

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

In the Matter of)	
)	MB Docket No. 05-181
Implementation of Section 210 of the)	
Satellite Home Viewer Extension and)	
Reauthorization Act of 2004 to Amend)	
Section 338 of the Communications Act)	

**OPPOSITION OF THE
NATIONAL ASSOCIATION OF BROADCASTERS TO
PETITIONS FOR RECONSIDERATION**

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EXECUTIVE SUMMARY

Section 210 of the Satellite Home Viewer Extension and Reauthorization Act of 2004 (“SHVERA”) requires carriage of analog and digital television broadcast signals in Alaska and Hawaii. In implementing Section 210, the Commission concluded that the required carriage includes high definition (“HD”) and multicast standard definition (“SD”) signals as broadcast by local stations in these states. DIRECTV, Inc. (“DIRECTV”) and EchoStar Satellite, L.L.C. (“EchoStar”) (collectively, “Petitioners”) have requested reconsideration of this decision. NAB now opposes these reconsideration petitions.

The Commission should reject Petitioners’ claims that requiring carriage of the entire free, over-the-air digital broadcast signal of local television stations in Alaska and Hawaii (potentially including an HD stream and/or one or more SD streams) will result in very significant capacity burdens. As set forth in detail in NAB’s opposition and in the attached engineering statement, these claims about capacity constraints are exaggerated and factually unsupported. In particular, analysis of DIRECTV’s satellite capacity currently available to serve Alaska and Hawaii shows that, contrary to DIRECTV’s assertions, a diversion of capacity devoted to other programming would not be necessary for the required carriage of digital broadcast signals in Alaska and Hawaii. And while EchoStar provided virtually no information about its capacity capabilities, publicly available information indicates that EchoStar currently has the capacity to carry DTV signals in Alaska and Hawaii. Given past claims about satellite capacity constraints that proved inaccurate and the continuing ability of satellite operators to expand their available channel capacity, the Commission should be skeptical of unproven assertions that the challenged carriage decision will cause serious capacity problems. Such

skepticism is particularly warranted because the digital carriage provisions will not even become effective until June 8, 2007.

Petitioners' statutory and constitutional arguments are similarly lacking. The Commission's interpretation of the Alaska and Hawaii carriage provision of SHVERA gives meaning to the terms of the statute and reflects Congress' underlying intent to ensure improved service to the citizens of these states. Because the Commission's construction of SHVERA is reasonable, it is therefore entitled to substantial deference. Moreover, Petitioners have failed to show any constitutional infirmity in the Commission's carriage decision. Because the decision promotes important governmental interests and does not burden Petitioners' speech rights, their claims of a First Amendment violation are unmeritorious. And because the Alaska and Hawaii carriage requirement constitutes neither a permanent physical occupation of real property nor a regulatory taking, it is consistent with the Fifth Amendment as well. For all these reasons set forth in greater detail in NAB's opposition, the Commission should not grant DIRECTV's and EchoStar's petitions for reconsideration.

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TO: The Commission

**OPPOSITION OF THE
NATIONAL ASSOCIATION OF BROADCASTERS TO
PETITIONS FOR RECONSIDERATION**

The National Association of Broadcasters (“NAB”)¹ submits this opposition to certain petitions requesting reconsideration of the Commission’s order adopting rules to implement Section 210 of the Satellite Home Viewer Extension and Reauthorization Act of 2004 (“SHVERA”), requiring carriage of analog and digital television broadcast signals in Alaska and Hawaii.² In implementing Section 210, the Commission concluded that the required digital carriage includes high definition (“HD”) and multicast standard definition (“SD”) signals as broadcast by local stations in these states. DIRECTV, Inc. (“DIRECTV”) and EchoStar Satellite, L.L.C. (“EchoStar”) (collectively, “Petitioners”) have requested reconsideration of this decision on technical, statutory and constitutional grounds.

¹ NAB is a nonprofit incorporated association of radio and television stations and broadcast networks, which serves and represents the American broadcasting industry.

² *Report and Order* in MB Docket No. 05-181, FCC 05-159 (rel. Aug. 23, 2005) (“*R&O*”).

In this opposition, NAB points out that the satellite operators' exaggerated and factually unsupported claims that multicast and HD carriage requirements limited to Alaska and Hawaii impose very significant capacity burdens should not lead the Commission to reconsider its decision. In light of past claims about satellite capacity constraints that proved inaccurate and the continuing ability of satellite operators to expand their available channel capacity, the Commission should be skeptical of unproven assertions that these digital carriage obligations – which do not even become effective until June 2007 – will cause serious capacity problems. Such skepticism is particularly warranted because publicly available information indicates that Petitioners currently have the capacity to carry DTV signals in Alaska and Hawaii. NAB also explains in this opposition that the Commission permissibly concluded that SHVERA requires carriage of the multicast and HD signals of local broadcasters in Alaska and Hawaii and that the Petitioners have failed to show that decision violates either the First or Fifth Amendments.

I. The Commission's Interpretation Of SHVERA's Carriage Requirements Is Reasonable And Entitled To Deference.

Both DIRECTV and EchoStar challenge the Commission's interpretation of Section 210 of SHVERA (47 U.S.C. § 338(a)(4)). Asserting their own "best reading of the statute,"³ the Petitioners contend that the Commission incorrectly concluded that Section 338(a)(4) calls for satellite carriage of the entire free, over-the-air digital broadcast signal of local television stations in Alaska and Hawaii (including any multicast streams). The Commission has already rejected the interpretation suggested by the Petitioners, however, as contrary to the plain language and intent of the statute. *See R&O* at ¶¶ 16-17. The Petitioners have not presented any basis for the

³ Petition of EchoStar at 4; Petition of DIRECTV at 6.

Commission to reverse its statutory analysis. Instead, they merely reiterate their earlier arguments.

Under well-settled case law, it is of no moment that the Petitioners disagree with the Commission's interpretation of this provision of SHVERA. Neither Petitioner contends that the statute unambiguously limits the digital carriage requirement to a single standard definition stream. In the absence of such plain language to the contrary, the analysis of the Commission – the agency charged with the duty to execute and enforce SHVERA – is clearly controlling.⁴

In its decision, the Commission found that the language of Section 338(a)(4) was unambiguous but also concluded that, if there were any ambiguity, “the better reading, and the one that most accurately reflects Congress’s intent, requires satellite carriers to carry all multicast and HD signals.” *R&O* at ¶ 17. Plainly, this reading gives meaning to the terms of the statute and reflects the underlying intent to ensure improved service to the citizens of Alaska and Hawaii. No more is required. If an implementing agency’s construction of a statute is permissible, it is entitled to deference, even if others argue that it is not the “best” interpretation. *See Chevron*, 467 U.S. at 843-44.⁵ Petitioners cannot properly contend that the Commission’s reading of SHVERA is unreasonable and thus the Commission need not change course.

⁴ *See, e.g., Chevron USA, Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 843-44 (1984).

⁵ *Accord Regions Hospital v. Shalala*, 522 U.S. 448, 457 (1998) (if an agency’s “reading” of a statute “fills a gap or defines a term in a reasonable way in light of the Legislature’s design,” then that “reading” is given “controlling weight”); *Northpoint Technology, Ltd v. FCC*, 414 F.3d 61, 69 (D.C. Cir. 2005) (deferring to the FCC’s interpretation of a statutory term as “permissible” and stressing that the agency’s construction does not need to be “the *only* permissible construction,” but just one that is “not arbitrary, capricious, or manifestly contrary to the statute”) (emphasis in original).

II. Satellite Operators' Claims That The Challenged Carriage Requirements Impose Very Significant Capacity Burdens Do Not Withstand Scrutiny.

Nor is the Commission required to change its course on the basis of the Petitioners' assertions of capacity burdens. Both DIRECTV and EchoStar assert that requiring carriage of the entire free, over-the-air digital broadcast signal (potentially including an HD stream and/or one or more SD streams) will result in very significant capacity burdens. *See* Petition of DIRECTV at 4-5; Petition of EchoStar at 11-12. DIRECTV further claims that these resulting capacity constraints will cause it to remove national programming channels from its system or to eliminate plans for initiating local service in other markets, while EchoStar states that such constraints "could" mean that it "will be unable to provide regional programming." *See* Petition of DIRECTV at 5-6; Petition of EchoStar at 11. As discussed below and in the attached engineering statement, Petitioners' claims do not withstand scrutiny.

As an initial matter, Petitioners overstate the capacity requirements for carrying HD and one or more SD programs. The amount of data transmitted in any broadcaster's digital television ("DTV") signal is limited, by technical standard,⁶ to 19.4 Megabits per second ("Mbps") – never more.⁷ Whether a DTV station is broadcasting one HD program or multiple SD programs or any combination of HD and SD programs, it is not possible for a broadcaster's signal to exceed that 19.4 Mbps fixed amount of data. Broadcasters can, moreover, only transmit what will fit in this 19.4 Mbps limit. It is not possible (as Petitioners imply) to add HD and SD programming

⁶ *See ATSC Digital Television Standard, Rev. D – w/Amendment 1*, Advanced Television Systems Committee, Doc. A/53D at 57 (July 19, 2005).

⁷ A DTV HD program normally requires 12-15 Mbps, or approximately 70 percent of this data rate, and may require most of it if, for example, sporting events are being transmitted.

streams without limit and exceed that number by even one digital bit.⁸ DIRECTV's and EchoStar's claim that carrying HD plus one or more SD streams somehow results in an increased capacity burden over carrying, for example, one HD stream alone simply makes no sense. If Petitioners will be carrying DTV stations in Alaska and Hawaii, then logically they must be prepared to carry an HD signal for each, which means by extension that they are capable of carrying broadcasters' multiplexed signals as well.

More specifically, DIRECTV's claims that carrying the entire free, over-the-air digital signal of local stations in Alaska and Hawaii will substantially burden the capacity of its systems, and even require the redirection of capacity from providing national programming channels or new local service in other markets, are not supported by the available evidence. In fact, analysis shows that carrying the required number of DTV stations in Alaska and Hawaii will require only 2.34 percent of the capacity that DIRECTV has currently available to serve those two states specifically.

The attached engineering statement examined information contained in DIRECTV's applications (SAT-MOD-20040614-00114 and -00113) for the Spaceway 1 and Spaceway 2 satellites.⁹ This examination reveals that the capacity required to carry the 17 television stations in the three DMAs in Alaska is 164.9 Mbps, which equates to 140 MHz of satellite bandwidth. The data capacity required to carry the 12 stations in Hawaii is 116.4 Mbps, which also equates to 140 MHz of satellite bandwidth, for a total bandwidth requirement of 280 MHz to carry all the

⁸ See Petition of DIRECTV at 4 (objecting to Commission's requirement to carry broadcasters' entire digital signal, "without limitation," because that would mean "requiring carriage of an HD stream *plus* however many SD (or, eventually, HD) streams the broadcaster can fit within the digital spectrum allotted to it").

⁹ See Attachment, *Engineering Statement of Sidney M. Skjei, P.E., Concerning DIRECTV's and EchoStar's Petitions for Partial Reconsideration* at 3-6 ("Attachment").

stations in both states. The total available bandwidth in the spot beams directed at Hawaii and Alaska by the Spaceway satellites is approximately 12,000 MHz. Thus, all the stations in Alaska and Hawaii will require only 2.34 percent (280/12,000) of DIRECTV's Spaceway 1 and 2 capacity. And all these stations will require an even smaller percentage of DIRECTV's Ka band capacity when DIRECTV 10 and 11 satellites are launched to augment the Spaceway satellites in 2007 (the year these carriage obligations will become effective). But even a use of 2.34 percent of the capacity currently available to serve Alaska and Hawaii hardly represents a significant burden for DIRECTV. Moreover, the applications for the Spaceway satellites indicate that the Spaceway system was designed with the built-in capability of providing service to Hawaii and Alaska.¹⁰ Consequently, it will not be necessary for DIRECTV to divert capacity that would otherwise be used to offer national programming or local service elsewhere – it is only necessary that DIRECTV use a limited portion of the capacity that the Spaceway satellites are already capable of providing for these two states. *See* Attachment at 3-7.

Similarly, EchoStar makes broad but technically unsupported assertions about its alleged inability to carry the DTV signals of broadcasters in Alaska and Hawaii. EchoStar argues that it lacks the capacity to carry broadcasters' multiplex signals and that doing so would render it unable to provide other regional programming wanted by Alaskans and Hawaiians; force it to use spectrum less efficiently; render compression techniques less efficient; and hamper its ability to use statistical multiplexing. *See* Petition of EchoStar at 11-12. However, EchoStar does not offer any technical information to support its assertions. It is at best unclear why carrying additional video streams would hamper statistical multiplexing because, in fact, facilitating the

¹⁰ *See, e.g.*, SAT-MOD-20040614-00114, at page 7 and B6, which shows that the "footprint" of the Spaceway 1 satellite can include Alaska and Hawaii.

efficient combination of multiple programming streams is precisely what statistical multiplexing was invented to do. In addition, since EchoStar has provided no specific information regarding the satellite(s) it uses to serve Alaska and Hawaii, it is difficult to assess whether or not EchoStar uses its spectrum efficiently. Interestingly, despite EchoStar's assertions that it cannot carry broadcasters' multiplex signals, EchoStar ultimately admits that it is possible to reengineer its system to overcome these technical obstacles. *See* Petition of EchoStar at 12.

EchoStar itself has provided little information about its capacity capabilities, and therefore provides no factual basis for reconsideration. An inventory of its current satellite licenses and leases (*see* Attachment at 9) in fact reveals that EchoStar currently holds licenses for four Ka band satellites and has already applied for several more Ka band licenses. In addition, EchoStar leases full Ka band capacity on at least one other satellite capable of providing service to Hawaii and Alaska and has placed orders for two more Ka band satellites. It is NAB's understanding, based on publicly available information about these various satellites, that EchoStar currently has the capacity to carry DTV signals in Alaska and Hawaii using the Ka band capacity on AMC-15 and its existing Ku spot beam coverage of EchoStar 7 and EchoStar 8. *See* Attachment at 9. But even if this understanding were not correct, it is clear that EchoStar will have sufficient capacity in the near future considering just one of the other two Ka band satellites that EchoStar has already ordered.¹¹

Beyond failing to provide information about its satellites' capacity, EchoStar also makes unexplained statements about broadcasters and multicasting. For example, EchoStar mysteriously states that "broadcasters may use certain information to manage their multicast

¹¹ *See* Attachment at 9-10 (when considering just one of the other two Ka band satellites that EchoStar has ordered, carriage of the digital broadcasts of stations in Alaska and Hawaii will have the same minimal impact on EchoStar's Ka band resources as on DIRECTV's capacity, as discussed above).

signals internally but then strip that information before the signal is broadcast,” and that it “may need that stripped information . . . to manage the retransmission of the multicast signal.” Petition of EchoStar at 13. NAB is not aware of any such “information.”

NAB further generally stresses that EchoStar’s and DIRECTV’s assertions about capacity constraints should be scrutinized skeptically. Petitioners have in the past made a number of claims about capacity constraints that proved inaccurate. As just one example, EchoStar and DIRECTV claimed in 2002 that, unless they were permitted to merge, neither firm could offer local-to-local service in more than approximately 50 to 70 markets.¹² Contrary to these pessimistic predictions, DIRECTV currently offers local channels in 133 local television markets, and EchoStar now offers local-to-local service in approximately 165 markets. Similar claims about capacity constraints made here by Petitioners, at the very least, should not be accepted at face value, particularly when they are unsupported by the available factual evidence.

NAB finally notes that Petitioners have available to them a wide range of techniques for further expanding their capacity, some of which are already being used. These techniques potentially include but are not limited to: (1) spectrum-sharing between DIRECTV and EchoStar; (2) use of Ka-band as well as Ku-band spectrum; (3) higher-order modulation and coding; (4) closer spacing of Ku-band satellites; (5) satellite dishes pointed at multiple orbital slots; and (6) improved signal compression techniques. Thus, it should rationally be expected that DIRECTV and EchoStar will be able to continue to expand their available channel capacity. See Attachment at 2, 8, 10. See also R&O at ¶ 21 (FCC noted that, even before any multicast

¹² *EchoStar, DirecTV CEOs Testify on Benefits of Pending Merger before U.S. Senate Antitrust Subcommittee*, www.spacedaily.com/news/satellite-biz-02p.html (last visited Dec. 6, 2005) (“Without the merger, the most markets that each company would serve with local channels as a standalone provider, both for technical and economic reasons, would be about 50 to 70” (quoting DIRECTV executive)).

and HD carriage requirement would take effect in mid-2007, any capacity issues may well be remedied through improvements in satellite technology).

III. Petitioners Have Not Demonstrated That The Commission's Carriage Decision Violates Either The First Or Fifth Amendments.

Both DIRECTV and EchoStar contend that the Commission's decision requiring carriage of local broadcasters' full digital signals (including any multicast streams) is contrary to the First Amendment and also raises issues under the Fifth Amendment. Neither position is tenable.

The Supreme Court has held that content-neutral regulations, such as must-carry, will be upheld against a First Amendment challenge if they further an important governmental interest unrelated to the suppression of free expression and if any incidental restriction or burden on First Amendment freedoms is no greater than essential to the furtherance of that interest. *Turner Broadcasting System, Inc. v. FCC*, 512 U.S. 622, 662 (1994). The satellite operators' First Amendment arguments rely primarily on the alleged burdens that the required carriage of multicast streams imposes on them and their First Amendment rights. *See* Petition of DIRECTV at 10-12; Petition of EchoStar at 11-14.

As discussed in Section II and in the attached statement, the extent of these alleged burdens on the satellite operators appears greatly exaggerated and factually unsupported. In particular, DIRECTV's claim that the Alaska and Hawaii carriage requirements would force it to divert capacity that would otherwise be used to provide different programming has been refuted. *See* Section II above; Attachment at 3-7. As demonstrated, carrying the required number of DTV stations in Alaska and Hawaii will require only 2.34 percent of the capacity that DIRECTV has currently available to serve Alaska and Hawaii specifically. The applications for DIRECTV's Spaceway satellites moreover indicate that its system was designed with the built-in capability of providing service to Hawaii and Alaska. For these reasons, to comply with the

challenged carriage decision, DIRECTV will only need to use a limited portion of the capacity its satellites are already capable of providing for Alaska and Hawaii specifically. It will not be necessary to divert capacity that would otherwise be used for national programming or local service elsewhere.¹³ In the absence of a substantial capacity burden and consequent “actual effects” on DIRECTV’s programming choices, DIRECTV has not shown a constitutionally significant burden on its speech. *Turner*, 512 U.S. at 667-68.¹⁴

EchoStar did not even clearly assert that the challenged carriage requirements would force it to forego the provision of alternative programming or to drop other programming services. *See* Petition of EchoStar at 11 (imposing multicast carriage requirement “*could* well mean that EchoStar will be unable to provide regional programming”) (emphasis added). Instead, EchoStar primarily complains that a multicast carriage requirement “could” force “it to use spectrum less efficiently” and “could” cause various other implementation problems requiring “capital expenditures.” Petition of EchoStar at 12-13. As set forth in Section II, these claims remain vague, unexplained and generally unsupported. In light of past claims about capacity constraints that proved inaccurate, EchoStar cannot be permitted here merely to assert that the Commission’s carriage decision will result in a significant capacity burden – such a burden, if any, must be demonstrated. It appears unlikely that EchoStar will be able to demonstrate this burden, given that publicly available information indicates that EchoStar’s satellites currently have the capacity to carry DTV signals in Alaska and Hawaii. *See* Section II

¹³ And if DIRECTV currently has the capacity to carry the DTV signals of Alaskan and Hawaiian broadcasters, it will certainly have such capacity when these carriage obligations become effective in 2007, given continuing advances in satellite technology.

¹⁴ NAB also notes that the D.C. Circuit has affirmed, against a First Amendment challenge, the constitutionality of a requirement that DBS operators reserve four to seven percent of channel capacity for noncommercial programming of an educational or informational nature. *Time Warner Entertainment Co., L.P. v. FCC*, 93 F.3d 957 (D.C. Cir. 1996).

above; Attachment at 9 (discussing combination of Ka band capacity and Ku spot beam coverage).¹⁵

Further complaints by EchoStar about implementation and costs of the Alaska and Hawaii carriage requirements (even if established) have little to do with actual burdens on *speech*.¹⁶ Given the importance of evidence, rather than assumptions or speculation, establishing the “actual effects” on the programming choices of satellite or cable systems in analyzing the constitutionality of must-carry rules, *Turner*, 512 U.S. at 667-68, the Commission correctly concluded here that the satellite operators failed to establish that the challenged carriage decision would actually burden their First Amendment rights. *See R&O* at ¶ 21.¹⁷

EchoStar’s and DIRECTV’s additional claims that the Alaska and Hawaii carriage requirements do not promote any important governmental interests are also unmeritorious. *See* Petition of EchoStar at 8-11; Petition of DIRECTV at 12-15. Congress has declared and the Supreme Court has agreed that the carriage of local broadcast signals by multichannel video programming distributors (“MVPDs”) serves three important governmental interests: (1) preserving the benefits of free, over-the-air local broadcast television; (2) promoting the

¹⁵ But even if NAB’s understanding, based on publicly available information, were not correct, it is clear that EchoStar will have sufficient capacity in the near future considering just one of the other two Ka band satellites that EchoStar has already ordered. *See* Section II above; Attachment at 9-10.

¹⁶ *See, e.g., Nixon v. Shrink Missouri Government PAC*, 528 U.S. 377, 398 (2000) (“Money is property; it is not speech,” and the “First Amendment” does not “provide[] the same measure of protection to the use of money” than “it provides to the use of ideas”) (J. Stevens, concurring).

¹⁷ In *Turner*, the Supreme Court remanded the case to obtain further evidence of the extent the analog must carry rules actually burdened speech, particularly the extent to which cable operators would, “in fact, be forced to make changes in their current or anticipated programming selections” and the “degree to which cable programmers will be dropped from cable systems to make room for local broadcasters.” 512 U.S. at 667-68. The Court did not inquire about the financial cost of implementing the analog must carry rules.

widespread dissemination of information from a multiplicity of sources; and (3) promoting fair competition in the market for television programming. *Turner*, 512 U.S. at 662. The fact that our system of broadcasting is changing from analog to digital does not reduce the importance of these governmental interests. For these reasons alone, the Commission would have been justified in concluding that the carriage of local broadcasters’ digital signals in Alaska and Hawaii (including their multicast or HD signals) promoted several important government interests.¹⁸

In the context of SHVERA, moreover, the Commission identified two additional important governmental interests served by its decision implementing Congress’ mandate that satellite operators carry the analog and digital signals of local broadcast stations in Alaska and Hawaii. *See R&O* at ¶¶ 18-19 (explaining that Congress, in passing this provision of SHVERA directly addressing Alaska and Hawaii, was remedying both a long history of limited and inequitable DBS service in these states and the unique lack of access and other difficulties with communication services in Alaska).¹⁹ Because these challenged carriage regulations were “issued under a specific grant of authority to . . . prescribe a method of executing a statutory provision,” greater deference is owed to them than any regulation adopted pursuant to the Commission’s general authority under the Communications Act to regulate in the public interest,

¹⁸ MVPD carriage of local broadcasters’ full digital signal, whether one HD or multiple program streams will, *inter alia*, specifically promote the development of diverse programming from a variety of sources not under the control of the MVPD for the benefit of all viewers, whether they subscribe to an MVDP or not.

¹⁹ Given that the challenged carriage requirements are limited to Alaska and Hawaii, there can be no serious argument that they are not narrowly tailored to serve these clearly identified governmental interests. *See Turner*, 512 U.S. at 662 (stressing that a content neutral regulation “need not be the least speech-restrictive means of advancing the Government’s interests,” but must only “promote[]” an interest “that would be achieved less effectively absent the regulation”).

convenience and necessity.²⁰ Certainly the deference shown to the Commission's carriage rules implementing an express congressional directive should be greater than the deference shown by petitioners here, who simply refused to recognize the Commission's identification of these valid interests.²¹ In sum, because the Commission's carriage decision promotes important governmental interests and has not been shown to actually burden the speech rights of satellite operators, DIRECTV's and EchoStar's claim that a multicast carriage requirement violates the First Amendment should be rejected.

DIRECTV alone also argues that any HD carriage requirement is contrary to the First Amendment. *See* Petition of DIRECTV at ii; 11-14 (arguing that required carriage of "multicast and HD" signals is inconsistent with the First Amendment). For all the same reasons identified above with regard to the multicasting carriage requirement, DIRECTV's arguments must fail. In addition, DIRECTV erroneously states that cable operators need not carry the HD signals of broadcasters. *See* Petition at 2; 17. The FCC has in fact determined that "a broadcast signal delivered in HDTV must be carried" by the cable operator "in HDTV."²² Satellite operators, moreover, are already prohibited from materially degrading the signals of the local commercial television stations (including the HD signals) they retransmit.²³ Given the existing prohibitions

²⁰ *Rowan Cos., Inc. v. United States*, 452 U.S. 247, 253 (1981). *Accord United States v. Vogel Fertilizer Co.*, 455 U.S. 16, 24 (1982) (reviewing court owes more deference to a regulation "issued under a specific grant of authority to define a statutory term or prescribe a method of executing a statutory provision" than to a regulation promulgated under an agency's general authority to "prescribe all needful rules").

²¹ *See* Petition of EchoStar at 11 ("the only interest that is served by the multicast requirement is a potential increase in the revenues of the broadcaster").

²² *Carriage of Digital Television Broadcast Signals*, First Report and Order and Further Notice of Proposed Rule Making, 16 FCC Red 2598, 2629 (2001).

²³ *See* 47 U.S.C. § 338(j) (when adopting regulations concerning satellite carriers' carriage of local television signals, FCC must issue "requirements on satellite carriers that are comparable to

against both cable and satellite operators degrading the signals of local broadcasters and the existing requirements that cable operators carry in HD any broadcast signals delivered to them in HD, DIRECTV's claim that the Alaska and Hawaii HD carriage requirements are somehow "inequitable" by comparison do not withstand scrutiny. *See* Petition of DIRECTV at 2; 14; 17.

DIRECTV's and EchoStar's assertions that the Commission's carriage decision raises issues under the Fifth Amendment can be dismissed summarily. *See* Petition of DIRECTV at 15-17; Petition of EchoStar at 14. Just as NAB explained in greater detail in earlier proceedings involving cable operators' obligation to carry the digital signals of broadcast stations,²⁴ the Supreme Court has clearly held that only a "permanent *physical* occupation of *real* property" presumptively constitutes a taking requiring "just compensation."²⁵ A carriage obligation limited to two states that merely involves the *use* of a small part of a satellite operators' carriage capacity in no way resembles the "permanent physical occupation of real property" that automatically requires compensation under the Fifth Amendment, but merely regulates the manner in which satellite companies allocate and employ their capacity. *See Loretto*, 458 U.S. at 436, 441 (court expressly recognized the government's "broad power to impose appropriate restrictions upon an owner's *use* of this property," and stressed that a physical invasion and occupation of one's property "is qualitatively more severe than a regulation of the *use* of property, even a regulation

the requirements on cable operators," including the requirement under 47 U.S.C. § 534(b)(4) that cable operators carry the signals of local commercial television stations "without material degradation").

²⁴ *See* NAB *Ex Parte* in CS Docket No. 98-120 (filed Aug. 5, 2002); NAB Reply Comments in CS Docket No. 98-120 at 81-88 (filed Dec. 22, 1998). *See also* Reply Comments of NAB in GN Docket No. 00-185, CS Docket No. 02-52 at 27-31 (filed Aug. 6, 2002).

²⁵ *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 427-28 (1982) (emphasis added).

that imposes affirmative duties on the owner”) (emphasis in original).²⁶ Indeed, were the Commission to accept the argument that rules prescribing the traffic to be carried on a wire or through other means of communication constitute a physical taking under *Loretto* akin to a condemnation of land, a vast range of FCC regulations – including many specifically required by Congress – would be jeopardized.²⁷

At most, then, the challenged carriage requirement affects the satellite operators’ unfettered use of certain corporate assets to serve a public purpose – a governmental action befitting the label “regulatory taking” and triggering only a deferential and “fact specific inquiry” under *Penn Central Transportation Co. v. City of New York*, 438 U.S. 104, 124 (1978).²⁸ Under the *Penn Central* inquiry, a court examines a number of factors, rather than a “set formula,” primarily including (1) the “economic impact of the regulation”; (2) the “extent to which the regulation has interfered with distinct investment-backed expectations”; and (3) the

²⁶ See also *Satellite Broadcasting and Communications Association v. FCC*, 275 F.3d 337, 368 (4th Cir. 2001) (finding that the “carry one, carry all” rule regulating the carriage of broadcast signals by satellite television operators did not work a *per se* taking under *Loretto*).

²⁷ See NAB *Ex Parte* in CS Docket No. 98-120 at 21 (filed Aug. 5, 2002) (discussing how the cable industry’s extraordinarily broad interpretation of *Loretto* and what constitutes a physical taking would bring under attack the leased access provisions and the PEG provisions of the Communications Act, the analog broadcast must carry rules upheld in *Turner*, and a wide array of common carriage requirements).

²⁸ A “narrow” category of regulatory action can be deemed a *per se* taking for Fifth Amendment purposes. Regulations that “completely deprive an owner of ‘all economically beneficial us[e]’ of her property” will require that the government pay just compensation. *Lingle v. Chevron U.S.A. Inc.*, 125 S.Ct. 2074, 2081 (2005) (quoting *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019 (1992)) (emphasis in original). However, a highly restricted carriage obligation affecting the use of an extremely small portion of a satellite operator’s total capacity cannot possibly be regarded as this type of “total” regulatory taking. *Lingle*, 505 U.S. at 2081.

“character of the governmental action.” *Id.* In evaluating these factors, the analysis focuses on “the parcel as a whole,” rather than just the portion of the property alleged to have been taken.²⁹

In the context of a satellite operator’s entire system, the economic burden imposed by a very limited carriage obligation would not be significant, especially in light of the rapid past and continuing expansion in satellite capacity. *See* Section II above; Attachment at 2, 8, 10. Second, any carriage requirements would not interfere with the “distinct investment-backed expectations” of satellite operators, but would only represent duties that a reasonable property owner could expect in an industry such as satellite, which is significantly regulated by Congress and the Commission.³⁰ Indeed, requirements resulting in the use of satellite operators’ capacity (such as carriage or programming obligations) have been a part of satellite regulation for years.³¹ Third, the character of the governmental action precludes any argument of a taking under *Penn Central*.

²⁹ *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*, 535 U.S. 302, 331 (2002).

³⁰ *See, e.g., General Tel. Co. of the Southwest v. U.S.* 449 F.2d 846, 864 (5th Cir. 1971) (“The property of regulated industries is held subject to such limitations as may reasonably be imposed upon it in the public interest and the court have frequently recognized that new rules may abolish or modify pre-existing interests.”); *Lucas*, 505 U.S. at 1027-28 (noting that “in the case of personal property, by reason of the State’s traditionally high degree of control over commercial dealings, [the owner] ought to be aware of the possibility that new regulation might even render his property economically worthless”); *Branch v. U.S.*, 69 F.3d 1571, 1576 (Fed. Cir. 1995) (noting that principles of takings law that apply to real property do not apply in the same manner to statutes imposing monetary liability “[b]ecause of the ‘State’s traditionally high degree of control of commercial dealings’”) (quoting *Lucas*, 505 U.S. at 1027).

³¹ For example, DBS providers are required to reserve four percent of their channel capacity exclusively for use by qualified programmers for noncommercial programming of an educational or informational nature. *See* 47 C.F.R. § 25.701(f); 47 U.S.C. § 335(b)(1). DBS operators are also required to comply with specific rules regarding political programming. *See, e.g.,* 47 C.F.R. § 25.701(b)(3)(i) (DBS providers must allow “reasonable access to,” or permit “purchase of reasonable amounts of time for, the use of their facilities” by federal candidates). The Satellite Home Viewer Improvement Act of 1999 further requires satellite television operators to carry all broadcast stations in a local market which request to be carried, if they carry any local stations within that market. *See* 47 U.S.C. § 338(a)(1).

As the Supreme Court recently unanimously observed, “the ‘character of the governmental action’-- for instance whether it amounts to a physical invasion or instead merely affects property interests through ‘some public program adjusting the benefits and burdens of economic life to promote the common good’ -- may be relevant is discerning whether a taking has occurred.” *Lingle*, 125 S.Ct. at 2082 (quoting *Penn Central*, 438 U.S. at 124). Here, as shown, there is no “physical invasion” of real property, *Penn Central*, 438 U.S. at 124, and the very limited carriage obligation would, as discussed in detail above, serve a legitimate public purpose. In short, the challenged carriage obligation would simply constitute a regulation arising through “some public program adjusting the benefits and burdens of economic life to promote the common good,” *id.*, and thus is constitutionally unobjectionable.³²

IV. Conclusion

The Commission should reject Petitioners’ claims that requiring carriage of the entire free, over-the-air digital broadcast signal of local television stations in Alaska and Hawaii will result in very significant capacity burdens. As set forth in detail above and in the attached engineering statement, these claims about capacity constraints are exaggerated and factually unsupported. In light of past claims about satellite capacity constraints that proved inaccurate

³² Petitioners’ assertions that the imposition of an Alaska and Hawaii multicast carriage requirement on satellite but not on cable operators violates the constitutional guarantee of equal protection are facially invalid. *See, e.g., FCC v. Beach Communications, Inc.* 508 U.S. 307 (1993) (rejecting claims by SMATV operators that FCC had construed legislation in a manner violating equal protection component of Fifth Amendment by requiring local cable franchising of some but not all SMATV facilities); *Regan v. Taxation with Representation of Washington*, 461 U.S. 540 (1983) (tax statute that treated certain nonprofit organizations more favorably than others found not to violate Fifth Amendment); *Medlock v. Leathers*, 842 S.W.2d 428 (Ark. 1992) (state’s imposition of a sales tax on cable television operators but not on satellite operators held not to violate equal protection). The Supreme Court has furthermore emphasized the extremely deferential nature of the review of regulatory classifications against equal protection challenges. *See, e.g., Beach*, 508 U.S. at 313-15. *See also Nordlinger v. Hahn*, 505 U.S. 1, 15 (1992) (“Equal Protection Clause does not demand . . . that a legislature or governing decisionmaker actually articulate at any time the purpose or rationale supporting its classification”).

and the continuing ability of satellite operators to expand their available channel capacity, the Commission should be skeptical of unproven assertions that the challenged carriage decision will cause serious capacity problems. Such skepticism is particularly warranted because publicly available information indicates that Petitioners currently have the capacity to carry DTV signals in Alaska and Hawaii.

Nor have Petitioners established any statutory or constitutional reasons for the Commission to reconsider its decision. The Commission's interpretation of the Alaska and Hawaii carriage provision of SHVERA is reasonable and therefore entitled to substantial deference. And Petitioners may not properly contend that the challenged carriage decision is inconsistent with the Constitution. Because the Commission's decision promotes important governmental interests and has not been shown to actually burden the speech rights of satellite operators, DIRECTV's and EchoStar's claim that it violates the First Amendment is unmeritorious. The Alaska and Hawaii carriage requirement constitutes neither a permanent physical occupation of real property nor a regulatory taking, and thus does not run afoul of the

Fifth Amendment. For all these reasons, the Commission should not grant DIRECTV's and EchoStar's petitions for reconsideration.

Respectfully submitted,

**NATIONAL ASSOCIATION OF
BROADCASTERS**

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NAB Science and Technology

December 8, 2005

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

In the Matter of)
) MB Docket No. 05-181
Implementation of Section 210 of the)
Satellite Home Viewer Extension and)
Reauthorization Act of 2004 to Amend)
Section 338 of the Communications Act)

**ENGINEERING STATEMENT OF SIDNEY M. SKJEL, P.E.,
CONCERNING DIRECTV'S AND ECHOSTAR'S
PETITIONS FOR PARTIAL RECONSIDERATION**

1. At the request of the National Association of Broadcasters, the undersigned has prepared this engineering statement for consideration by the Commission in connection with the Petitions for Partial Reconsideration filed by DirecTV, Inc. and EchoStar Satellite, L.L.C., in the above-referenced proceeding. The credentials and experience of the undersigned are set forth in the attached **Exhibit A**. As detailed there, I have, among other things, conducted technical evaluation and technical due diligence assessments for a variety of broadcasting, satellite and microwave transmission systems, including as advisor to the Department of Justice in connection with the proposed merger of EchoStar and DirecTV. I attempt in this Engineering Statement to provide the Commission with the benefit of this experience, without violating any of the strict confidentiality rules that have been part of previous assignments. In conducting this assessment I have utilized only public documents.

2. Based upon publicly available information, it is my opinion that both DirecTV and EchoStar will be able to comply with the Alaska/Hawaii mandates of

SHVERA without significantly impacting their capacity or impeding services to other parts of the country. My overall assessment of the DirecTV and EchoStar Petitions is that they overstate the capacity demands that the SHVERA Alaska and Hawaii provisions will impose on the capacity of their systems and the adverse effects these provisions will have on providing service to other areas of the country. At the same time, the Petitions understate the actual and potential technological advances that likely will ameliorate these concerns prior to the mid-2007 deadline for the carriage of digital signals. In this regard, it should be recalled that as recently as 2002 these two DBS firms publicly claimed that unless they were permitted to merge, neither firm could offer local-into-local service to more than about 50 to 70 markets. Today EchoStar is providing such service in approximately 165 markets and DirecTV is providing it in 133 markets.

Analysis of DirecTV Petition for Partial Reconsideration

3. DirecTV treats as static the technical and operational DBS environment. All parties recognize the technological advances that DirecTV has made over the years—such as use of spot beams and statistical multiplexing. These capabilities did not exist during the initial days of DBS operation. There is no reason to assume that similar advances will not continue in the future. In addition to use of MPEG 4 AVC and 8 PSK modulation, there are other technical advances which hold promise of increased capacity in the near future. For example, the Digital Video Broadcast Project ("DVB"), an industry led consortium of over 270 broadcasters, manufacturers, network operators, software developers, and regulatory bodies in over 35 countries that designs global standards for the delivery of digital television, has codified hierarchical and layered modulation as operational specifications in their DVB-S2 specification. DirecTV, as a

DVB member, participated in the process leading to the development of these specifications, but DirecTV fails even to mention these capacity enhancing techniques in the Petition for Partial Reconsideration, much less attempting to explain why they will not ameliorate any possible capacity issues.

4. DirecTV states that contiguous state capacity would have to be diverted to meet Alaska/Hawaii requirements but provides no capacity details. To address this issue, I have performed some capacity calculations, which are presented below, assuming that only the Spaceway 1 and Spaceway 2 satellites are operational (not DirecTV 10 or 11).

**Spaceway 1 and 2 Capacity Required for Alaska/Hawaii
Local to Local HDTV and SDTV Channels**

5. This section presents an analysis of the capacity available to DirecTV at Ka Band on Spaceway 1 and Spaceway 2 satellites to provide local-local HDTV and SDTV service to Alaska and Hawaii.

6. In both its Comments and in its Petition for Partial Reconsideration, DirecTV states that such satellite carriage in Alaska and Hawaii will require DirecTV to divert capacity that would otherwise be used to provide national programming or to provide local-into-local service in other markets. My analysis shows that **less than 3% of the available capacity of Spaceway 1 and Spaceway 2 Ka Band assets are required to provide such local-into-local DTV service**, based on data included in DirecTV's FCC filing for those satellites. No diversion of national programming capacity is necessary.

7. It is important to note that Spaceway 1 and Spaceway 2 are not the only Ka band spot beam satellites that will be used by DirecTV for DBS service. Based on SEC and FCC filings, DirecTV 10 and 11 will be used in addition to Spaceway 1 and 2

and will replace only those portions of the Spaceway 1 and 2 payload which are not used for DTH service (the so called B1 and B2 frequency blocks). Therefore, my analysis and calculations provide for a margin of error of up to 50% since they do not take into account DirecTV 10 and DirecTV 11 satellites.

The results of this analysis are summarized in Table 1 and are discussed in detail below.

- Row A contains the ATSC data rate used by television broadcasters for terrestrial transmission. Per ATSC specification, this signal employs MPEG-2 digital encoding.
- Row B: If MPEG 4 AVC encoding is used instead of MPEG-2, a 50% data rate reduction is assumed in accordance with current industry estimates for MPEG -4 performance. Segregation of HDTV and SDTV is not assumed. Statistical multiplexing of HDTV and SDTV is not assumed, although this will clearly become possible as technology improvements occur.
- Row L: A conservative assessment of the overall capacity available to DirecTV on the B3 and B4 frequency blocks. A frequency reuse factor of 12 is assumed based upon previously documented technical information. This reasonably assumes that no new spot beams are required above those which would have been required anyway for HDTV-only carriage. Six uplink sites are assumed for both Spaceway 1 and 2 uplinks.
- Finally, it is worth noting that in any multibeam antenna such as the phased array antennas used for Spaceway, overall satellite capacity is

usually increased by use of spot beams to areas which are geographically separated from the main group of downlink beams (for example, by use of spot beams covering Hawaii and Alaska). This is because in a multibeam system the beam-to-beam interference is a primary factor in reducing overall system capacity. This beam-to-beam interference is reduced with geographical separation, and so the use of spot beams to Alaska and Hawaii actually serves to increase the overall system capacity because there is less interference to other (contiguous state) beams due to the geographical separation of these two states.

Table 1: Spaceway 1 and 2 Satellite Resources Required					
Row		Hawaii HD + SD Local-Local	Alaska HD + SD Local-Local		
A	MPEG- 2 ATSC Data Rate per Television Station	19.4	19.4	Mbps	
B	MPEG 4 AVC Data Rate required to carry	9.7	9.7	Mbps	
C	Number of Television Stations requiring carriage	12	17	Stations	
D	Total MPEG 4 Data Rate Required	116.4	164.9	Mbps	(B x C)
E	Symbol rate per carrier	20	20	Msps	From DirecTV Filing
F	Modulation used	8 PSK	8 PSK		From DirecTV Filing
G	FEC Rate	0.691	0.691		From DirecTV Filing. Rate $\frac{3}{4}$. + Reed Solomon
H	Available information rate per carrier	41.5	41.5	Mbps	Calculated from rows E-G
I	Number of carriers required to carry Local-Local	2.81	3.98	Carriers	D/H
J	Number of 62.5 MHz Channels	2	2	Channels	Two carriers per channel assumed, per DirecTV filing
K	Total satellite bandwidth used	140	140	MHz	62.5 MHz per channel plus guard band
L	Total bandwidth available on two Spaceway satellites	12,000	12,000	MHz	Assumes frequency reuse factor of 12.
	Percentage of total available capacity used	1.17%	1.17%		K/L
	Total Spaceway capacity required for Hawaii and Alaska HD + SD Local-Local		2.3%		Percentage of Spaceway 1 and Spaceway 2 capacity

8. DirecTV asserts that complying with SHVERA's requirements with respect to Alaska and Hawaii would force it to divert capacity that would otherwise be used to provide national programming to subscribers across the country. My analysis of DirecTV's capacity would suggest otherwise. Moreover, DirecTV's assertion is strained in that national programming is generally transmitted via much larger CONUS beams, not the spot beams used to serve Alaska and Hawaii.

9. DirecTV makes repeated claims that the imposition of carriage of multicast and HD signals would impose excessive and unreasonable demands on its capacity. My previous analysis of its capacity indicates this is not the case. Moreover, contrary to DirecTV's suggestion, the mix of HD or SD multicast signals a broadcaster may choose to transmit generally speaking will not greatly affect the capacity demands on DirecTV. This is because a broadcaster's digital over-the-air bandwidth is limited to 19.4 Mbps. This bandwidth can be used for various combinations of HD or SD multicasts, but the combination chosen will never exceed 19.4 Mbps of MPEG-2 modulation. It may, in the short term, complicate use of statistical multiplexing but this would be more of an implementation problem that can be overcome in time with advances in MPEG 4 AVC multiplexing techniques.

10. DirecTV claims that the spot beams it has "now assigned to Alaska and Hawaii do not have capacity to retransmit the HD and multicast programming mandated by the Commission." (DirecTV Petition at page 5.) DirecTV fails to explain why it is unwilling or unable to reassign to Alaska and Hawaii any of its planned Ka spot beam capacity.

Analysis of EchoStar Petition for Partial Reconsideration

11. EchoStar, like DirecTV, fails to provide technical justification for many of its assertions regarding capacity. In one particularly important area, EchoStar's Ka Band satellite resources, there is a shortage of technical detail, as is discussed below.

12. Many of the capacity issues raised by EchoStar would appear to be temporary in nature, based on the history of technological and operational advancement in DBS. Difficulty with statistical multiplexing both HD and SD signals, and difficulty in adapting to changing broadcaster schedules are both mentioned, but are "learning curve" operational matters. In this regard, statistical multiplexing itself was a "learning curve" development whose effective use came years after the beginning of DBS service.

13. The typical television broadcaster has a fixed 19.4 Mbps digital bit stream that it must stay within, changing from "HDTV only" to "HDTV plus a small amount of multicasting SDTV" to "all SDTV multicasting and no HDTV". The MPEG transport stream, which EchoStar uses, provides great flexibility in this regard.

14. EchoStar downplays or ignores technological advances that historically have resulted in increasing satellite capacity. This is surprising, in view of the role that spot beams, improved MPEG-2 encoders, 8 PSK modulation, MPEG 4 AVC encoding and statistical multiplexing have had in increasing EchoStar's capacity. Potential new developments continue to arise, such as using satellites at 4.5 degree spacing instead of 9 degree spacing, use of hierarchical and layered modulation (as contained in the approved and operational DVB-S2 specification), and increased frequency reuse of Ka band satellites.

EchoStar's Ka Band Capacity

15. EchoStar does not claim that carrying multicast programming in Alaska and Hawaii would deprive the contiguous states of service.

16. According to industry publications such as Via Satellite magazine (see, for example, the October 5, 2005 edition), EchoStar is an existing user of Ka band with its use of EchoStar IX at 121 WL. EchoStar now holds licenses for Ka band satellites at 97, 113, 117, and 121 degrees west longitude, and has applied for several other Ka band licenses as well.

17. In regard to actual satellites in use or under contract, EchoStar has leased the full Ka band capacity on AMC-15 at 105 and AMC-16 at 85, and has two additional Lockheed Martin A2100 Ka band satellites on order.

18. Technical details on the A2100 satellites are not available, and so it is not possible to do a detailed capacity analysis for EchoStar's ability to accommodate the Alaska and Hawaii DTV local-local traffic. It appears that the AMC-15 capacity of a 125 MHz transponder for the fixed Alaska spot beam and another 125 MHz transponder for the fixed Hawaii spot beam (capacity that cannot be used for or diverted to the contiguous states) falls just short of the resource necessary to provide Alaska and Hawaii local-into-local DTV service from the single AMC-15 satellite itself. (This is based on the FCC filings for AMC-15.) However, when the existing Ku spot beam coverage of EchoStar 7 and EchoStar 8 is added, sufficient capacity exists for the Alaska and Hawaii DTV traffic. Furthermore, if one of the other two A2100 satellites which EchoStar has on order has at least as much capability as AMC-15, provision of local-into-local DTV service to Alaska and Hawaii will have the same minimal impact on EchoStar's Ka band

resources as was the case with DirecTV. (In regard to the latter, the AMC-15 satellite only utilizes one polarization and only 2-3 times frequency re-use, so it is hard to imagine that EchoStar's new A2100 satellites would not have at least this much capacity.)

19. Press accounts indicate that EchoStar has repeatedly expressed interest in offering direct to home internet service and has considered this for its Ka Band satellites. (See, for example, "EchoStar Banks On Satellite," Chris Walsh, Rocky Mountain News, December 14, 2004.) It apparently has not decided how much of the Ka capacity to use for DBS service, and how much to use for internet service, since this is not mentioned in the Petition for Partial Reconsideration. Accordingly, there does not appear to be an issue regarding diversion of capacity from the contiguous states to Hawaii and Alaska; rather, the issue appears to be how much Ka capacity EchoStar will dedicate to DBS use as opposed to internet service.

Conclusion

Based upon publicly available information, it is my opinion that both DirecTV and EchoStar will be able to comply with the Alaska/Hawaii mandates of SHVERA without significantly impacting their capacity or impeding services to other parts of the country. DirecTV and EchoStar overstate the capacity demands that the Alaska and Hawaii provisions will impose on the capacity of their systems and the adverse effects these provisions will have on providing service to other areas of the country. Both Petitions also vastly understate the critical and potential technological advances that likely will ameliorate these concerns prior to the mid-2007 deadline for carriage of digital signals, and treat as static the technical and operational DBS environment. The history of Direct Broadcasting Satellite is a triumph of technical and operational achievement, with

services (such as local-to-local) being provided today which were thought impossible only a few years ago. There is no reason to believe that new technological and operational achievements will not continue to allow satellites to provide not only local DTV but other new and innovative services in the years to come.

Respectfully submitted,

A handwritten signature in cursive script, reading "Sidney Skjei".

Sidney M. Skjei, P.E.

EXHIBIT A

Sidney M. Skjei, P.E.

Twenty five years market-oriented systems engineering, design, test and implementation of products and services that utilize communications satellites or are associated with television and radio broadcasting. Extensive hands-on experience in hardware and software development for digital television and radio, packet data and telephony products. Highly knowledgeable in all aspects of broadcast engineering, satellite transmission, earth station and RF engineering, and technical regulatory analysis.

PROFESSIONAL EXPERIENCE

Skjei Telecom, Inc.

President

1994 to Present

Founded and manage consulting firm providing technical-marketing and engineering services in the area of digital broadcasting, satellite and broadcast telecommunications systems. Clients have included services and product providers, network owners and operators, broadcasters, internet and common carriers and systems integrators. Assignments have included technical support, tradeoff evaluation and management recommendation to a wide variety of networks and system implementations, most frequently involving digital television, internet data, and both digital and analog telephony. Supported multiple-user application areas, including distance learning, audio and video broadcast (including DBS), Internet access and trunking, thin route network extension, and satellite transponder engineering and management.

Performed multiple assignments as Litigative Consultant and Expert Witness, including serving as Department of Justice technical expert for the proposed merger of EchoStar and DirecTV Corporation.

Conducted technical evaluation and technical due-diligence assessments for a variety of broadcasting, satellite, and microwave transmission systems.

Extensive experience in digital video encoding and transmission systems. Currently teach a course in Digital Video offered by ATI. Experience includes MPEG 2, MPEG 4, H.26L, AVC and advanced digital encoding methods and systems. Frequently called upon to assess quantitative and qualitative aspects of digital video, particularly including satellite transmission and reception. Served on ATSC Working Group defining transmission of ATSC Digital Television via satellite.

GTE Spacenet Corporation

Director of Engineering and Product Development

1993 to 1994

Senior corporate technical executive, reporting directly to CEO and directing systems architecture, engineering and development of all satellite telecommunications products and services. Accountable for product performance, cost, and schedule for interactive packet data VSAT (CDMA, TDMA, X.25, TCP/IP, and SNA/SDLC), compressed digital video (MPEG type) products, including associated network management systems.

- Developed system level design, specifications and outsourcing package for a compressed digital television product, including network control and automated satellite access subsystems. Provided marketing and sales support, and implementation engineering for deployment of final product. Product is now operational in two major corporate video networks with over 2000 installed receivers.
- Led development, integration and test of an industry-first X.25 packetized voice and facsimile overlay to an interactive packet data VSAT network. Network has been successfully implemented in Mexico.

Director of Engineering

1988 to 1993

Provide broad scope systems engineering support to eight SPACENET and GSTAR satellites and the services that they carry. Oversee transmission engineering to assign users access and manage the transponders to recover maximum revenue while minimizing user interference. Design, propose and support installation of customer networks consisting of standard VSAT products, custom earth stations, satellite newsgathering and DAMA circuit switched products and services. Consult and advise management regarding spacecraft payload performance and resolution of transponder anomalies. Design and configure telemetry, tracking, control and monitoring facilities supporting spacecraft and transponder operations. Provide technical content of all filings and pleadings with government and regulatory agencies such as the FCC, ITU, IFRB and NTIA. Personally conduct negotiations with other US and international carriers to coordinate GTE satellites with other systems.

- Created and put into service an industry-first, bandwidth on demand, variable data rate SCPC product. Design includes a satellite signaling channel, VME/MC68020 DAMA control processor and IBM PC remote controllers.
- Succeeded in changing the CCIR Rules involving the use of energy dispersal at Ku Band. This involved transmission analysis, development and submission of supporting papers, and obtaining support from satellite carriers and regulatory authorities.

- Designed a Ku Band satcom terminal (1.3 m diameter tracking antenna and transceiver) for the USS George Washington capable of transmitting and receiving a T-1 (1.544 Mbps) signal for videoconferencing purposes. Conducted site and interference survey on board and supervised all engineering associated with terminal manufacture and installation.

Director, Satellite Systems Engineering

1985 to 1988

Responsible for satellite newsgathering service design, development and marketing, and for technical support to transponder sales and services. Responsible for manufacturing and sourcing DAMA voice product adapted for use in SNG vehicles. Also provide technical support to marketing and sales efforts involving over \$200M annually. This includes network design, estimation of product changes, transmission analysis and preparation of technical proposals

Southern Pacific Satellite Company (SPRINT)

Manager, Systems Engineering

1983 to 1985

Started up and led all systems engineering, and many program management activities associated with implementation of four different TDMA networks on two different satellites. This included over 30 large (9 to 18 m) C and Ku band earth stations, 120 Mbps TDMA and ADPCM voice compression equipment and network management system.

COMSAT World Systems Division

1979 to 1983

Manager, Transmission Engineering

Represented US Signatory in INTELSAT Technical Advisory Committee (BG/T) having broad scope technical responsibility for INTELSAT system, including spacecraft development/deployment, launch vehicles, development of international services and research and development. Led engineering analyses, and field tests for new international telephone services.

U.S.Navy, Washington, D.C

1975 to 1978

Office of the CNO, OP-941E
Navy SATCOM Program Office
Coordinator, Satellite Communications

Coordinated earth segment implementation and space segment access for Navy UHF satellite systems during initial operational capabilities on leased (MARISAT-Gapfiller)

and owned (FLTSATCOM) space segments. Interfaced with other service, JCS and DOD officials to obtain consensus on DSARC III procurement for FLTSATCOM. Previously, developed initial Navy input into DOD User Requirements Data Base and translated Navy requirements into design parameters for UHF and SHF (DSCS III) satellite systems. Initiated and guided R&D efforts for advanced systems and capabilities.

Naval Telecommunications Architecture Group, OP-943
Satellite Communications Architect

Developed telecommunications architectures for meeting Navy strategic and tactical communications requirements using satellite communications. Developed OTH-T long term targeting communications architectures and system definitions. Developed initial Navy SATCOM User Requirements Database

Previously, designed, built and tested prototype spread spectrum communications system adaptable to multiple transmission media. Work involved extensive printed circuit board design of coding, modulation, CDMA tracking and digital correlation components.

EDUCATION

MSEE (With Distinction), Communications Engineering, 1975, Naval Postgraduate School, Monterey, California

BS (With Merit), Naval Science, 1967, U.S. Naval Academy, Annapolis, Maryland

AWARDS

Leslie H. Warner Technical Achievement Award, GTE Corporation, May 1987

AFCEA Outstanding Engineering Graduate Award, June, 1975

LICENSES AND PROFESSIONAL MEMBERSHIPS

Registered Professional Engineer, Commonwealth of Virginia

Eta Kappa Nu, IEEE, SMPTE, AFCCE

PUBLICATIONS

“Using a Fishbone Diagram to Troubleshoot a Satellite Link”, *The Society of Satellite Professionals International Orbiter*, April, 2005

“Broadcast Business Continuity”, *National Association of Broadcasters Engineering Conference Proceedings*, April, 2004

“DVB-S2: A major Development in Broadcast Networking”, *The Society of Satellite Professionals International Orbiter*, April, 2004

“Shelter-in-Place: People vs. Operations?” *The Society of Satellite Professionals International Orbiter*, August, 2003

“The Importance of Business Continuity Planning”, *The Financial Manager*, June/July 2003

“The Vital Need for Satellite Communications Capacity Research and Development”, *The Society of Satellite Professionals International Orbiter*, January, 2003

“A New Breed of Networks: Push/Pull Hybrid Satellite/Terrestrial”, *The Society of Satellite Professionals International Orbiter*, June/July, 2002

“Link Budgets Made Easy, Part Two”, *The Society of Satellite Professionals International Orbiter*, February/March, 2002

“Taking the Mystery out of Link Budgets”, *The Society of Satellite Professionals International Orbiter*, October/November, 2001

"Metered Channel Service: a High Speed DAMA SCPC Data Service", with K. Talberth, *AIAA 12th Communications Satellite System Conference*, June, 1992

“Engineering and Operational Experience with GSTAR III”, *Intelsat Inclined Orbit Seminar*, October, 1991

"New Developments in Satellite Communications", *Religious Broadcasting Magazine*, September, 1986

"New Techniques for Voice/Data Services in Satellite Newsgathering Operations", *40th Annual National Association Of Broadcasters Broadcast Engineering Conference*, April, 1986

"US Results of TDMA Field Trials", with A Ghais, J Kolsrud and H Suyderhoud, *Fifth International Conference on Digital Satellite Communications*, 1981

A Flexible Spread Spectrum System, National Technical Information Service,
Springfield, Virginia, June 1975

CERTIFICATE OF SERVICE

I, Patricia Jones, Legal Secretary for the National Association of Broadcasters, hereby certify that a true and correct copy of the foregoing Opposition of the National Association of Broadcasters was sent this 8th day of December, 2005, by first class mail, postage prepaid, to the following:

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/s/ Patricia Jones
Patricia Jones