September 21, 2004

HAND-DELIVER

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

Re: Report No. SPB-196; SAT-PDR-20020425-00071

Dear Ms. Dortch:

In these proceedings, the FCC is considering various proposals for new DBS orbital locations that would be spaced only 4.5 degrees away from existing DBS orbital locations, thereby halving the current separation. To date, the materials submitted to the FCC appear to have focused on the impact of such proposals on conventional DBS service to small satellite dishes mounted on subscribers' homes. However, there is a growing DBS submarket – service to mobile platforms such as cars, boats, and commercial and private aircraft – that must also be considered.

The FCC has recognized that mobile applications fall within the definition of DBS service, and that such applications are, just like stationary applications, worthy of interference protection. Indeed, the FCC has even considered whether additional measures were necessary to protect mobile receivers.[1] As discussed below, the proposed "tweener" satellites would have an even more serious and detrimental affect on such mobile platforms than they would on fixed antennas.

KVH Industries, Inc., is an international leader in designing and manufacturing innovative satellite television antennas for mobile applications on land or sea. KVH has been bringing DBS service to mobile consumers since 1995, and the company now supplies more in-motion satellite television systems for the marine and land-mobile markets than any other manufacturer in the world. Tens of thousands of boat, RV, and motor coach owners enjoy digital-quality television programming thanks to KVH's family of award-winning TracVision® antennas. Most recently, KVH has applied its technological leadership to the automotive market to develop the TracVision A5, an advanced hybrid phased-array antenna with a profile small enough (approximately five inches high) that it can be attached to most standard roof racks of SUVs, mini-vans, vans, and luxury cars.[2] Regardless of vehicle motion,

[1] 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, First Report and Order and Further Notice of Proposed Rule Making, 16 FCCR 4096, 4173 (2000) (considering whether additional measures were necessary to protect DBS service to aircraft against NGSO FSS systems).
[2] A picture of the TracVision A5 unit is attached to this letter.

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TracVision A5 automatically finds and tracks the DBS satellite and relays the signals to any standard in-vehicle passenger video display system, providing reliable and uninterrupted reception on open roads throughout the continental United States.

Since their inception, DBS operations in the United States have been characterized by the use of high-power satellites and nine degree orbital spacing. KVH designed its advanced mobile antenna systems to operate in this environment. In designing such systems, KVH faces two challenges that are not relevant to stationary DBS antennas. First, the antenna/ radome must have a low profile to decrease drag on the moving vehicle. Second, the antenna must be able to track the apparent satellite position as the vehicle moves.

As a result, the antenna beam patterns for mobile receive antennas are asymmetrical, with broader gain in the elevation axis (due to the smaller linear dimension) compensated to some extent by the design in the azimuth direction. Even with state-of-the-art technology, the inherent limitations of a mobile environment result in smaller link margins and lower availability than can be expected for fixed antennas operating in the same area.

To date, lower margins and availability have not been a problem for mobile DBS receive systems, as they were contemplated in the design of mobile systems and viewers are accustomed to mobile services that are somewhat less robust than stationary services. However, if the orbital spacing of DBS satellites were halved from nine degrees to 4.5 degrees, the link would be significantly degraded – to the point where in many cities the signal could not be received even in clear sky conditions using the antennas already designed and deployed.

The example link budget below shows the sensitivity of the TracVision antenna to interference from satellites with 4.5 degree spacing.[3] The difference in off-axis discrimination of the TracVision antenna with orbital spacing of nine degrees versus 4.5 degrees is dramatic - over 8 dB. This decreases the ratio of the desired signal to interfering signals from adjacent satellites (or "C/I") from 18 dB to 9.5 dB. As shown in the example below, the presence of a "tweener" satellite results in negative link margin, which means that the link does not close and the subscriber receives no signal even in clear sky conditions.

Link Budget - Washington, DC

		Clear Sky	Clear Sky w/4.5-deg	Rain Down	Rain Dn w/4.5 deg
Uplink C/N (thermal), dB	Transmit power, dBW	14.4	14.4	14.4	14.4
	Transmit losses, dB	-2.0	-2.0	-2.0	-2.0
	Ground antenna gain, dB	65.5	65.5	65.5	65.5
	Antenna pointing loss, dB	-0.5	-0.5	-0.5	-0.5

[3] The link budget assumes that the tweener satellite operates at the EIRP levels that were filed with the ITU for the USAT-S1 MOD-A and IOMBSS-1 satellites, as well as 0.1 degree station-keeping (total) and no receive antenna mis-pointing.

		Clear Sky	Clear Sky w/4.5-deg	Rain Down	Rain Dn w/4.5 deg
	Free space loss, dB	-208.8	-208.8	-208.8	-208.8
	Atmospheric loss, dB	-0.2	-0.2	-0.2	-0.2
	Uplink rain loss, dB	0.0	0.0	0.0	0.0
	Satellite G/T, dB/K	3.0	3.0	3.0	3.0
	Bandwidth, dB-Hz	-73.0	-73.0	-73.0	-73.0
	Boltzmann's constant, dBW/Hz K	228.6	228.6	228.6	228.6
Total Uplink C/N		**27.1**	**27.1**	**27.1**	**27.1**
Downlink C/N (thermal), dB	Satellite EIRP (D4S), dBW/24 MHz	53.8	53.8	53.8	53.8
	Free space loss, dB	-206.0	-206.0	-206.0	-206.0
	Atmospheric loss, dB	-0.2	-0.2	-0.2	-0.2
	Downlink rain loss, dB	0.0	0.0	-1.5	-1.5
	Rain temp increase, dB	0.0	0.0	-2.0	-2.0
	Rcv. antenna pointing loss, dB	-0.5	-0.5	-0.5	-0.5
	Radome loss, dB	-0.4	-0.4	-0.4	-0.4
	Ground G/T, dB/K	10.5	10.5	10.5	10.5
	Bandwidth, dB-Hz	-73.0	-73.0	-73.0	-73.0
	Boltzmann's constant, dBW/Hz K	228.6	228.6	228.6	228.6
Total Downlink C/N		**12.8**	**12.8**	**9.3**	**9.3**
Totals	Uplink C/N (thermal), dB	27.1	27.1	27.1	27.1
	Downlink C/N (thermal), dB	12.8	12.8	9.3	9.3
	x-pol interference, dB	19.2	19.2	19.2	19.2
	ACI, dB	20.0	20.0	20.0	20.0
	Aggregate C/I from 9-deg. ASI, dB	18.0	18.0	18.0	18.0
	Aggregate C/I from 4.5-deg. ASI, dB	99.0	**9.5**	99.0	**9.5**
	Total ASI, dB	**18.0**	**8.9**	**18.0**	**8.9**
	Total C/(N+I), dB	**10.4**	**6.9**	**8.1**	**5.7**
	Required C/(N+I), dB	**7.6**	**7.6**	**7.6**	**7.6**
	Margin, dB	**2.8**	**-0.7**	**0.5**	**-1.9**

Tens of thousands of mobile craft currently receive service from U.S. DBS satellites, and we expect DBS service for vehicles to become even more popular in the near future. The FCC has recognized that this use is consistent with the DBS service rules and is worthy of protection from interference. The introduction of "tweener" DBS satellites would increase interference to the point where there would be no link margin remaining and service to thousands of deployed antennas would be interrupted, at least occasionally if not, permanently. The result for mobile DBS system manufacturers and consumers would be devastating, and what is currently a promising and growing application of DBS technology will be stifled in its infancy.

Under these circumstances, the FCC should dismiss any request for authority to operate a DBS satellite spaced at less than nine degrees from existing U.S. operations. KVH strongly urges the FCC to do so as quickly as possible in order to avoid creating uncertainty that could delay further innovation in mobile DBS technology.

Sincerely,

Martin Kits van Heyningen
President/CEO

Attachment

The TracVision A5 satellite TV antenna offers a patented, sleek, and rugged design that houses KVH's innovative hybrid phased-array antenna technology.