Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding Flexible Use of the 3.7 to 4.2 GHz Band	)	GN Docket No. 18-122
	)	

COMMENTS OF INTELSAT LICENSE LLC

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EXECUTIVE SUMMARY

Intelsat License LLC ("Intelsat") welcomes the Federal Communications Commission's (the "Commission") publication of a preliminary cost catalog which is intended to set parameters on the estimated range of costs that the Commission would presume to be reasonable during the complex accelerated relocation process. To best accomplish this goal, Intelsat believes that the cost catalog must contain clearly defined cost categories and reasonably accurate expense estimate ranges that align with the scope of expenses that are reimbursable under the terms of the Report and Order and account for real-world circumstances.

As drafted, there are several areas where the cost catalog may have failed to capture material relocation costs, or where clarification or further refinement is needed before the Commission issues the document as guidance. It also currently does not consistently reflect the actual apportionment of tasks or a full range of relative costs among "incumbent space stations, incumbent earth station operators, and appropriate surrogates of those parties that incur compensable costs."

Intelsat therefore provides additional data and input to address or correct certain assumptions reflected in the preliminary cost catalog. These changes are important to ensure comprehensive coverage of all relevant relocation costs to help avoid cost disputes that could lead to delays in the compressed timeframe for transition.

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Intelsat License LLC ("Intelsat") submits these comments in response to the Federal Communications Commission's (the "FCC" or "Commission") Public Notice seeking comments on the completeness of a preliminary cost catalog for expected C-band relocation expenses.[1] The cost catalog, if it is reasonably comprehensive and fairly reflects the range of costs that actually will be encountered, can help realize important cost and other resource efficiencies for the overall C-band transition.

I. INTRODUCTION

As one of the incumbent satellite operators directly involved in formulating the proposal for the C-band transition, Intelsat has a perspective to share on several of the cost categories and ranges provided in the preliminary cost catalog. While the cost catalog is not meant to "cover every expense, for every situation," or serve "as an exhaustive list of all expenses that may potentially qualify for reimbursement," there are areas where the cost catalog may have failed to capture material relocation costs, or where clarification or further refinement is needed before the Wireless Telecommunications Bureau (the "Bureau") issues the document as guidance.[2]

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[1] *See* Wireless Telecommunications Bureau Seeks Comment on Preliminary Cost Category Schedule for 3.7-4.2 GHz Band Relocation Expenses, *Public Notice*, GN Docket No. 18-122, DA-20-457 (Apr. 27, 2020), https://www.fcc.gov/document/wtb-seeks-comment-37-ghz-band-preliminary-cost-category [hereinafter "Public Notice"].

[2] *Id.*, Attachment, 1.

Because "[r]eimbursement submissions that fall within the estimated range of costs in the cost category schedule issued by the Bureau shall be presumed reasonable," clearly defined cost categories and reasonably accurate expense estimation that account for real-world circumstances could contribute to streamlining the Relocation Payment Clearinghouse's ("Clearinghouse") review of relocation costs.[3] A cost catalog that fairly balances stakeholders' interests can also serve as a framework and guide the Clearinghouse's approach to adjudication of reimbursable cost disputes and in that way minimize the need to refer such disputes to the Bureau for resolution.[4] For these reasons, refinement and clarification of costs and cost ranges would be beneficial to the administration of cost-related aspects of the C-band transition by the Clearinghouse.[5]

While the preliminary cost catalog is a good start, it currently does not consistently reflect the actual apportionment of tasks or a full range of relative costs among "incumbent space stations, incumbent earth station operators, and appropriate surrogates of those parties that incur compensable costs."[6] This results – in some instances – in the estimated preliminary range of costs potentially being insufficient to cover all expenses that should be reimbursable under the terms of the Report and Order.[7] Intelsat's comments are meant to provide additional data and input that may affect the assumptions that the Commission's contractor, RKF Engineering Solutions, LLC ("RKF"), may have made in compiling the preliminary cost catalog. These should lead to more comprehensive categories of costs as well as, in some cases, revised ranges for relevant relocation costs in the cost catalog.

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[3] Expanding Flexible Use of the 3.7 to 4.2 GHz, *Report and Order and Order of Proposed Modification*, 35 FCC Rcd. 2343, paras. 194, 260-62 (2020) [hereinafter "Report and Order"].

[4] *Id.*, para. 268.

[5] *See id.*, para. 255.

[6] *Id.*, para. 263.

[7] *Id.*, para. 193 ("[C]ompensable costs will include all reasonable engineering, equipment, site and FCC fees, as well as any reasonable, additional costs that the incumbent space station operators and incumbent earth station operators may incur as a result of relocation.")

For ease of review, this submission maintains the same section structure and numbering format as the preliminary cost catalog.

II. SATELLITE OPERATOR COSTS

A. Expected Cost to Repack Existing Satellites

Intelsat has no suggested changes for this section.

B. In Orbit Delivery of New Satellites

Intelsat has no suggested changes for this section.

C. Space Segment Cost Breakout

The Report and Order explicitly allowed reimbursement for "procuring and launching new satellites."[8] It also reflected a range of reasonable estimated costs of $1.28 billion to $2.5 billion for this category, including "$160-$250 million in capital costs for each satellite" and an "estimated range of eight to ten additional satellites."[9] Intelsat's recommendations below for changes to this cost category would not result in total estimated transition costs exceeding those reflected in the rulemaking record.

1. Spacecraft

While Intelsat has no suggested changes for this section, Intelsat notes that due to the 2019 novel coronavirus pandemic, the cost of procuring satellites has noticeably increased as a result of efforts to ensure that satellite manufacturers will be able to meet the expedited timelines despite the potential for work stoppages or supply shortages.

2. Launch Costs

Intelsat recommends that the Commission consider changing Table II-C-2 to increase the high end of the range for a single launch from $104 million to $140 million. As Intelsat

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[8] *Id.*, para. 199.

[9] *Id.*, para. 210.

understands it, RKF conducted its survey on this issue with the assumption that only certain launch providers with historically lower costs would likely be used by satellite operators in the relocation process. However, in order for the range of estimated costs to establish the intended presumption of "reasonableness," the Commission must consider situations where satellite operators may, due to contractual issues, transition time constraints, launch manifest availability and other circumstances, have to use a different, higher cost launch provider.

Based on costs associated with using all potential launch providers, the proposed high end of the range – $104 million – would be insufficient to cover these additional costs. Accordingly, Intelsat submits that the high end of the cost estimate should be $140 million to allow Intelsat the flexibility it needs in the event that it has to utilize an alternative launch provider to avoid delays in clearing the spectrum. The additional costs will cover securing alternative launch options and ordering back-up launch vehicles if a launch failure were to occur. This higher end of the estimated range would be consistent with estimates that the C-Band Alliance and SES previously presented to the Commission.[10]

3. Other Potential Costs

Intelsat has no suggested changes for this section.

D. Relocation Program Management

Intelsat has no suggested changes for this section.

E. Overall Program Management, Staffing, and Support

Intelsat cautions that the preliminary cost catalog does not take into consideration the overall costs of program management, staffing, and support to ensure satellite operators' completion of a complex process that has been compressed into a very short amount of time. These should be added as a new category.

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[10] *See id.*, para. 206.

There is no question that a premium is placed on full performance within specified time ranges, and that has yet to be reflected in the preliminary cost catalog. Intelsat envisions that it will need to contract with a program management consultant to interface and report to the Relocation Coordinator and the Relocation Payment Clearinghouse. This consultant function would be devoted entirely to work on relocation-related activities and will be required for the duration of the project, which will result in an estimated cost of $6 million - $10 million.

Additionally, the contractors who are providing implementation services will incur charges related to program management, the installation of equipment, staffing call centers to perform earth station outreach and certification, and supporting end users. Intelsat estimates that the administrative management costs for its contractors will fall in the $4 million - $6 million range over the course of the project.

Finally, Intelsat envisions that a significant portion of the work needed for relocation to happen will be performed internally by full-time Intelsat employees – particularly since much of this work will need to occur before the Relocation Coordinator is even selected. These employees are dedicated to: managing customer repacking and affiliate outreach; managing field service logistics, including antenna seeding and filter implementation efforts; overall vendor management across all clearing work streams; and developing financial analysis and reporting throughout the relocation process. Intelsat estimates that 25-40 full-time employees are needed to serve this function, with an average loaded salary of $300,000 per year for a total of $7.5 million to $12 million per year for Intelsat's employee labor alone.

Each of these estimated program management costs should be added to the revised cost catalog to ensure that it reflects expected actual costs.

III. EARTH STATION MIGRATION AND FILTERING COSTS

In March 2019, as part of the C-Band Alliance's proposal, Intelsat sent a commitment letter to its customers with a proposal 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."[11] Under that proposal, which the Commission elected not to adopt, "reimbursable expenses [for earth station migration and filtering] include . . . benchmark antenna performance tests, labor costs, and filter and other equipment costs."[12] The preliminary cost catalog estimates relating to earth station migration and filtering costs are generally consistent with that earlier itemization of costs, with the exception of the items below.

A. <u>Filtering/Retuning/Repointing</u>

Intelsat believes tables III-A-3 and III-A-4 were mistakenly placed in this section, as neither table captures costs related to filtering/retuning/repointing. Intelsat suggests moving these tables where they more logically belong, to section III–B-4 – Gateway and Large Aperture Point-to-Point Systems.

B. <u>Equipment Costs</u>

1. Receive-Only Earth Stations

Intelsat recommends adding the following category to table III-B-1 to account for Simulsat antennas that were not listed, but should be.

Simulsat Antenna System	
New Simulsat feed system, 2 PLL LNBs and cabling Installation and Instruction manuals (per unit)	$6000 - $8,000

And in the same table under the existing category Supporting Equipment, Intelsat recommends adding the following line item:

Simulsat bubble cover kit	$1000 - $2,000

[11] C-Band Alliance Ex Parte Filing, 1 (Apr. 3, 2019), https://ecfsapi.fcc.gov/file/10403446622844/CBA%20-%20Customer%20Commitment%20Ex%20Parte%20-%204-3-19.pdf.

[12] *Id*.

2. Bi-directional Earth Stations

Intelsat has no suggested changes for this section.

3. Temporary Fixed Earth Stations

Intelsat has no suggested changes for this section.

4. Gateway and Large Aperture Point-to-Point Systems

As noted above in Section III-A, Intelsat suggests moving tables III-A-3 and III-A-4 into this section and renaming them as tables III-B-6 and III-B-7, respectively. These two tables represent the RF equipment options and costs that will need to be added to the antenna costs provided in table III-B-5 to arrive at a range for full antenna system cost.

C. <u>TT&C Consolidation Costs</u>

The Report and Order explicitly allows reimbursement to incumbent space station operators for several categories of costs to "consolidate their TT&C sites . . . and reduce the number of gateway facilities," "including the installation of additional antennas at these facilities, procurement of new real estate, and support for customer migration to the relocated facilities."[13] As Intelsat is tasked with consolidating over twenty antennas to two consolidated TT&C sites, it will incur significant TT&C consolidation costs and, therefore, this cost category has great operational importance.[14]

As in initial matter, Intelsat notes that the cost shown for a 13-meter antenna system (full-motion, calibrated) appears to be incorrectly placed in this section and is inconsistent with the cost data provided above in table III-B-5 and the tables III-B-6 and III-B-7 that Intelsat suggests should be moved from III-A-3 and III-A-4. The correct range for this antenna system is $3.6 million - $3.8 million.

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[13] Report and Order, para. 199.

[14] *See id.*, para. 374.

Intelsat also believes that the estimated cost range shown for "Site Infrastructure Buildout" is too low to cover the actual cost for the task. Here, the estimates in the preliminary cost catalog suggest that the Commission incorrectly assumed that satellite operators would be able to save a significant portion of the costs of building out infrastructure by eliminating infrastructure at existing TT&C/Gateway sites. In fact, existing TT&C/Gateway sites will remain in operation – both to ensure that TT&C operations are dual-illuminated for some amount of time in order to ensure the safety of the fleet and to continue Ku-band operations. For this reason, Intelsat has to build brand new infrastructure at the two new consolidated TT&C/Gateway teleports, including new or upgraded electrical power systems, HVAC systems, generators, building renovations, and all associated site work -- the costs for which would not occur absent the mandate to consolidate all C-band TT&C operations at two remote sites. Intelsat forecasts that these expenses will cost $18 million - $35 million per consolidated TT&C/Gateway site.

D. Expected Total Costs – Earth Station

Intelsat has no suggested changes for this section.

E. Lump Sum Payment Transition

Intelsat proposes replacing the existing content in this section with the following:

1. Proposed Lump Sum Payment Scheme

Earth station owners who are interested in opting out of the satellite operator installations are entitled to receive a "lump sum reimbursement for all of their incumbent earth stations based on the average, estimated costs of relocating all of their incumbent earth stations."[15] However, the Report and Order did not specify the basis on which the "average, estimated costs" will be determined for each type of earth station.[16] The preliminary cost category report is likewise silent

[15] *Id.*, para. 202.

[16] *Id.*, paras. 202-03.

on this matter.[17] The preliminary catalog proposes lump sums on a per-earth station basis. Intelsat believes such a methodology inadequately accounts for the various changes that different types of earth station owners would need to account for when accepting the lump sum.

Given the variety of earth station applications represented by the eligible earth station pool, the amount of work that will be necessary to relocate each site is not consistent across all sites. Therefore, Intelsat submits that the amount of compensation should not be the same on a per site basis. For instance, some sites host a single antenna with a single feed and will require less than an hour of work for necessary relocation tasks. By contrast, large cable headend sites will have 10-20 antennas to service and compression equipment to install that may take weeks' worth of work to perform.

Earth station "type" is a better proxy than per-site or per-antenna count and size because it considers the amount and kind of work that will need to be performed at an earth station to receive services at the new location on each satellite. For instance, it is well known that cable television sites are more likely to need an additional antenna to point at new video neighborhoods than a radio station site is.

Intelsat therefore proposes that the earth stations be broken into categories to account for the number of antennas at the site and likely amount of technical work to be performed. Specifically, Intelsat suggests that the following definitions should be considered for each category of earth stations.

Single Antenna Sites: Typical applications in this category include radio stations, religious programming sites, and confidence remote monitoring sites that simply monitor transmitter antennas for quality control purposes. These sites generally have a single antenna with either one or both polarities in use. Most of these sites will require one or two filters to be installed on the

[17] Public Notice, Attachment, 14.

site, and some may require a frequency change on the existing Integrated Receiver/Decoder ("IRD") to tune to the new home of their existing signal. Other than filters, no new equipment will be needed unless an antenna must be replaced, which will be rare.

Broadcast Affiliate Sites: Typically, regional broadcast affiliate sites have 5-7 antennas per site: one each for primary and backup feeds from the broadcaster as well as up to five monitoring and Occasional Use antennas for contribution traffic such as sports programming that is not received full-time. Most of these sites will require 5-14 filters to be installed, while some will require repointing antennas and/or adding antennas in order to receive existing content from new satellites.

Rural or Single-site Cable Sites: These are smaller cable head ends and cable companies with a single head end that encompasses 10-20 antenna feeds. All these sites will be required to install filters on all their feeds, many will have to repoint antennas or install new ones to access existing content on new satellites, and some will have to install new IRDs sent to them by the content providers with whom they are affiliated.

Urban or Multi-site Cable Sites: These are multi-market cable systems that host 10-20 antennas at multiple sites and/or one sites with extensive fiber feeds to serve additional markets. All these sites will be required to install filters on all of their feeds, and those in 46 of the top 50 PEAs will be required to do so twice on all of their antenna feeds. Many will have to repoint antennas or install new ones to access existing content on new satellites and some will have to install new IRDs sent to them by the content providers with whom they are affiliated. Also, these sites tend to carry more channels and are likely to incur a higher incidence of changes and volume of IRD installations as a result.

In addition to difference in effort and complexity by earth station category, there is finite and discrete work associated with each site tied to filtering the antenna feeds on site. The Commission proposes in the preliminary cost catalog six types of antennas and seeks input on the

cost of remediating each antenna type. Intelsat believes the effort and costs are driven by the site type and number of antenna feeds rather than by the antenna type. Given that sites in the same categories above could still have substantially different numbers of antennas, there should be a set per feed stipend paid to offset both the cost of the filters and the associated labor to install them. Intelsat proposes that the filter procurement and installation stipend be set on a per feed basis, and that cable head end site stipends be lower because the filters can be installed more efficiently without the need to travel for each filter installation.

Intelsat proposes that the lump sum payments be comprised of both a flat fee based on the categories above, plus a per-antenna feed stipend to cover the cost of purchasing and installing filters. The flat fee would be designed to cover all costs outside of the filter and installation of the filter and would be sized by the anticipated complexity and work for each category of earth station. The table below covers the proposed payments accordingly:

Category	**Flat fee**	**Stipend**
Single Antenna Sites	$0 per site	$800 per feed
Broadcast Affiliate	$7,000 per site	$800 per feed
Rural or Single-site Cable	$15,000 per site	$650 per feed
Urban or Multi-site Cable	$15,000 per site, not to exceed $75,000 per earth station operator	$650 per feed

2. Application Fees

There are several FCC-imposed application fees that satellite operators and earth station operators will be subject to resulting from required relocation tasks. Intelsat believes these fees should be reimbursable as they are directly attributable to relocation and would not be incurred except for the need to clear the spectrum:

License fee type	**Amount**	**Use case**
New earth station license application	$2,985 application fee + $3600 for Comsearch coordination report (if required)	An earth station is required to install a new antenna to take existing content off a new satellite (antenna seeding)
Application to modify existing earth station license	$210 application fee + $3600 for Comsearch coordination report (if required)	A content provider is required to transmit services to a new satellite as part of the clearing and has to update their transmit license.

New satellite license application	$136,930 application fee	Space station operators are required to launch new satellites in order to maintain enough on-orbit capacity to maintain existing services in 200 MHz.

3. Compression Ranges

Intelsat submits that the costs for customer and affiliate compression and/or bifurcation equipment should be as follows. Intelsat also notes that customers generally have both primary and back-up or disaster recovery uplink sites and that both uplinks require upgrades and therefore should be reimbursable expenses:

	Uplink Costs	Affiliate Downlink Costs
Large Customer – assumes 8 transponders and service to most cable head ends (2000+)	$3M - $5M	(as many as 10-20k IRDs or data terminals needed)
Medium Customer – assumes 4 transponders and service to many cable head ends (1500)	$1M- $2.5M	(as many as 5-10k IRDs or data terminals needed)
Small Customer – assumes 2 transponders and service to a subset of the head ends (1000)	$500k- $1.5M	(as much as 500-5k IRDs or data terminals needed)
Typical IRD or data terminal cost per unit		$5,000 - $35,000 per unit. Number of units depends on the site configuration; base case is 1 IRD per channel with up to 16 channels per transponder

IV. FIXED SERVICE COSTS

Intelsat has no suggested changes for this section.

V. TECHNOLOGY UPGRADES

The Report and Order recognized the need for satellite incumbents to provide "targeted technology upgrades necessary for clearing the lower 300 megahertz," including "upgrades such as video compression, modulation/coding, and HD to SD down-conversion at downlink locations."[18] These expenses are "compensable" when "the costs for which incumbents are seeking reimbursement are reasonably necessary to complete the transition in a timely manner (and

[18] Report and Order, paras. 194, 199.

reasonable in cost)" and, in situations where legacy equipment cannot be replaced with equipment that is exactly comparable in functionality and cost, when the expenses are for "improved functionality beyond what is necessary to clear the band."[19]

RKF correctly identified that these technology upgrade costs are logically related to satellite transponders and not to earth station antennas. However, as drafted, the preliminary cost catalog does not clearly describe the scope of this category of reimbursable costs as contemplated by the Report and Order. To ensure consistency with the Report and Order's terms, Intelsat recommends the following edits to the existing text in this section:[20]

> Multiple activities are understood to be required to clear the lower 300 megahertz of spectrum in the 3700-4200 MHz band, inclusive of repacking via load balancing across existing satellites, the deployment of new satellites, and also the installation of new video compression and data transmission systems and technologies to reclaim spectrum, that require a refresh of all receive sites with new receiver/decoder technologies ~~that incorporate compression technologies~~.
>
> Compression/ remultiplexing/ bifurcation approaches and related technologies are not considered to either improve or degrade performance of a link, but they allow the transmission of the content in less spectrum. Not all content transmissions to earth station ~~links~~ will require compression in order to clear the lower 300 megahertz. Further, the costs associated with new encoding/transcoding equipment at the transmit/uplink site and integrated receiver/decoder devices at ~~the~~ all receive sites can be expensive. Therefore, only some stakeholders, where spectrum reductions are material and necessary, are expected to be reimbursed for new encrypt/encode/compress and decode/decrypt/decompress equipment for all of their receive locations. Moreover, if one side of the link is replaced then so too must all sites on the other. Therefore, the reimbursement for and distribution of this equipment is anticipated to flow through the satellite operators and is not part of earth station costs (except for labor for installing said equipment). In this way, the satellite operators are both responsible and accountable for the successful repacking of their operations into the upper 200 megahertz.[21]

Furthermore, Intelsat seeks to clarify that the price range of $5,000 - $35,000 provided in table V-A-2 is to be applied for each IRD or modem, and not for each transponder. This distinction is important because a single transponder can carry many channels, with each channel requiring

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[19] *Id.*, para. 194.

[20] Note that text in blue font indicates addition, while text in ~~red strikethrough~~ indicates deletion.

[21] Public Notice, Attachment at 21.

individual decoding equipment units. Some customers use a 1:1 channel to decoder configuration. Others use multiplex decoders that can handle multiple channels, but those are significantly more expensive and can fall outside of the cost range listed in the preliminary cost catalog. For simplicity and to allow content providers flexibility to architect their networks as they see fit, the acceptable range here should reflect a *per-IRD or per-modem* range of $5000 - $35,000.

VI. CONCLUSION

Intelsat appreciates the opportunity to comment on the preliminary cost catalog to improve its value to the Clearinghouse as it reviews claimed reimbursable costs. While many aspects of the catalog are consistent with Intelsat's experience and work done in preparation for the C-band transition, other aspects require revision of ranges that currently do not reflect the likely actual costs that such a complex undertaking will require within a compressed timeframe.

Respectfully submitted,

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