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ATTORNEYS AT LAW

March 7, 2007

**BY ELECTRONIC FILING**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, S.W.  
Washington, D.C. 20554

Re: *IB Docket No. 06-160; Rep. No. SPB-196*

Dear Ms. Dortch:

DIRECTV Enterprises, LLC (“DIRECTV”) hereby briefly responds to three aspects of the reply comments filed in this proceeding by SES Americom, Inc. (“SES”) and Spectrum Five LLC (“Spectrum Five”).

- SES and Spectrum Five argue that, in deciding whether to create a “third way” for twener entry, the Commission should not consider the effect of twener operations on DBS services enjoyed by millions of mobile users because these services are not entitled to protection under the Region 2 Plan of the ITU Radio Regulations. This reflects a totally self-serving view of the ITU’s spectrum coordination process – one in which U.S. DBS operators with ITU priority must accommodate tweeners, but tweeners are free to ruin existing mobile services enjoyed by millions of Americans. Allowing tweeners to operate as they propose would completely disrupt existing and effectively preclude future mobile DBS services – even by the tweeners themselves. The Commission cannot ignore this fact.
- Spectrum Five asserts that signal degradation caused by mispointed DBS receive antennas is only marginally compromised further by the introduction of a twener system. However, Spectrum Five’s analysis depends upon two critical assumptions – that all receive antennas are mispointed exactly *away from* one interfering twener and that there is no twener operating on the opposite side of the existing DBS system. This is entirely uninformative, if not outright misleading. When properly analyzed, the impact of twener operations are demonstrably far greater.

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- SES continues to claim that antenna mispointing has no meaningful effect on the tweener interference analysis. A closer look at its own evidence confirms the error of this claim.

There is one aspect of this proceeding on which DIRECTV and SES appear to agree. SES claims that it

has repeatedly demonstrated that accommodation of new DBS service at reduced spacing does not require any changes to existing policies. Instead, Commission rules expressly contemplate the filing of requests for new DBS service from locations not in the original Region 2 Plan, and ITU regulations provide a mechanism for conducting carrier-to-carrier coordination with respect to such requests.<sup>1</sup>

DIRECTV also believes that no new rules creating a “third way” for tweener entry are necessary or appropriate. Rather, as SES has “demonstrated”, the Commission should continue to rely upon the well-established international spectrum coordination process to resolve technical issues associated with tweener system proposals.

### **1. The Commission Cannot Ignore the Devastating Effect of Tweener Operations on Established and Developing Mobile DBS Services.**

Over the last several years, the public’s interest in and options for receiving mobile video products has grown dramatically. For example, two different operators – Qualcomm’s MediaFlo and Crown Castle’s Modeo – are rolling out services that will enable consumers to receive video on their mobile phones. DBS was one of the first services to explore this niche – one which the Commission found to be covered by the DBS spectrum allocation.<sup>2</sup> For years, companies such as KVH Industries have offered mobile DBS service to more traditional television screens located in non-traditional, mobile venues, such as cars, boats, and RVs, and continue to upgrade their technology and service offerings. Similarly, LiveTV provides DBS service on commercial airlines carrying millions of passengers each year, and is looking to expand its operations. These

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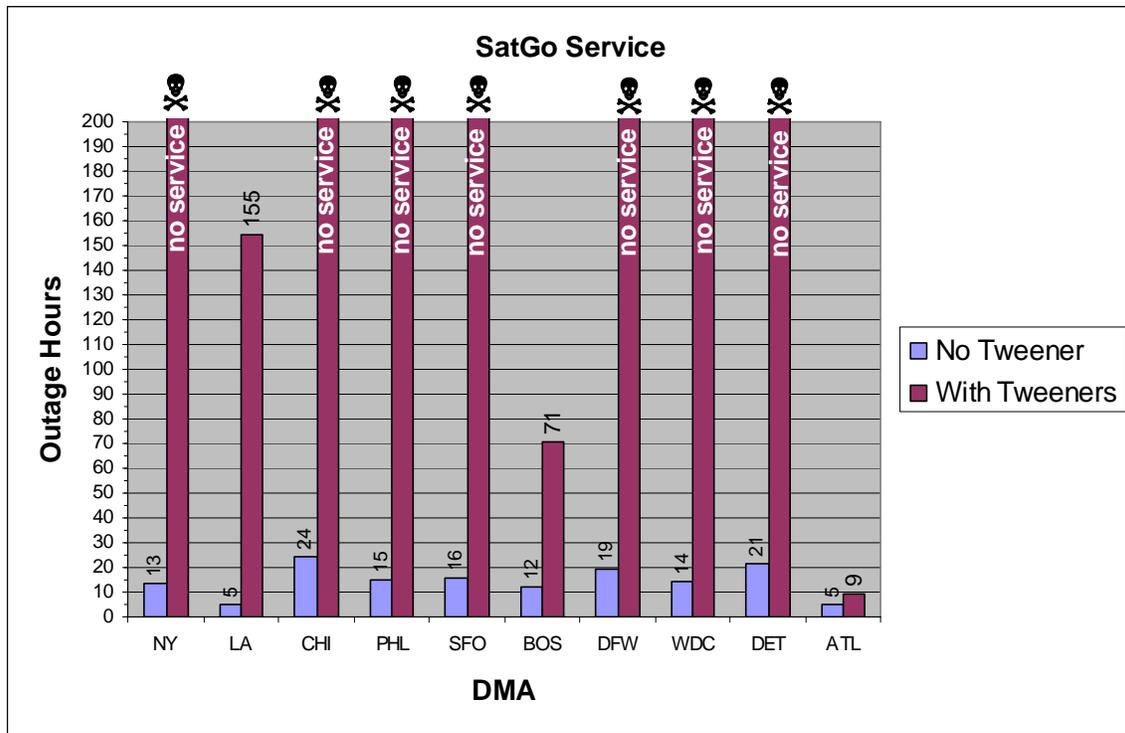
<sup>1</sup> SES Reply Comments at 26.

<sup>2</sup> See, e.g., *Amendment of Parts 2 and 25 of the Commission’s Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, 16 FCC Rcd. 4096, 4173 (2000) (concluding that aeronautical mobile DBS service is “consistent with the allocation because the DBS definition in the Commission’s Rules does not limit transmissions to fixed receive earth stations”) (“*Ku-NGSO Order*”). In an analogous context, the Commission has expressly endorsed the primary use of spectrum allocated for BSS (Sound) services to provide mobile satellite antennas with Digital Audio Radio Service. See generally *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service*, 12 FCC Rcd. 5754 (1997).

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trends continue, as DIRECTV recently announced its new SatGo terminal, which will provide viewers with high quality live television in a portable unit – usable for casual viewing but also designed to support public safety personnel in times of crisis. And DIRECTV was recently granted a license for a new satellite optimized for service to even smaller receive antennas (just 8-12 inches) on mobile platforms.<sup>3</sup>

These developments have required significant investments to develop advanced new technologies capable of operating in a mobile environment – at a size conducive to mobile form factors. Such innovation has been spurred by both the drive to meet consumer desires and the fierce competition within the video programming distribution industry. But it has been made possible by the nine-degree orbital spacing that has characterized the DBS service to date. Tweener systems threaten to eviscerate established mobile DBS services and to preclude future development in this area. For example, Figure A below shows the effect that tweener interference would have on a SatGo receiver in the ten largest Designated Market Areas (“DMAs”).



**Figure A. SatGo Outages With and Without Tweener Interference**

<sup>3</sup> See File No. SAT-RPL-20060119-00005 (granted Nov. 16, 2006). Interestingly, the only systems that would be “affected” by this satellite under the ITU coordination analysis are the tweener filings for SES and Spectrum Five. *Id.*, Appendix D at D5. Neither one commented on DIRECTV’s application. The Commission has forwarded the information on that satellite – including these small receive antennas – to the ITU to begin the process of modifying the Region 2 Plan.

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Tweener proponents have a decidedly cavalier attitude toward their devastating impact on mobile DBS services, arguing that the Commission should not even consider such services in its analysis. As stated by SES,

The Commission has made clear that these [mobile] antennas, which are smaller than 45 cm in diameter, are not entitled to interference protection, and DirecTV has acknowledged as much. These antennas have been deployed at the operators' own risk, and service providers have been on notice since at least 1998 that the Commission might authorize DBS systems at reduced orbital spacing. DirecTV clearly has no basis to complain now that these operations could be adversely affected by Commission action to authorize reduced DBS spacing. More importantly, the Commission must not allow its policy choices to be constrained by the purported need to accommodate operations that are not entitled to protection.<sup>4</sup>

This is a truly extraordinary assertion – that existing services enjoyed by millions of Americans should be sacrificed to accommodate foreign satellite operators. Of course, SES fails to recognize that the Commission's rules in place since 1998 contemplate reduced orbital spacing *only* if a proposed DBS system could successfully complete coordination with affected U.S. systems<sup>5</sup> – something SES seeks to by-pass. At least in one regard, DIRECTV could not agree more with SES – the Commission should not feel constrained in any way by “the purported need to accommodate operations that are not entitled to protection” – in this case, tweener operations.

For its part, Spectrum Five makes the similar argument that “[a]ntennas smaller than 45 cm are not entitled to protection and should not be allowed to inhibit the development of the BSS, including the addition of tweekers.”<sup>6</sup> Of course, Spectrum Five has it exactly backward: it is the notional tweener systems that would inhibit the ongoing development of existing and nascent mobile DBS services. Spectrum Five's callous disregard for the investment of multiple companies and tens of thousands of consumers is stark. “Mobile users will have to adjust their operating parameters in order not to impede the development of the BSS according to the Region 2 Plan, as modified.”<sup>7</sup> Of course,

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<sup>4</sup> SES Reply Comments at 7 (citations omitted).

<sup>5</sup> *See Amendment of the Commission's Policies and Rules for Processing Applications in the Direct Broadcast Satellite Service*, 21 FCC Rcd. 9443, ¶ 29 (2006) (discussing 47 C.F.R. §§ 25.148(f) and 25.114(d)(13)(ii)).

<sup>6</sup> Spectrum Five Reply Comments, Technical Appendix at 6.

<sup>7</sup> *Id.*

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Spectrum Five overlooks one crucial fact – the Region 2 Plan has not yet been modified to include its proposed tweener system, and never will be absent agreement from affected administrations such as the United States, or submission of characteristics compliant with Appendix 30, Annex 1 of the Radio Regulations.

These arguments reflect the tweener proponents' self-serving view of the ITU spectrum coordination process. When international norms would require them to make compromises to protect long-established U.S. DBS systems with international priority, they urge the Commission to ignore standard international procedures. However, when international priority works in their favor, they categorically state that the Commission cannot and should not consider the needs of existing services with lower priority. To the contrary, the Commission has in the past considered the effect that new systems operating in the DBS band would have on mobile DBS services.<sup>8</sup> There is every reason to continue to do so here.

Astoundingly, SES actually claims that the ability to provide mobile DBS services is a public interest justification for creating a “third way” for tweeners, arguing that “the availability of additional DBS bandwidth resulting from reduced orbital spacing will promote, not impede, technological developments that will make mobile video services more attractive and accessible.”<sup>9</sup> SES does not explain how, with less orbital spacing and less power than current U.S. DBS operations, it would be able to provide service to mobile antennas that they claim are not protected under the Commission's rules. For example, SES proposes to use 52 cm receive antennas – much too large for use in a mobile application. Allowing tweeners to operate as proposed would effectively preclude mobile DBS services by *all* operators – including tweeners themselves.

SES asserts that if the Commission were to “block introduction of service from orbital locations at reduced spacing, it would be virtually guaranteeing that there would be no significant change in the DBS competitive landscape for years to come.”<sup>10</sup> To the contrary, the U.S. DBS market has been characterized by constant innovation, from the introduction of ever-better compression and coding technology to the use of spot beam satellites that vastly increase spectrum efficiency. Indeed, the trend toward developing mobile DBS platforms is but one of the latest innovations in this service. Tweener systems operating in the manner proposed by SES and Spectrum Five would preclude such services now and in the future and result in a giant step backward for the industry.

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<sup>8</sup> See, e.g., *Ku-NGSO Order*, 16 FCC Rcd. at 4173 (considering whether additional measures were necessary to protect DBS service to aircraft against interference from NGSO FSS systems).

<sup>9</sup> SES Reply Comments at 7.

<sup>10</sup> SES Reply Comments at i.

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**2. Tweener Proponents Misrepresent the Significant Effect of Antenna Mispointing in Assessing Tweener Interference**

Both SES and Spectrum Five continue to assert that, in assessing the interference that proposed tweener systems would cause, the Commission should ignore mispointing of receive antennas deployed by existing DBS subscribers. In its comments, DIRECTV demonstrated the significant impact of mispointing, and in its reply comments, DIRECTV debunked the tweener proponents’ assertion that mispointing has no net effect in the presence of two tweener systems.<sup>11</sup> In their reply comments, SES and Spectrum Five purport to provide technical support for their assertion that mispointing has only a negligible effect. Once again, DIRECTV feels compelled to show that these analyses do not support the tweeners’ argument – and in fact, actually confirm DIRECTV’s analysis.

**A. Spectrum Five Erroneously Presents the Effects of Mispointing**

In its reply comments, Spectrum Five submits an analysis that purports to demonstrate that the introduction of interference from a tweener system adds only marginally to the signal degradation a subscriber would already experience as a result of antenna mispointing. Specifically, as summarized in Table 1 of that filing (reproduced below), Spectrum Five asserts that the introduction of tweener interference decreases C/N+I by only 0.09 dB and 0.04 dB for an antenna mispointed by 1.5° and 2.5°, respectively.

Mispointing Error (Degrees)	Threshold C/N+I (dB)	Loss From Peak (dB)	Loss from 0.5 dB Level (dB)	C/N+I (dB) (Without Tweeners)	C/N+I, dB (With Tweeners)	Difference in C/N+I Attributable to Tweeners (dB)
1.5	6.9	1.92	1.42	5.48	5.39	0.09
2.5	6.9	5.33	4.83	2.07	2.03	0.04

**Spectrum Five Table 1. Reduction in C/N+I As a Result of Mispointing, With and Without Tweeners**

Accordingly, Spectrum Five concludes that “the effect of a tweener on subscriber antennas with substantial misalignments is minor on an absolute scale, and minor relative to the signal loss caused by the antenna misalignment itself. In addition, as the antenna misalignment becomes larger, the relative impact of a tweener satellite actually declines.”<sup>12</sup>

<sup>11</sup> See DIRECTV Comments at 13-16; DIRECTV Reply Comments at 7-12.

<sup>12</sup> Spectrum Five Reply Comments at 10 (emphasis in original).

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DIRECTV found these conclusions to be not only suspect but highly counterintuitive, and sought to test them. Although not all of the methodology and assumptions in Spectrum Five’s analysis are entirely clear,<sup>13</sup> DIRECTV has been able to replicate these results fairly closely by making two key assumptions: *that there is only one tweener system and the receive antenna is mispointed directly away from it.*

Where these two assumptions apply, it should come as no surprise that a tweener’s effect would diminish as the receive antenna is pointed *further away from* the tweener. Ironically, in the unusual case Spectrum Five has chosen to analyze, the effect of the tweener system actually *increases* with improved antenna pointing. However, such a finding is of little aid to the Commission in assessing the likely impact of tweeners, since (1) it would be unrealistic to assume that all antennas are mispointed in a best-case direction that results in the least interference possible, and (2) there are likely to be tweeners on each side of a U.S. DBS slot, so that mispointing away from one will be toward the other. Thus, Spectrum Five’s analysis is at best uninformative, if not entirely misleading.

Without conceding the validity of Spectrum Five’s methodology, DIRECTV sought to apply this analysis to a more informative interference scenario. Accordingly, the results were recalculated first assuming the operation of a single tweener system with the subscriber’s antenna mispointed *toward* it, and then assuming the operation of two tweener systems and mispointing toward one of them. The results (including the case analyzed by Spectrum Five) are summarized in the table below.

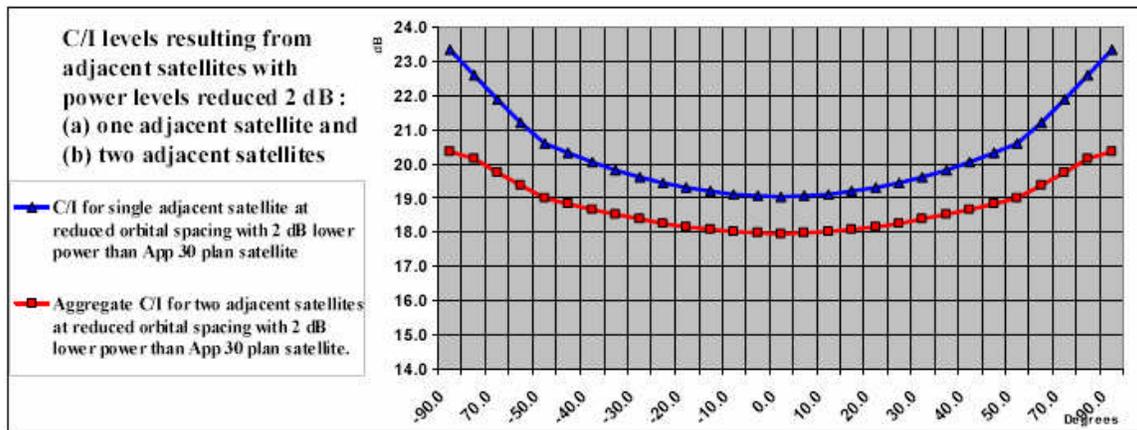
Mispointing Error (degrees, direction, # of tweeners)	Threshold C/N+I (dB)	Loss From Peak (dB)	Loss from 0.5 dB Level (dB)	C/N+I (dB) (Without Tweeners)	C/N+I (dB) (With Tweeners)	Difference in C/N+I Attributable to Tweeners (dB)
1.5° Away, Single	6.9	1.92	1.42	5.48	5.42	0.06
1.5° Toward, Single	6.9	1.92	1.42	5.48	3.49	1.99
1.5°, Two Tweeners	6.9	1.92	1.42	5.48	3.46	2.02
2.5° Away, Single	6.9	5.33	4.83	2.07	2.05	0.02
2.5° Toward, Single	6.9	5.33	4.83	2.07	-0.29	2.36
2.5°, Two Tweeners	6.9	5.33	4.83	2.07	-0.30	2.37

<sup>13</sup> Spectrum Five refers obliquely to the analysis described in the technical exhibit to its comments. Spectrum Five Reply Comments, Technical Appendix at 2. However, the analysis as described in that filing leaves much to the imagination, as it relies in part upon “Spectrum Five’s unique approach to CONUS antenna design (patent pending).…” Spectrum Five Comments, Technical Exhibit at 6.

Not surprisingly, even Spectrum Five’s own methodology – when properly applied – demonstrates the significant impact of tweeners on mispointed DBS receive antennas. Specifically, with mispointing toward one tweener or in the presence of two tweeners, tweener interference contributes 2 dB or more degradation to the DBS signal. Thus, contrary to Spectrum Five’s assertion, tweeners are likely to constitute a significant component of signal degradation and in fact become more significant as mispointing increases.<sup>14</sup>

**B. SES’s Analysis of Mispointing Actually Supports DIRECTV’s Arguments**

SES devotes substantial effort to proving that the introduction of a second tweener results in a fairly modest increase in aggregate interference, on the order of 1 dB assuming 0.5° mispointing.<sup>15</sup> The results of SES’s calculations are summarized in Figure 6 of Attachment A, which is reproduced below.



**SES Figure 6. Aggregate C/I Levels**

Of course, this is not inconsistent with DIRECTV’s analysis. In fact, Table 1 of DIRECTV’s Reply Comments (reproduced below) similarly shows an increase in aggregate interference of 1.1 dB (C/I changing from 16.7 dB for one tweener to 15.6 dB for two) for the 0.5° mispointing case for a hypothetical U.S. DBS satellite at 101° W.L. in the presence of two tweener systems.

<sup>14</sup> Although DIRECTV was unable to replicate Spectrum Five’s unavailability analysis, it can only surmise that that analysis – which reaches similar conclusions – relies upon the same two unrealistic assumptions that underlie the flawed C/N+I analysis.

<sup>15</sup> SES Reply Comments, Attachment A at 3 and Figure 6.

Location	0.0° Mispointing			0.5° Mispointing			1.0° Mispointing		
	C/I from Tw'er A	C/I from Tw'er B	Total C/I	C/I from Tw'er A	C/I from Tw'er B	Total C/I	C/I from Tw'er A	C/I from Tw'er B	Total C/I
101 W.L.	20.6	20.6	17.6	16.7	22.0	15.6	12.5	22.7	12.1

**DIRECTV Table 1. Generalized Effects of Mispointing for a U.S. DBS Satellite at 101° W.L.**

The SES and DIRECTV analyses are also consistent in showing that the addition of a second tweener results in a 3 dB increase in aggregate interference in the case that SES contends is relevant for tweener analysis – *i.e.*, where there is no mispointing in the direction of the orbital arc.<sup>16</sup> This should come as no surprise, since adding an identical second interferer results in a doubling of interference power – *i.e.*, a 3 dB increase. It is interesting that SES chose not to discuss this much larger differential in its analysis.

Yet SES’s analysis does demonstrate two important inconsistencies – with SES’s own assertions. First, SES has asserted that mispointing “will result in the antenna receiving increased interference from a satellite on one side of the desired satellite, but proportionally reduced interference from the satellite on the other side,” and that “[a]s a result, the increased interference from one side is cancelled out by the decreased interference from the other side, so that the effect of the mispointing on the overall C/I calculation is nullified.”<sup>17</sup> If that were the case, the aggregate C/I plot in Figure 6 would be a flat line to indicate no change in aggregate interference correlated with mispointing. Instead, that plot is a curved line that varies by more than 2 dB. Specifically, the aggregate C/I varies from a low of 18 dB when all antenna mispointing is directly toward one tweener (which SES denotes as the 0.0° case) to more than 20 dB when the antenna is mispointed exactly perpendicular to the orbital arc (which SES denotes as the 90° cases).

<sup>16</sup> SES’s Figure 6 shows a 3 dB difference between single and aggregate C/I when mispointing is exactly in the north/south direction (which SES denotes at the 90° cases). Because the interference from each tweener is equal in such a case, it is analogous to a case with no mispointing. Ironically, though not surprisingly, the effect of a second tweener diminishes as mispointing toward the first tweener increases.

<sup>17</sup> SES Comments, Technical Appendix at 4. *See also* Spectrum Five Comments, Technical Exhibit at 10 (asserting its belief that “subscriber pointing error effects are almost negligible” because “with a given subscriber antenna pointing error, the interference from one adjacent satellite increases while the interference from the other adjacent satellite decreases, the overall result will be a slight decrease in the C/I (approximately 0.3 dB) assuming all satellites have the same PFD”).

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Second, SES has asserted that mispointing is only an issue in the “very small percentage of cases” in which the antenna is mispointed precisely along the geostationary arc – *i.e.*, exactly toward one tweener or the other.<sup>18</sup> Because SES’s analysis in Attachment A assumes a constant mispointing of 0.5°, the strength of the desired signal “C” also remains constant. Accordingly, any variance in C/I for various directions of mispointing can only be explained by a variance in interference “I”. As DIRECTV explained in its reply comments, mispointing in any direction (other than the rare case of pure north-south mispointing which is the 90° case in the SES analysis) has some component of mispointing in the east-west direction. That is exactly what Figure 6 shows. C/I does not increase dramatically as the mispointing moves away from the orbital arc, but rather changes gradually as the N/S component of mispointing increases and the E/W component decreases.<sup>19</sup>

\* \* \*

Consumers are increasingly demanding access to video content while they are on the move, and U.S. DBS services are meeting that demand in a variety of innovative ways. The introduction of proposed tweener systems would not only halt the growth of this nascent business, but essentially bring it to an end – even for tweeners themselves. The Commission cannot, as tweener proponents argue, simply ignore the impact of tweeners on services enjoyed by millions of Americans. Similarly, the Commission must reject the unsupported assertion that antenna mispointing need not be considered in assessing the impact of tweener interference.

There is no reason to compromise existing and future DBS services to accommodate foreign tweener systems. Alternative satellite spectrum, such as the Ka-band and the 17/24 GHz BSS band that becomes available next month, offer attractive alternatives that do not endanger ongoing operations upon which millions of Americans rely. Moreover, the alleged benefits of tweener operations are highly suspect. DIRECTV submits that, in light of all of the evidence in the record, there can be but one conclusion: creating a “third way” to facilitate tweener entry would not serve the public interest.

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<sup>18</sup> SES Comments at 15.

<sup>19</sup> SES’s discussion of C/I versus orbital spacing also contains erroneous data. Specifically, antenna discrimination for a B.O.-1213 antenna with nine-degree separation is 29.1 dB, not 26.1 dB as presented by SES. *See* SES Reply Comments, Attachment A at 8. Accordingly, the difference in discrimination at nine degrees and 4.5 degrees is 8 dB, not 5 dB.

**HARRIS, WILTSHIRE & GRANNIS LLP**

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Respectfully submitted,

/s/

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