UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION AUTHORIZATION

Current Authorization : FCC WEB Reproduction

Unofficial Copy

Name: LOWERY SATELLITE SERVICES INC.

Call Sign: E050154
File Number: SES-LIC-20050531-00664

Authorization Type: License
Common Carrier
Grant Date: 07/13/2005 **Expiration Date:** 07/13/2020

Nature of Service: Fixed Satellite Service

Class of Station: Temporary Fixed Earth Station

A) Site Location(s)

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	NAD	Special Provisions (Refer to Section H)
1)	C-115					UNK	

Licensee certifies antenna(s) comply with gain patterns specified in Section 25.209

Subject to the provisions of the Communications Act of 1934, The Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning Wednesday, July 13, 2005 (3 AM Eastern Standard Time) and ending Monday, July 13, 2020 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is Thursday, July 13, 2006 (3 AM Eastern Standard Time). Grantee must file with the Commission a certification upon completion of construction and commencement of operation.

B) Particulars of Operations

#	Frequency	Polarization	Emission	Tx/Rx Mode	Max EIRP /Carrier	Max EIRP Density	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1)	5925.0000 - 6425.0000	H,V	36M0F8W	T	69.20	29.66	1		FM Video carrier with associated ATIS and audio subcarier

C) Frequency Coordination

#	Frequency Limits(MHz)	Satellite Arc (Deg. Long.) East Limit	Satellite Arc (Deg. Long.) West Limit	Elevation (Degrees) East Limit	Elevation (Degrees) West Limit	Azimuth (Degrees) East Limit	Azimuth (Degrees) West Limit	Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
1)	.0000 - .0000								1

D) Point of Communications

ALSAT: An ALSAT earth station license authorizes the licensee to communicate with all U.S.-licensed satellites, and all non-U.S.-licensed satellites on the Permitted List, with respect to the services and frequency bands specified on the Permitted List for each satellite.

E) Antenna Facilites

Site ID	Antenna ID	Units	Diameter (Meters)	Manufacturer	Model Number	Site Elevation	Max Antenna Height (Meters)	Special Provisions (Refer to Section H)
C-115	1	1	4.5	Andrew	ESA45AAPT-1			

Max Gains(s):46.2 dBi @ 5.9250 GHz 41.8 dBi @ 4.0000 GHz

Maximum total input power at antenna flange (Watts) = 200.0

Maximum aggregate output EIRP for all carriers (dBW)69.2

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G) Antenna Structure marking and lighting requirements:

None unless otherwise specified under Special and General Provisions

H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

1010 Applicable to all receiving frequency bands. Emission designator indicates the maximum bandwidth of received signal at associated station(s). Maximum EIRP and maximum EIRP density are not applicable to receive operations.

1900 Applicable to all transmitting frequency bands. Authority is granted to transmit any number of RF carriers with the specified parameters on any discrete frequencies within associated band in accordance with the other terms and conditions of this authorization, subject to any additional limitations that may be required to avoid unacceptable levels of inter-satellite interference.

2300 Authority is granted to operate this station by remote control provided that: (1)The parameters of the transmissions of this station monitored at the remote control point, and the operational functions sufficient to insure that the operations of this station are in full compliance with the station authorization at all times; (2) upon detection by the grantee, or upon notification from the Commission, of a deviation of the operation of this station shall be immediately suspended until the deviation is corrected, except the transmissions concerning the immediate safety of life or property may be conducted for the duration of such emergency; and (3) the grantee shall have available, at all times, the technical personnel necessary to perform the technical servicing and maintenance of this station expeditiously. See also Public Notice "The International Bureau Provides Guidance Concerning the Relocation of Earth Station Remote Control Points", DA 06-978 (rel. May 4, 2006).

2916 Transmitter(s) must be turned off during antenna maintenance to ensure compliance with the FCC-specified safety guidelines for human exposure to radiofrequency radiation in the region between the antenna feed and the reflector. Appropriate measures must also be taken to restrict access to other regions in which the earth station's power flux density levels exceed the specified guidelines.

2938 Upon completion of construction, each licensee must file with the Commission a certification including the following information: name of the licensee, file number of the application, call sign of the antenna, date of the license and certification that the facility as authorized has been completed, that each antenna facility has been tested and is within 2 dB of the pattern specified in Section 25.209 and that the station is operational including the date of commencement of service and will remain operational during the license period unless the license is submitted for cancellation.

3941 The antenna structure authorized herein must not pose or cause hazard(s) to Aviation Traffic. See Part 17, FCC Rules and Regulations.

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H) Special and General Provisions

B) This RADIO STATION AUTHORIZATION is granted subject to the additional conditions specified below:

This authorization is issued on the grantee's representation that the statements contained in the application are true and that the undertakings described will be carried out in good faith.

This authorization shall not be construed in any manner as a finding by the Commission on the question of marking or lighting of the antenna system should future conditions require. The grantee expressly agrees to install such marking or lighting as the Commission may require under the provisions of Section 303(q) of the Communications Act. 47 U.S.C. § 303(q).

Neither this authorization nor the right granted by this authorization shall be assigned or otherwise transferred to any person, firm, company or corporation without the written consent of the Commission. This authorization is subject to the right of use or control by the government of the United States conferred by Section 706 of the Communications Act. 47 U.S.C. § 706. Operation of this station is governed by Part 25 of the Commission's Rules. 47 C.F.R. Part 25.

This authorization shall not vest in the licensee any right to operate this station nor any right in the use of the designated frequencies beyond the term of this license, nor in any other manner than authorized herein.

This authorization is issued on the grantee's representation that the station is in compliance with environmental requirements set forth in Section 1.1307 of the Commission's Rules. 47 C.F.R. § 1.1307.

This authorization is issued on the grantee's representation that the station is in compliance with the Federal Aviation Administration (FAA) requirements as set forth in Section 17.4 of the Commission's Rules. 47 C.F.R. § 17.4.

The following condition applies when this authorization permits construction of or modifies the construction permit of a radio station.

This authorization shall be automatically forfeited if the station does not meet each required construction deadline by the required date of completion unless, before such date(s), a specific application is timely filed to request an extension of the construction deadline(s), supported with good cause why that failure to construct by the required date was due to factors not under control of the grantee.

Licensees are required to pay annual regulatory fees related to this authorization. The requirement to collect annual regulatory fees from regulates is contained in Public Law 103-66, "The Omnibus Budget Reconciliation Act of 1993". These regulatory fees, which are likely to change each fiscal year, are used to offset costs associated with the Commission's enforcement, public service, international and policy and rulemaking activities. The Commission issues a Report and Order each year, setting the new regulatory fee rates. Receive only earth stations are exempt from payment of regulatory fees.

Radiation Hazard Analysis

This analysis predicts the radiation levels around a proposed earth station complex, comprised of one or more aperture (reflector) type antennas. This report is developed in accordance with the prediction methods contained in OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, Edition 97-01, pp 26-30. The maximum level of non-ionizing radiation to which employees may be exposed is limited to a power density level of 5 milliwatts per square centimeter (5 mW/cm2) averaged over any 6 minute period in a controlled environment and the maximum level of non-ionizing radiation to which the general public is exposed is limited to a power density level of 1 milliwatt per square centimeter (1 mW/cm2) averaged over any 30 minute period in a uncontrolled evironment. Note that the worse-case radiation hazards exist along the beam axis. Under normal circumstances, it is highly unlikely that the antenna axis will be aligned with any occupied area since that would represent a blockage to the desired signals, thus rendering the link unuseable.

Earth Station Technical Parameter Table

Antenna Actual Diameter
4.5 meters
Antenna Surface Area
15.9 sq. meters
Antenna Isotropic Gain
46.2 dBi
Number of Identical Adjacent Antennas*
0
Nominal Antenna Efficiency (e)
52%
Nominal Frequency
6000 MHz
Nominal Wavelength (?)
0.05 meters
Maximum Transmit Power / Carrier
400 Watts
Number of Carriers
1
Total Transmit Power
400 Watts
W/G Loss from Transmitter to Feed
3 dB
Total Feed Input Power
200 Watts
Near Field Limit
Rnf = $D^2/4?$ = 101 meters
Far Field Limit
Rff = 0.6 $D^2/?$ = 243 meters
Transition Region
Rnf to Rff

* The Radiation Levels will be increased directly by the number of antennas indicated, on the assumption that all antennas may illuminate the same area.

In the following sections, the power density in the above regions, as well as other critically important areas will be calculated and evaluated. The calculations are done in the order discussed in OET Bulletin 65. In addition to the input parameters above, input cells are provided below for the user to evaluate the power density at specific distances or angles.

1.0 At the Antenna Surface

The power density at the reflector surface can be calculated from the expression:

PDrefl =
4P/A =
5.04 mW/cm^2
(1)

Where:
P = total power at feed, milliwatts

A = Total area of reflector, sq. cm

In the normal range of transmit powers for satellite antennas, the power densities at or around the reflector surface is expected to exceed safe levels. This area will not be accessible to the general public. Operators and technicians should receive training specifying this area as a high exposure area. Procedures must be established that will assure that all transmitters are rerouted or turned off before access by maintenance personnel to this area is possible.

2.0 On-Axis Near Field Region

The geometrical limits of the radiated power in the near field approximate a cylindrical volume with a diameter equal to that of the antenna. In the near field, the power density is neither uniform nor does its value vary uniformly with distance from the antenna. For the purpose of considering radiation hazard it is assumed that the on-axis flux density is at its maximum value throughout the length of this region. The length of this region, i.e., the distance from the antenna to the end of the near field, is computed as Rnf above.

The maximum power density in the near field is given by:

PDnf = $(16e\ P)/(p\ D^2)$ =
0 mW/cm^2 (2)

from 0 to 101 meters
Evaluation

Uncontrolled Environment:
Complies to FCC Limits

Controlled Environment:
Complies to FCC Limits

3.0 On-Axis Transition Region

The transition region is located between the near and far field regions. As stated in Bulletin 65, the power density begins to vary inversely with distance in the transition region. The maximum power density in the transition region will not exceed that calculated for the near field region, and the transition region begins at that value. The maximum value for a given distance within the transition region may be computed for the point of interest according to:

PDt =
(PDnf)(Rnf)/R = dependent on R (3)

where:
PDnf = near field power density

Rnf = near field distance

R = distance to point of interest

For:
101 < R < 243 meters
We use Eq (3) to determine the safe on-axis distances required for the two occupancy conditions:
Evaluation

Uncontrolled Environment Safe Operating Distance,(meters), Rsafeu:
0

Controlled Environment Safe Operating Distance,(meters), Rsafec:
0

4.0 On-Axis Far-Field Region
The on- axis power density in the far field region (PDff) varies inversely with the square of the distance as follows:

PDff =
$PG/(4pR^2)$ = dependent on R (4)

where:
P = total power at feed

G = Numeric Antenna gain in the direction of interest relative to isotropic radiator

R = distance to the point of interest

For:
R > Rff = 243 meters

PDff = 0 mW/cm^2 at Rff
We use Eq (4) to determine the safe on-axis distances required for the two occupancy conditions:
Evaluation

Uncontrolled Environment Safe Operating Distance,(meters), Rsafeu :
See Section 3

Controlled Environment Safe Operating Distance,(meters), Rsafec :
See Section 3
5.0 Off-Axis Levels at the FarField Limit and Beyond
Ipn the far field region, the power is distributed in a pattern of maxima and minima (sidelobes) as a function of the off-axis angle between the antenna center line and the point of interest. Off-axis power density in the far field can be estimated using the antenna radiation patterns prescribed for the antenna in use. Usually this will correspond to the antenna gain pattern envelope defined by the FCC or the ITU, which takes the form of:

Goff = 32 - 25log(T)

for T from 1 to 48 degrees; -10 dBi from 48 to 180 degrees

(Applicable for commonly used satellite transmit antennas)
Considering that satellite antenna beams are aimed skyward, power density in the far field will usually not be a problem except at low look angles. In these cases, the off axis gain reduction may be used to further reduce the power density levels.
For example: At one (1) degree off axis At the far-field limit, we can calculate the power density as:
Goff = 32 - 25log(1) = 32 - 0 dBi = 1585 numeric

PD1 deg off-axis = PDffx 1585/G = 0 mW/cm^2 (5)
6.0 Off-Axis power density in the Near Field and Transitional Regions
According to Bulletin 65, off-axis calculations in the near field may be performed as follows: assuming that the point of interest is at least one antenna diameter removed from the center of the main beam, the power density at that point is at least a factor of 100 (20 dB) less than the value calculated for the equivalent on-axis power density in the main beam. Therefore, for regions at least D meters away from the center line of the dish, whether behind, below, or in front under of the antenna's main beam, the power density exposure is at least 20 dB below the main beam level as follows:

PDnf(off-axis) = PDnf /100 = 0 mW/cm^2 at D off axis (6)
See page 5 for the calculation of the distance vs elevation angle required to achieve this rule for a given object height.
7.0 Region Between the Feed Horn and Sub-reflector
Transmissions from the feed horn are directed toward the subreflector surface, and are confined

within a conical shape defined by the feed horn. The energy between the feed horn and subreflector is conceded to be in excess of any limits for maximum permissible exposure. This area will not be accessible to the general public. Operators and technicians should receive training specifying this area as a high exposure area. Procedures must be established that will assure that all transmitters are rerouted or turned off before access by maintenance personnel to this area is possible.

Note 1:

Mitigation of the radiation level may take several forms. First, check the distance from the antenna to the nearest potentially occupied area that the antenna could be pointed toward, and compare to the distances appearing in Sections 2, 3 & 4. If those distances lie within the potentially hazardous regions, then the most common solution would be to take steps to insure that the antenna(s) are not capable of being pointed at those areas while RF is being transmitted. This may be accomplished by setting the tracking system to not allow the antenna be pointed below certain elevation angles. Other techniques, such as shielding may also be used effectively.

Evaluation of Safe Occupancy Area in Front of Antenna

The distance (S) from a vertical axis passing through the dish center to a safe off axis location in front of the antenna can be determined based on the dish diameter rule (Item 6.0). Assuming a flat terrain in front of the antenna, the relationship is:

$$S = (D/\sin a) + (2h - D - 2)/(2 \tan a) \quad (7)$$

Where:

a = minimum elevation angle of antenna

D = dish diameter in meters

h = maximum height of object to be cleared, meters

For distances equal or greater than determined by equation (7), the radiation hazard will be below safe levels for all but the most powerful stations (> 4 kilowatts RF at the feed).

For
D =
4.5 meters

h =
1 meters

Then:

a	S
10	13.2 meters
15	9 meters
20	7 meters
25	5.8 meters

30
5.1 meters

5
25.9 meters

90
4.5 meters
Bottom of Form 0
Suitable fencing or other barrier should be provided to prevent casual occupancy of the area in front of the antenna within the limits prescribed above at the lowest elevation angle required.