

**Demonstration that the Clear Channel Satellite Services
Raven .98M VSAT Antenna System
Will Not Cause Unacceptable Interference
Under Conditions of Uniform 2° Spacings**

Clear Channel Satellite Services (CCSS) will utilize the Raven Manufacturing Ltd Galaxy Model GKU-98 antenna system to provide temporary fixed VSAT platforms supporting hub based two way communications services as part of our DVB-RCS VSAT network. The network will be controlled out of Clear Channel's hub in Denver, CO and will operate on domestic geostationary satellites to provide coverage within the continental US. Additionally, CCSS' application employs a central hub station that provides remote control over the VSAT terminals. Remote terminals may not go on line except under the command and control of the hub station. Remote terminals may also be remotely shut down via CCSS' hub equipment. Although the Raven GKU-98 antenna, exceeds the near in 25.209 pattern limitations between 1.25 and 1.6°, the antenna EIRP density during operation will be maintained sufficiently below the -14 dBW/4kHz level to assure the emission limits for compliance with 2° orbital spacing are maintained as described herein..

1. FCC 47 C.F.R. § 25.209 (f) states “An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be routinely authorized after February 15, 1985 upon a finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacings.”
2. Further, FCC Declaratory Order 3588, released April 9, 1986, § D. paragraph 16 reiterates FCC 47 C.F.R. § 25.209 (f) by stating “The Commission's rules on antenna performance standards as revised in Reconsideration of Reduced Orbital Spacing (99 FCC 2d 737 (1985)). See 47 C.F.R. § 25.209 (a) – (f).) provide two methods by which an applicant's facilities can be routinely licensed without recourse to waiver procedures at 14 GHz. Either an antenna must meet the standards of § 25.209 (a) or an applicant must *demonstrate* that the use of a non-conforming antenna will not cause unacceptable interference under conditions of uniform 2° spacing as specified in 25.209 (f).”
3. In 1993 FCC 47 C.F.R. § 25.209 (g) was added to relax the start of antenna gain envelope in (a) from 1° to 1.25° in order to routinely license antennas as small as 1.2 meters in the 12/14 GHz band.
4. Thus, under the current rules the Raven Galaxy Model GKU-98, 0.98-meter antenna, is considered non-conforming only because it is smaller than 1.2 meters and the width of the main lobe extends beyond 1.25°. The antenna specification data and supporting plots submitted in support of FCC licensing show that from 1.6°, and especially in the region of any adjacent satellites, it

is fully compliant with FCC 47 C.F.R §25.209 as shown in the antenna patterns included as an attachment to the FCC filing .

5. FCC 47 C.F.R. § 25.212 (c) specifies the maximum input power density of -14 dBW/4 kHz into the antenna in the 14 GHz band.
6. FCC Declaratory Order 3588, released April 9, 1986, Paragraph 35 provides further clarification: “Specifically, a waiver request will be unnecessary where the power density into the antenna is set at a level to assure that the radiated EIRP density does not exceed $15-25 \log_{10} \theta$ in dBW/4 kHz for off-axis angles between 1° * and 7° , and does not exceed -6 dBW/4 KHz for off-axis angles between 7° and 9.2° , in the 14.0-14.5 GHz band.” (*Note: §25.209 (g) subsequently relaxed the start of the off-axis angle to 1.25° as stated above).
7. The operating mode of the .98-meter antenna in Clear Channel’s VSAT network in the DVB-RCS system and operating into a 6-meter hub station antenna requires an input power density at or below -19.9 dBW/4 kHz, the only region of off-axis EIRP density non-compliance is between 1.25° and 1.6° as indicated in figure 1 below.
8. The difference in the performance of the Raven .98M antenna from the FCC limits as measured from the antenna patterns is presented in the table below. Note that the only area of concern is between 1.25 and 1.6° . By maintaining the EIRP density level into the antenna at or below the value indicated in the required EIRP density column, the antenna operation conforms to the FCC limitations for off-axis emissions.

Calculation of the maximum off-axis EIRP density for the Raven .98M VSAT antenna systems						
Value of Theta (degrees)	$29-25 \log \theta$ (dBi)	GKU-98 Off-Axis Gain from Test Data	0.98M Raven (GKU-98) Gain (dBi)	25.209 Max EIRP Density (dBW/4kHz) into antenna	Required EIRP Density to meet 25.209	Off Axis EIRP Density (dBW/4kHz)
1	29.0	N/A	41	-14		15.0
1.25	26.6	32.5	41	-14	-19.9	12.6
1.5	24.6	26.5	41	-14	-15.9	10.6
1.6	23.9	23.9	41	-14	-14.0	9.9
2	21.5	21.5	41	-14	-14.0	7.5
3	17.1	17.1	41	-14	-14.0	3.1
4	13.9	13.9	41	-14	-14.0	-0.1
5	11.5	11.5	41	-14	-14.0	-2.5
6	9.5	9.5	41	-14	-14.0	-4.5
7	7.9	7.9	41	-14	-14.0	-6.1
7.1	8.0	8.0	41	-14	-14.0	-6.0
8	8.0	8.0	41	-14	-14.0	-6.0

9. Positive control is maintained over each remote terminal in the network through the CCSS hub station. Remote terminals are monitored and may be

activated and deactivated remotely from the hub. The hub station network operations center is manned on a 24/7 basis.

10. CCSS therefore requests licensing, pursuant to 25.209 (f), of its .98M Ku-band VSAT antenna system.

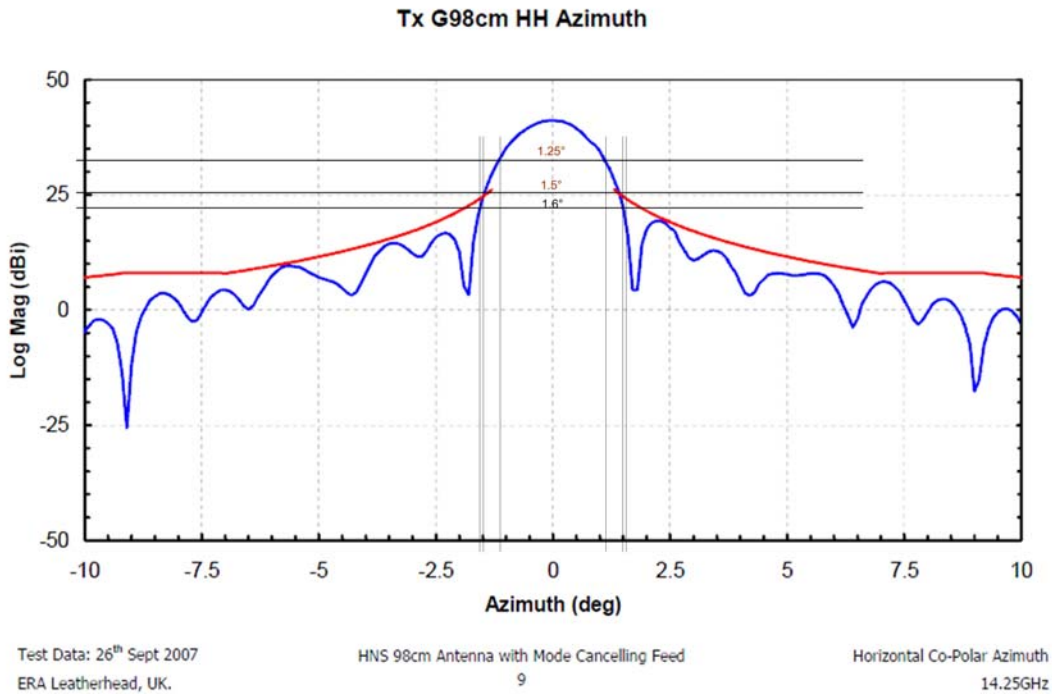


Figure 1: Annotated Plot of Raven .98-meter antenna