistency, Operator intends to utilize the services of the CBA to manage many aspects of the transition and the Operator contracts with the CBA to provide program management services to organize

and implement portions of the spectrum clearing activity; however, the Operator is and will remain obligated to Customer for this transition. Furthermore, the CBA will qualify and engage independent third parties as technicians to implement the transition under the coordination of the CBA for which the Operator remains ultimately responsible.

III. Potential Impacts to Customers and End Users

The CBA has identified four categories of potential impact:

- A. **FILTER REQUIRED:** All C-band End Users' receive antennas operating in the Continental US (CONUS) will require a filter to be installed on each polarization in use by each feed on every antenna.
- B. **FREQUENCY CHANGE:** Some Customers will remain on the same satellite but will require a change in frequency to move their transmission out of the lower 200 MHz or as part of a repacking effort. This will require the C-band end users who receive that Customer's signal to change frequency on their satellite receiver to lock onto the new signal frequency.
- C. **POLARIZATION CHANGE:** Some Customers will remain on the same satellite but will be moved to transponders on a different polarization than they use today. This will require some End Users who receive this signal to rotate their feed to lock into the new frequency range and polarization. If the antenna already has a 2-port feed downlinking feeds from this satellite, that indicates they can already receive both polarizations. In this case, a feed rotation is not necessary. A polarization change will also require a frequency change. In the case where access to the original polarization is required to receive services, a two-port feed, LNB and cabling will be provided to support the new polarization.
- D. **SATELLITE CHANGE:** Some users will be required to change the satellites from which they currently receive their feed. This will require the End Users who receive their signal to re-point their antenna to an entirely new orbital position to lock into the signal at the new orbital location. In cases where users are unable to reuse existing antenna equipment, new equipment will be provided or reimbursed by the Operator.

Each of these changes requires labor, and in some cases, equipment expenses on the part of the End User. Under the CBA's proposal, all reasonable costs resulting from the need to clear spectrum and mitigation expenses to prevent 5G interference, will be reimbursed by the satellite operators.

IV. CBA-Led Cost Schedule by Impact Type

A. CBA-Led Filter Implementations

All C-Band receive antennas in CONUS should install one bandpass filter for every port/polarization on every feed on an existing antenna. The purpose of this filter is to suppress all signals being transmitted in the 3700-3900 MHz frequency range. 5G signals will operate in this range and given the strength of the 5G signal, this bandpass filter will protect End Users from interference caused by the 5G operators in range of the antenna.

To ensure consistency and reliability of the filter, the CBA will provide all filters under both installation programs. One filter per receive feed polarity per antenna will be provided free of charge to the owner of the receive antennas.

All installations will be scheduled with the End Users by the CBA scheduling group. The following labor will be provided, and tasks performed, free of charge during the installation of a filter:

Item	Description
1	Benchmark test of antenna performance
2	Labor to remove the low noise blockers (“LNBS”) and altimeter filters (if installed) without removing the coax cable, to install the filter, and to return the antenna to working condition.
4	Installation of 1 or 2 filters (2 filters per single feed antenna, one for each polarization if needed)
5	Reinstalling old LNBS (replacing the existing LNB with a new one in cases where required)
6	Post installation test to verify link margin is within threshold
7	Provide nuts, bolts, and miscellaneous hardware required to secure the filter to the feed and re-secure it to the antenna
8	Documentation and submission of the evidence of installation to the CBA
9	Travel to and from the site
10	Sign-off from End User that work has been completed

Any labor or equipment above and beyond what is specified above must be submitted and approved through the CBA review process in order to be covered by the Operators. Equipment and labor items related to repairing an antenna that does not function properly when the installer arrives or replacing functional antenna or cables at the request of the owner or site personnel will not be approved. Antennas that cannot feasibly support a filter installation will be replaced pursuant to the CBA review process.

B. CBA-Led Frequency Changes

The frequency repacking exercise may require frequency changes for many Customers in order to clear the lower 200 MHz of C-band. Such changes are a standard part of earth station operations and generally require little effort or technical expertise. In many cases a change in frequency can be initiated at the uplink and the satellite receivers associated with the receive antennas will change frequency automatically. In cases where the satellite receivers cannot handle an automatic frequency change, a manual intervention will be needed to make the frequency change. In these cases, installers will perform the frequency change whether it occurs at the time of filter installation or needs to be performed on a separated visit. Any circumstances that necessitate additional consideration should be submitted through a review process.

Item	Description
1	Benchmark test of antenna performance
2	Change the frequency on the satellite receiver for a given service and verify that lock on the new signal occurs
3	Sign-off from end user that work has been completed

C. CBA-Led Polarity Changes

The frequency repacking exercise may require polarization changes. In many cases, receive antenna are typically capable of receiving both polarizations, and in such cases, the changes will be limited to ensuring that the satellite receiver is connected to the right polarization and tuned to the right frequency. As such, expenses related to polarization changes for antenna already equipped to receive both polarizations are not covered under the CBA's proposal.

In cases where an antenna is only equipped with a single polarization feed, a change in the orientation of the feedhorn may be necessary. In such cases, the CBA will send an installer to make the necessary changes. In some cases, the CBA may retrofit the antenna with 2-port feedhorns to make them capable of receiving both polarizations simultaneously. All activities to support a polarization change will be scheduled with the end user by the CBA scheduling group. The scheduling group will determine if a filter can be installed at the same time.

Item	Description
1	Benchmark test of antenna performance
2	Labor to reposition feed or remove and replace it with a new feed suited to the new polarization and to return the antenna to working condition

3	Post installation test of antenna performance to ensure service is functioning to specification
4	Documentation and submission of the evidence of installation to the CBA
5	Travel to and from the site
6	Sign-off from end user that work has been completed

D. CBA-Led Satellite Changes

The frequency repacking exercise may require content that is currently on one satellite to be moved to a different satellite at a different orbital location. This will require the C-band End Users who receive said content via a particular satellite to re-point their antenna to the new orbital position to lock into the signal on an alternate satellite.

In cases where the End User does not have the ability to re-point receive antenna to the new satellite, the CBA will provide contractors to re-point them free of charge.

V. End User-Led Cost Schedule by Impact Type

A. End User-Led Filter Implementations

For those End Users who have the knowledge and willingness to install filters themselves, the CBA will reimburse them for filter installation. To begin the owner-installation program, the End Users will need to provide antenna and site information via the CBA’s customer portal.

The information required will include, but not be limited to, the number of antennas at the specific C-Band headend site and the specific signal reception (“content”) detail for each antenna, so that the CBA can identify the correct filter and, if necessary, other equipment required for each antenna and site. Once the information is received and complete in the portal, the CBA will be responsible for shipping the filter kits to the sites in advance of the installation windows.

In addition to equipment, the End Users will be provided details about the timing of content migrations to new frequencies (where applicable) and the timing of required filter installations. The antenna owner is responsible for executing the filter implementations within the windows provided for each content provider. End Users will be reimbursed for related expenses by way of a stipend per antenna, as outlined below. Reimbursements will be sent once evidence of the installation is uploaded to the customer portal referenced above.

Item	Description	Amount
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DUAL-FEED ANTENNA FILTER IMPLEMENTATION (Dual RX port feed)		
1	Benchmark test of antenna performance	\$600.00
2	Labor to remove the LNB without removing the coax cable, to install the filter, and to return the antenna to working condition	
3	Labor to install filters (2 filters per single feed antenna, one for each polarization). Filters will be provided free of charge by the CBA	
4	Reinstalling old LNBS (or replacing the LNB if it is no longer functional or cannot be feasibly restored to full functionality)	
5	Post installation test of antenna performance to ensure link performance is within threshold	
6	Nuts, bolts, and miscellaneous hardware and tools required to secure the filter to the feed and re-secure it to the antenna	
7	Documentation of installation and submission to the CBA customer portal	
8	Travel to and from the site	
9	Contingency – intended to cover incidental expenses, such as excess labor to replace a cable or the cost of rental equipment, lifts, etc. as required	\$200.00
Total Self-Install Reimbursement per Dual-Feed Antenna (2 filters installed)		\$800.00
SINGLE-FEED ANTENNA FILTER IMPLEMENTATION (Single RX Port Feed)		
1	Benchmark test of antenna performance	\$400.00
2	Labor to remove the LNB without removing the coax cable, to install the filter, and to return the antenna to working condition	
3	Labor to install filters (2 filters per single feed antenna, one for each polarization). Filters will be provided free of charge by the CBA	
4	Reinstalling old LNBS (or replacing the LNB if it is no longer functional or cannot be feasibly restored to full functionality)	
5	Post installation test of antenna performance to ensure link performance is within threshold	
6	Nuts, bolts, and miscellaneous hardware and tools required to secure the filter to the feed and re-secure it to the antenna	
7	Documentation of installation and submission to the CBA customer portal	

8	Travel to and from the site	
9	Contingency – intended to cover incidental expenses, such as excess labor to replace a cable or the cost of rental equipment, lifts, etc. as required	\$200.00
	Total Self-Install Reimbursement per Single-Feed Antenna (1 filter installed)	\$600.00

Those sites expected to have extraneous circumstances where the reimbursement amount above would not cover the reasonable expenses incurred for implementing a set of filters should contact the CBA to submit a review in advance of the work being performed.

B. End User-Led Frequency Changes

The frequency repacking exercise may require frequency changes for many End Users in order to clear the lower 200 MHz of C-band.

For End User-led frequency changes, labor required to adjust the equipment settings and verify that the equipment locks onto the new signal will be required, whether it occurs at the time of filter installation or needs to be performed at a different time due to programming migration timelines:

Table 2-2 Work Included in CBA-led frequency change		
Item	Description	Amount
1	Benchmark test of antenna performance	\$100.00
2	Change the frequency on the satellite receiver for a given service and verify that lock on the new signal occurs	
3	Travel to and from the site	
4	Sign-off from end user that work has been completed	
	Total Operator-led Reimbursement per frequency change on a receive antenna	\$100.00

Any circumstances that necessitate additional consideration should be submitted through a review process.

C. End User-Led Polarity Changes

Many broadcasters and cable headends have performed polarization changes in the past and the CBA expects many will choose to perform this work with internal

resources. The CBA will provide a stipend for those who perform the work themselves to offset the cost of equipment and labor involved in making polarization changes.

End Users will be reimbursed for related expenses by way of a stipend per antenna, as outlined below:

Item	Description	Amount
1	Benchmark test of antenna performance	\$100.00
2	Labor to reposition feed or remove and replace it with a new feed suited to the new polarization, re-point the antenna and to return the antenna to working condition	
4	Post install testing of the signal levels to ensure service is functional	
5	Travel to and from the site	
6	Contingency – intended to cover incidental expenses, such as excess labor, a replacement LNB, or the cost of rental equipment, lifts, etc. as required	
Total per antenna polarization change		\$200.00

D. End User-Led Satellite Changes

In most cases, when a service is moved from one satellite to another, the filter will be installed at the same time. In those cases, the incremental work and costs associated with the satellite change will be reimbursed as follows:

Item	Description	Costs
1	Benchmark test of antenna performance	\$400.00
2	Labor to repoint the antenna to the new orbital location and make adjustments to frequency or polarity to receive the signal	
3	Post maintenance test of antenna performance to ensure service is functioning to specification using a spectrum analyzer or other tools as required	
4	Documentation and submission of the evidence of installation to the CBA	
5	Travel to and from the site	
5	Sign-off from End User that work has been completed	
Total per satellite change		\$400.00

VI. Antenna Seeding and Antenna Replacements

There will be cases where an End User needs a new antenna to point to a satellite orbital location for which the End User has no antenna pointed to or has old equipment that cannot feasibly be repointed. In these cases, the CBA will work with the End User to understand the need.

After reviewing the need, if it is determined to be a reasonable expense attributable to the satellite change, the CBA will cover the associated costs. This will require coordination and communication with the site operators and a possible site survey.

In these cases, End Users will be reimbursed for related expenses by way of a stipend per antenna, as outlined below in Table 2-3:

Table 2-3 Work Included in owner-led antenna replacements and new satellite antenna seedings		
Item	Description	Qualified Expense?
1	3.7M Fixed Mount Antenna	Provided by CBA, free of charge **OR** \$3700 stipend pending evidence of install
2	Feed and cables required to provide connectivity to the new orbital location	Provided by CBA, free of charge **OR** included in stipend
4	Double or triple feed assembly to receive multiple signals	Provided by CBA, free of charge **OR** included in stipend
5	LNB(s) and cables	Provided by CBA, free of charge **OR** included in stipend
6	Installation kit for antenna	Provided by CBA, free of charge **OR** included in stipend
7	Line of site landscaping, tree-trimming	Provided by CBA, free of charge **OR** included in stipend

8	Civils and licenses	Provided by CBA, free of charge **OR** included in stipend
9	Installation of the antenna and assembly of the feeds	Provided by CBA, free of charge **OR** included in stipend
10	Connection of cables and power	Provided by CBA, free of charge **OR** included in stipend

CUSTOMER SPECIFIC PROJECT PLANS

- 1.0 Customer transition timeline – project plan
- 2.0 Customer transponder loading & restoration plan
- 3.0 Customer terrestrial uplink and operations plan (if required)

ATTACHMENT C

Filters that meet the below specification will provide the 43 dB of 5G in-band emissions rejection described in the mobile terrestrial operating rules proposed by the CBA. The filter proposed by the CBA meets the required 5G in-band rejection in 3700-3900 MHz and minimizes the amount of signal loss anywhere within 3900-4200 MHz.

5G Rejection Filter Requirements		
Electrical Characteristics	Pass Band (F2 - F3)	3900 - 4200 MHz
	Group delay variation within +/- 0.5 MHz	1.45 nsec Max
	Insertion Loss in Pass Band	1.0 dB Max
	Return Loss	20 dB Min
	Rejection at 3700 MHz (F0)	60 dB Min
	Rejection at 3880 MHz (F1)	40 dB Min
	Rejection at 4230 MHz (F4)	30 dB Min
Mechanical Characteristics	Interfaces	CPR-229G & CPR-229F
	Size	6.75 " X 3.00" X 2.96"
	Finish	Matte white light textured paint

