

**Demonstration that the Clear Channel Satellite Services
.75M VSAT Antenna System
Will Not Cause Unacceptable Interference
Under Conditions of Uniform 2° Spacings**

Clear Channel Satellite Services (CCSS) will utilize the AvL Technologies Model IMoVSAT antenna system to provide mobile 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. The antenna system is in an identical configuration as licensed by AvL Technologies. The same demonstration previously submitted by AvL Technologies in support of their license application is appropriate and is included here. 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.

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° spacings 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 AvL Model 750 iMoVSAT 0.75E-meter antenna, which uses the Channel Master 89 by 62 cm elliptical-aperture reflector and feed assembly, is considered non-conforming only because it is smaller than 1.2 meters and the width of the main lobe extends beyond 1.25°. However, at ≥1.73°, 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 attached antenna patterns.

5. The AvL Model 750 Roto-Lok® antenna drive system automatically adjusts to the correct polarization by rotating the entire reflector and feed assembly thus maintaining the elliptical reflector major (89 cm) axis parallel to the orbital arc.
6. 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.
7. 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).
8. Because the power density into the AvL Model 750 antenna is at or below -15 dBW/4 kHz, the only region of off-axis EIRP density non-compliance is between 1.25° and 1.73° .
9. In September 26, 2002 the FCC released IB Docket No. 00-248, FCC 02-257, Further Notice of Proposed Rulemaking. This FNPRM suggests "...begin[ning] the antenna gain pattern envelope as far as 1.8° off-axis in the GSO orbital plane if we could assume that there is no possibility of earth station antenna pointing error."
10. CCSS is utilizing the unique Tracstar controller with the AvL Technologies Model 750 iMoVSAT. This controller was developed as a joint effort of AvL and Tracstar. AvL and Tracstar understand the unique technical requirements necessary to assure proper positioning of mobile satellite antennas to provide maximum performance for the user and to assure there is no interference above that allowed by the FCC. This goal is achieved with an auto-acquisition antenna controller that initially points the main beam within 0.1° . The AvL positioner utilizes the patented Roto-Lok® cable drive that reduces backlash to less than 0.1° and provides stiffness adequate to control deflection of the transmit beam when the wind blows to below 0.1° . The combined pointing error will not exceed 0.2° . In addition, the controller issues a "transmit mute" command if disturbances above 0.2° are sensed and performs a re-peak prior to enabling transmit. Because of the precise pointing and minimal backlash and deflection there will be no possibility non-conforming off axis emissions from 1.25° to 1.73° will be directed to adjacent satellites of uniform 2° spacings.

11. Proposed operation of this antenna will result in off-axis emissions below the $15-25 \text{ Log}_{10} \theta \text{ dBW/4 kHz}$ allowed by the FCC under conditions of uniform 2° orbital spacings. Even with maximum pointing errors of 0.2° , the off-line-of-sight emissions toward adjacent satellites will still be below that suggested by the Commission in its observation that the antenna gain pattern envelope might begin as far as 1.8° off-axis in the GSO orbital plane if we could assume that there is no possibility of earth station antenna pointing error.
12. 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.
13. CCSS therefore requests licensing, pursuant to 25.209 (f), of its .75M Ku-band Mobile VSAT antenna system.