

November 11, 2008

Federal Communications Commission – International Bureau
445 12th Street, S.W.
Washington, D.C. 20554

Subject: Affidavit Regarding L3 FSS-4180 Antenna

To whom it may concern:

This letter certifies that Intelsat and SES Americom are aware of the application(s) filed by Intellicom Technologies, Inc (“ITC”) on behalf of L3 Communications – Titan Corporation (“L3”), to access the following satellites licensed by the Federal Communications Commission (“FCC”).

| Orbit (West Lat) | Operator | Description |
|------------------|--------------|-------------|
| 74 | Intelsat | H2 |
| 89 | Intelsat | G28 |
| 91 | Intelsat | G17 |
| 93 | Intelsat | G26 |
| 99 | Intelsat | G16 |
| 129 | Intelsat | G27 |
| 72 | SES Americom | AMC-6 |
| 79 | SES Americom | AMC-5 |
| 83 | SES Americom | AMC-9 |
| 101 | SES Americom | AMC-2 |
| 103 | SES Americom | AMC-1 |
| 105 | SES Americom | AMC-15 |

The antennas (listed below) are to be deployed in vehicle mounted earth stations and are not compliant with the FCC Part 25 rules with regard to off-axis gain. These antennas exhibit their non-compliance in the region from 1.0 to 7.0 degrees off axis from maximum gain in the transmit band, due to the width of their main gain lobe. The antennas are compliant with the side lobe pattern requirements specified in Section 25.209 of the Commission’s Rules for off-axis angles starting at 7.0 degrees in the transmit band. The off-axis EIRP values generated by the terminal in the transmit band are reduced to that of a compliant antenna by decreasing the antenna flange power spectral density¹ of –14 dBW/4KHz by the amount of non-compliance.

¹ 47 CFR § 25.134

Model L3 FSS-4180

- 18" circular aperture
- The amount of non-compliance is 7.7 dB in this range of off-axis angle
- The maximum antenna flange power spectral density² is:
 $-14 - 7.7 = -21.7 \text{ dBW/4KHz}$

Model L3 FSS-4180LP (low profile) and FSS-4180LC (low cost)

- 18" w x 13" h elliptical aperture³
- The amount of non-compliance is a function of the rotation of the elliptical antenna relative to the geostationary arc per Table-1. Spectral density limits will be managed manually or automatically based on the geometry within an operating geographical area.
- The maximum antenna flange power spectral density⁴ is per Table-1.

| Relative Rotation Or Polarization (Degrees) | Increase in Excess Gain (dB) | Maximum Power Spectral Density allowed into the "non-compliant" antenna (dBW/4kHz) |
|---|------------------------------|--|
| 0 | 0 | -21.7 |
| 1 to 10 | 0.3 | -22.0 |
| 11 to 20 | 0.9 | -22.6 |
| 21 to 30 | 1.6 | -23.3 |
| 31 to 40 | 2.2 | -23.9 |
| 41 to 50 | 2.7 | -24.4 |
| 51 to 60 | 3.1 | -24.8 |
| 61 to 70 | 3.4 | -25.1 |
| 71 to 80 | 3.5 | -25.2 |
| 81 to 90 | 3.6 | -25.3 |

These antennas are equipped with automatic tracking systems which result in a pointing accuracy of less than or equal to +/- 0.2 degrees. Additionally the tracking system has a built-in feature to stop uplink transmission while the pointing error accidentally exceeds +/- 0.2 degrees.

Through the use of advanced control systems utilizing Kalman filters, GPS, inertial navigation systems, and various sensors, the total antenna pointing errors are maintained to the following absolute error +/-E:

² 47 CFR § 25.134

³ "Technical Brief for On-The-Move SATCOM Permanent Licensing", Intellicom Technologies, September 3, 2008, filename: 20060920M01V11pm_TECH_BRIEF.pdf.

⁴ 47 CFR § 25.134

| | |
|--|---|
| Antenna/Vehicle are NOT in motion | E<0.1°, 100% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion (paved or dirt roads) | E<0.2° Transmitter is Enabled |
| Extreme Terrain Churchville B mobile vehicle conditions | E<0.2°, 95% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion | E>0.2° Transmitter is MUTED |
| Note: Churchville B mobile vehicle conditions are the anticipated most extreme operational conditions. Typically the operational environment will be less severe. | |

In order to prevent unacceptable interference into adjacent satellites, Intelsat, SES Americom, and Intellicom acknowledge that, except as described above, these antennas will be operated in compliance with the technical, operational, and performance requirements of Part 25 of the FCC rules and any requirements set forth in the licenses granted by the FCC for the above L3 antennas.

Intellicom acknowledge that the use of the L3 non-conforming antennas will not cause unacceptable interference into adjacent satellites in accordance with the FCC's 2-degree spacing policy and will accept interference from adjacent satellites at the same levels as that of an earth station employing an antenna conforming to the reference patterns defined in § 25.209 and operating in accordance with sections 2.134 of the FCC rules. If the use of the above L3 antennas should cause interference into other systems, Intellicom agrees that it will terminate transmissions immediately upon notice from the affected parties.

Intelsat and SES Americom further state that they will include the subject non-conforming earth station operations in all future satellite network coordinations.

The following document is accepted by the parties identified and signed below:

- Technical Brief, "20060920M01V11pm_TECH_BRIEF.pdf"

Acceptance by Intelsat :

Jose Albuquerque

11 November 2008

Jose Albuquerque
Senior Director, Spectrum Engineering
Intelsat, 3400 International Drive, N.W., Washington D.C. 20008
+1-202-944-6897
jose.albuquerque@intelsat.com

Acceptance by SES Americom:

Jaime D Londono

11 November 2008

Jaime D Londono
SES Americom, 4 Research Way, Princeton, NJ 08540
+1-609-987-4000
Jaime.Londono@ses-amicom.com

Acceptance by Intellicom:

Intellicom testifies that the information provided to Intelsat and reflected in this Affidavit is true and accurate to the best of Intellicom's knowledge.

Paul Moller

11 November 2008

Paul Moller
VP
Intellicom Technologies, Inc., PO Box 27056, San Diego, CA 92198
+1-480-993-2220
PMoller@ITCcom.net
www.ITCcom.net

October 6, 2008

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

Dear Ms. Dortch

Subject: Certification of Telesat Brasil Capacidade de Satélites Ltda, regarding the use of two
(2) Non-Conforming antennas to provide service to vehicle mounted earth stations
(VMES)

Telesat Brasil Capacidade de Satélites Ltda (TBCS) operator of the satellite Estrela do Sul 1 (EDS1 - also known as Telstar 14) at 63.º WL, a satellite on the FCC's Permitted Space Station list, hereby confirms that it is aware of L3 Communications – Titan Corporation's (L3) plans, as represented by Intellicom Technologies, Inc., to utilize two earth station antennas that do not comply with the FCC's antenna performance standards, in §25.209 of the Commission's rules, in a VMES network. The antennas in question are L3's models L3 FSS-4180 and L3 FSS-4180LP (low profile).

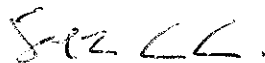
With regard to the use of these antennas to communicate with EDS1, TBCS states:

- i) It is aware that these antennas have the potential to receive interference from adjacent satellite networks that may be unacceptable.
- ii) The proposed operation of the L3 earth stations with these antennas, taking into account the power density at the transmit antenna flange, and the performance characteristics described in L3's application, including the network's required downlink EIRP density, is consistent with the existing coordination agreements for EDS1.
- iii) TBCS will include the use of these antennas on its satellite in all future satellite network coordinations.

TBCS respectfully asks the Commission to approve the use of these antennas, as described in L3's application, to operate in conjunction with the EDS1 satellite.

Should the Commission have any questions in this regard, please contact me at:
fdasilva@telesat.com

Respectfully submitted,



Flavio Da Silva
Manager, Regulatory Engineering

November 26, 2008

Federal Communications Commission – International Bureau
445 12th Street, S.W.
Washington, D.C. 20554

Subject: Affidavit Regarding L3 FSS-4180 Antenna

To whom it may concern:

This letter certifies that Intelsat and Echostar are aware of the application(s) filed by Intellicom Technologies, Inc ("ITC") on behalf of L3 Communications – Titan Corporation ("L3"), to access the following satellites licensed by the Federal Communications Commission ("FCC").

| Orbit (West Lat) | Operator | Description |
|------------------|----------|-------------|
| 74 | Intelsat | H2 |
| 127 | Intelsat | H1 |

The antennas (listed below) are to be deployed in vehicle mounted earth stations and are not compliant with the FCC Part 25 rules with regard to off-axis gain. These antennas exhibit their non-compliance in the region from 1.0 to 7.0 degrees off axis from maximum gain in the transmit band, due to the width of their main gain lobe. The antennas are compliant with the side lobe pattern requirements specified in Section 25.209 of the Commission's Rules for off-axis angles starting at 7.0 degrees in the transmit band. The off-axis EIRP values generated by the terminal in the transmit band are reduced to that of a compliant antenna by decreasing the antenna flange power spectral density¹ of -14 dBW/4KHz by the amount of non-compliance.

Model L3 FSS-4180

- 18" circular aperture
- The amount of non-compliance is 7.7 dB in this range of off-axis angle
- The maximum antenna flange power spectral density² is:
-14 - 7.7 = -21.7 dBW/4kHz

¹ 47 CFR § 25.134

² 47 CFR § 25.134

Model L3 FSS-4180LP (low profile) and FSS-4180LC (low cost)

- 18" w x 13" h elliptical aperture³
- The amount of non-compliance is a function of the rotation of the elliptical antenna relative to the geostationary arc per Table-1. Spectral density limits will be managed manually or automatically based on the geometry within an operating geographical area.
- The maximum antenna flange power spectral density⁴ is per Table-1.

| Table 1 – Rotation of Azimuth Plane Relative to Geostationary Orbit Plane | | |
|---|------------------------------|--|
| Relative Rotation Or Polarization (Degrees) | Increase in Excess Gain (dB) | Maximum Power Spectral Density allowed into the "non-compliant" antenna (dBW/4kHz) |
| 0 | 0 | -21.7 |
| 1 to 10 | 0.3 | -22.0 |
| 11 to 20 | 0.9 | -22.6 |
| 21 to 30 | 1.6 | -23.3 |
| 31 to 40 | 2.2 | -23.9 |
| 41 to 50 | 2.7 | -24.4 |
| 51 to 60 | 3.1 | -24.8 |
| 61 to 70 | 3.4 | -25.1 |
| 71 to 80 | 3.5 | -25.2 |
| 81 to 90 | 3.6 | -25.3 |

These antennas are equipped with automatic tracking systems which result in a pointing accuracy of less than or equal to +/- 0.2 degrees. Additionally the tracking system has a built-in feature to stop uplink transmission while the pointing error accidentally exceeds +/- 0.2 degrees.

³ "Technical Brief for On-The-Move SATCOM Permanent Licensing", Intellicom Technologies, September 3, 2008, filename: 20060920M01V11pm_TECH_BRIEF.pdf.

⁴ 47 CFR § 25.134

Through the use of advanced control systems utilizing Kalman filters, GPS, inertial navigation systems, and various sensors, the total antenna pointing errors are maintained to the following absolute error +/-E:

| | |
|---|--|
| Antenna/Vehicle are NOT in motion | E<0.1°, 100% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion (paved or dirt roads) | E<0.2° Transmitter is Enabled |
| Extreme Terrain Churchville B mobile vehicle conditions | E<0.2°, 95% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion | E>0.2° Transmitter is MUTED |
| Note: Churchville B mobile vehicle conditions are the anticipated most extreme operational conditions. Typically the operational environment will be less severe. | |

In order to prevent unacceptable interference into adjacent satellites, we acknowledge that, except as described above, these antennas will be operated in compliance with the technical, operational, and performance requirements of Part 25 of the FCC rules and any requirements set forth in the licenses granted by the FCC for the above L3 antennas.

ITC acknowledges that the use of the L3 non-conforming antennas will not cause unacceptable interference into adjacent satellites in accordance with the FCC's 2-degree spacing policy and will accept interference from adjacent satellites at the same levels as that of an earth station employing an antenna conforming to the reference patterns defined in § 25.209 and operating in accordance with sections 25.134 of the FCC rules. If the use of the above L3 antennas should cause interference into other systems, ITC agrees that it will terminate transmissions immediately upon notice from the affected parties.

Intelsat and Echostar further state that they will include the subject non-conforming earth station operations in all future satellite network coordinations.

ITC hereby commits to operating the non-conforming antennas that are the subject of this affidavit in accordance with the descriptions and data provided in the following document:

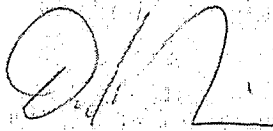
- Technical Brief, "20060920M01V11pm_TECH_BRIEF.pdf"

Acceptance by Intelsat :



Jose Albuquerque
Senior Director, Spectrum Engineering
Intelsat, 3400 International Drive, N.W., Washington D.C. 20008
+1-202-944-6897
jose.albuquerque@intelsat.com

Acceptance by EchoStar:



David Bair
Senior Vice President, Space Programs and Operations
EchoStar Satellite L.L.C., 9601 S. Meridian Blvd., Englewood, CO 80112
303-706-4000 or (303) 723-1068
david.bair@echostar.com

Acceptance by Intellicom:

Intellicom testifies that the information provided to Intelsat and EchoStar and reflected in this Affidavit is true and accurate to the best of Intellicom's knowledge.



Paul Moller
VP
Intellicom Technologies, Inc., PO Box 27056, San Diego, CA 92198
+1-480-993-2220
PMoller@ITCcom.net





December 16, 2008

Federal Communications Commission – International Bureau
445 12th Street, S.W.
Washington, D.C. 20554

Subject: Affidavit Regarding L3 FSS-4180 Antenna

To whom it may concern:

This letter certifies that Intelsat and StarOne are aware of the application(s) filed by Intellicom Technologies, Inc (“ITC”) on behalf of L3 Communications – Titan Corporation (“L3”), to access the following satellites licensed by the Federal Communications Commission (“FCC”).

| Orbit (West Lat) | Operator | Description |
|------------------|----------|-------------|
| 74 | Intelsat | H2 |

The antennas (listed below) are to be deployed in vehicle mounted earth stations and are not compliant with the FCC Part 25 rules with regard to off-axis gain. These antennas exhibit their non-compliance in the region from 1.0 to 7.0 degrees off axis from maximum gain in the transmit band, due to the width of their main gain lobe. The antennas are compliant with the side lobe pattern requirements specified in Section 25.209 of the Commission’s Rules for off-axis angles starting at 7.0 degrees in the transmit band. The off-axis EIRP values generated by the terminal in the transmit band are reduced to that of a compliant antenna by decreasing the antenna flange power spectral density¹ of -14 dBW/4KHz by the amount of non-compliance.

Model L3 FSS-4180

- 18” circular aperture
- The amount of non-compliance is 7.7 dB in this range of off-axis angle
- The maximum antenna flange power spectral density² is:
-14 – 7.7 = -21.7 dBW/4kHz

Model L3 FSS-4180LP (low profile) and FSS-4180LC (low cost)

¹ 47 CFR § 25.134

² 47 CFR § 25.134

- 18" w x 13" h elliptical aperture³
- The amount of non-compliance is a function of the rotation of the elliptical antenna relative to the geostationary arc per Table-1. Spectral density limits will be managed manually or automatically based on the geometry within an operating geographical area.
- The maximum antenna flange power spectral density⁴ is per Table-1.

| Table 1 – Rotation of Azimuth Plane Relative to Geostationary Orbit Plane | | |
|---|------------------------------|--|
| Relative Rotation Or Polarization (Degrees) | Increase in Excess Gain (dB) | Maximum Power Spectral Density allowed into the "non-compliant" antenna (dBW/4kHz) |
| 0 | 0 | -21.7 |
| 1 to 10 | 0.3 | -22.0 |
| 11 to 20 | 0.9 | -22.6 |
| 21 to 30 | 1.6 | -23.3 |
| 31 to 40 | 2.2 | -23.9 |
| 41 to 50 | 2.7 | -24.4 |
| 51 to 60 | 3.1 | -24.8 |
| 61 to 70 | 3.4 | -25.1 |
| 71 to 80 | 3.5 | -25.2 |
| 81 to 90 | 3.6 | -25.3 |

These antennas are equipped with automatic tracking systems which result in a pointing accuracy of less than or equal to +/- 0.2 degrees. Additionally the tracking system has a built-in feature to stop uplink transmission while the pointing error accidentally exceeds +/- 0.2 degrees.

³ "Technical Brief for On-The-Move SATCOM Permanent Licensing", Intellicom Technologies, September 3, 2008, filename: 20060920M01V11ipm_TECH_BRIEF.pdf.

⁴ 47 CFR § 25.134

Through the use of advanced control systems utilizing Kalman filters, GPS, inertial navigation systems, and various sensors, the total antenna pointing errors are maintained to the following absolute error +/-E:

| | |
|--|--|
| Antenna/Vehicle are NOT in motion | E<0.1°, 100% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion (paved or dirt roads) | E<0.2° Transmitter is Enabled |
| Extreme Terrain Churchville B mobile vehicle conditions | E<0.2°, 95% of the time Transmitter is Enabled |
| Antenna/Vehicle are in motion | E>0.2° Transmitter is MUTED |
| Note: Churchville B mobile vehicle conditions are the anticipated most extreme operational conditions. Typically the operational environment will be less severe. | |

In order to prevent unacceptable interference into adjacent satellites, we acknowledge that, except as described above, these antennas will be operated in compliance with the technical, operational, and performance requirements of Part 25 of the FCC rules and any requirements set forth in the licenses granted by the FCC for the above L3 antennas.

ITC acknowledges that the use of the L3 non-conforming antennas will not cause unacceptable interference into adjacent satellites in accordance with the FCC's 2-degree spacing policy and will accept interference from adjacent satellites at the same levels as that of an earth station employing an antenna conforming to the reference patterns defined in § 25.209 and operating in accordance with sections 25.134 of the FCC rules. If the use of the above L3 antennas should cause interference into other systems, ITC agrees that it will terminate transmissions immediately upon notice from the affected parties.

Intelsat and Star One further state that they will include the subject non-conforming earth station operations in all future satellite network coordinations.

ITC hereby commits to operating the non-conforming antennas that are the subject of this affidavit in accordance with the descriptions and data provided in the following document:

- Technical Brief, "20060920M01V11pm_TECH_BRIEF.pdf"



Acceptance by Intelsat :



Jose Albuquerque
Senior Director, Spectrum Engineering
Intelsat, 3400 International Drive, N.W., Washington D.C. 20008
+1-202-944-6897
jose.albuquerque@intelsat.com

Acceptance by Star One:



Hélcio Sarapecck Ribeiro Pinto
Manager
Spectrum Engineering
Star One
Av Pres Vargas, 1012 – 6o andar – Centro Rio de Janeiro – RJ
+ 55 21 2121-7420
helcio.sarapecck@starone.com.br

Acceptance by Intellicom:

Intellicom testifies that the information provided to Intelsat and EchoStar and reflected in this Affidavit is true and accurate to the best of Intellicom's knowledge.



Paul Moller
VP
Intellicom Technologies, Inc., PO Box 27056, San Diego, CA 92198
+1-480-993-2220
PMoller@ITCcom.net



**TECHNICAL OPERATIONAL COORDINATION AGREEMENT
FOR THE JOINT USAGE OF THE BAND 14.0 - 14.5 GHz
BETWEEN THE NATIONAL SCIENCE FOUNDATION AND
LAND MOBILE SATELLITE SERVICE EARTH STATIONS (LMSS)
OPERATED BY L-3 COMMUNICATIONS**

20090929M01V08_NSF_ITC_Coordination.doc
03 December 2009

Radio Astronomy observations are conducted in the 14.47-14.5 GHz band in the USA at a number of Radio Astronomy sites. L-3 Communications desires to operate a network of Land Mobile Satellite Service earth stations in the continental United States only, which will operate in the 14.0 to 14.5 GHz transmit and the 11.7 to 12.2 GHz receive band. The proposed agreement is intended to facilitate operation of the L-3 system, without causing interference to Radio Astronomy stations.

1. General Information

- 1.1 The band **14.47 to 14.5 GHz** is allocated to the radio astronomy service on a secondary basis.
- 1.2 The band 14.0 – 14.5 GHz is also allocated in the United States to the Land Mobile Satellite Service (“LMSS”) on a secondary basis, provided that LMSS stations include special protection to radio astronomy stations that observe in this band.
- 1.3 L-3 Communications plans to file an application with the FCC to operate up to four hundred (400) technically identical transmit/receive On-The-Move satellite earth stations to operate in the 11.7 – 12.2 and 14.0 – 14.5 GHz frequency bands.
- 1.4 This agreement document has been developed to govern the use of all L-3 Communications On-The-Move stations operating in CONUS to ensure the protection of radio astronomy stations operations in the 14.47 to 14.5 band.
- 1.5 The Electromagnetic Spectrum Unit of the National Science Foundation (NSF) has the authority to negotiate and sign this agreement for the radio astronomy sites listed in Section 2.1, and Intellicom Technologies on behalf of L-3 Communications has the authority to negotiate and sign this agreement.

2. List of NSF supported Radio Astronomy observatories observing or planning to observe in the band 14.47 - 14.5 GHz within the US and its territories

- 2.1 The following is a list of ten radio astronomy sites supported by NSF that are included in this agreement. Two of these sites, Green Bank, WV and Socorro, NM, require more stringent levels of protection, while the remaining eight sites, which are associated with the Very Long Baseline Array (VLBA), require less stringent protection. See section 3.1 below.

| Name | Latitude (deg N) | Longitude (deg E) | Type |
|------------------|------------------|-------------------|----------------|
| Green Bank, WV | 38.4331 | -79.8397 | SINGLE DISH |
| Socorro, NM | 34.0789 | -107.6183 | INTERFEROMETER |
| Brewster, WA | 48.1311 | -119.6833 | VLBA |
| Owens Valley, CA | 37.2317 | -118.2769 | VLBA |

| | | | |
|-------------------|---------|-----------|------|
| Kitt Peak, AZ | 31.9564 | -111.6125 | VLBA |
| Pie Town, NM | 34.3011 | -108.1192 | VLBA |
| Los Alamos, NM | 35.775 | -106.2456 | VLBA |
| Fort Davis, TX | 30.635 | -103.9447 | VLBA |
| North Liberty, IA | 41.7714 | -91.5742 | VLBA |
| Hancock, NH | 42.9336 | -71.9866 | VLBA |

This list of stations is subject to change. NSF shall give Intellicom on behalf of L-3 Communications no less than 2 months advance notice of changes in the status of existing sites, or of any additional radio astronomy site being brought into use in the 14.47 - 14.5 GHz band. In case of any change to this list of stations, either party may reopen this agreement to address issues arising in connection with such change.

3. Technical Operational Coordination Agreement

NSF and L-3 Communications agree to the following:

- 3.1 The purpose of this agreement is to provide protection to the radio astronomy sites listed in Section 2.1 in the 14.47 - 14.5 GHz band to the following aggregate pfd levels within that band:
 - -221 dB(W/m²/Hz) for the Green Bank and Socorro sites
 - -189 dB(W/m²/Hz) for the eight CONUS VLBA sites
- 3.2 This agreement shall be reviewed on an **annual basis** by all parties signing this document beginning within one year after L-3 Communications has informed NSF of the start of service in CONUS under an operational license. The purpose of this review is to assess the effectiveness of this agreement as well as to update as applicable this or successor operational coordination agreements.
- 3.3 Each party shall inform the other party in a timely manner of changes in the **points of contact** as defined in Section 5.

L-3 Communications agrees to:

3.4 Prevent transmissions from any LMSS that would exceed the threshold given in Section 3.1 above. Based on L-3's technical parameters and operational characteristics agreed to during direct communications with Intellicom on behalf of L-3 Communication/NSF coordination discussions, L-3 will achieve this by ensuring that the L-3 terminals do not transmit within the sub-band 14.47 - 14.5 GHz, and will not operate within exclusion zones around the radio astronomy sites listed in Section 2.1. The agreed upon separation distances for each NSF type are shown below:

| | |
|---|-------|
| Green Bank, WV (GBT)..... | 25 km |
| Socorro, NM (VLA)..... | 25 km |
| Seven Very Long Baseline Array (VLBA) Sites | |
| Other Than Hancock, NH | 25 km |
| VLBA Site at Hancock, NH..... | 25 km |

Until such time as L-3 Communication terminals are able to coordinate based on both time and location (data logging), the terminals will not operate when within the given separation distances of the observatories. In the future, if L-3 Communications terminals add the ability to coordinate based on time, restrictions on use will only apply when the terminals are within the specified separation distances and the observatory is scheduled to be observing in this band.

NSF agrees to:

3.5 Maintain an observation schedule for the band 14.47 - 14.5 GHz for the sites listed in Section 2.1 and make this schedule available upon request to the designated L-3 Communications point-of-contact listed in Section 5.2, upon notification that L-3's terminals have achieved the capability of coordinating frequency use based upon time.

3.6 Provide, through NRAO, full access to L-3 Communications representatives to data on interference that may be collected during observations that fall within the scope of this agreement.

4. Assignment and Termination

4.1 This agreement shall be binding upon the parties hereto and their respective successors and assigns.

4.2 This agreement may be terminated by the written mutual agreement of the parties, upon 6 months notice.

5 Points of Contact

5.1 Points of contact concerning this agreement.

| | |
|--|--|
| Name: Dr. Andrew Clegg | Name: Paul Moller |
| Organization: National Science Foundation | Organization: Intellicom Technologies |
| Title: Electromagnetic Spectrum Manager | Title: VP Engineering |
| Address: 4201 Wilson Boulevard, Room 1030 | Address: 1335 W Shellfish Dr |
| City State Zip: Arlington VA 22230 | City State Zip: Gilbert, AZ 85233 |
| Phone: (703) 292-4892 | Phone: (480) 993-2220 |
| Fax: (703) 292-9034 | Fax: (425) 940-7361 |
| E-mail: esm@nsf.gov | E-mail: PMoller@ITCcom.net |

5.2 Contacts concerning the notification of radio astronomy observation schedules:

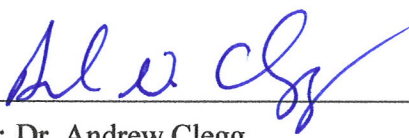
| | |
|--|--|
| Name: Dr. Harvey Liszt | Name: William Harbison |
| Title: Director, Spectrum Management | Title: Engineering Manager |
| Organization: NRAO | Organization: L-3 Communications |
| Address: NRAO 520 Edgemont Road Charlottesville, VA 22903-2475 | Address: L-3 Communications 3033 Science Park Rd San Diego, CA 92121 |
| Phone 434.296.0344 | Phone: 800-331-9401, (858) 342-8688 |
| Fax: 434.296.0278 | Fax: (858) 552-9660 |
| E-mail: hliszt@nrao.edu | E-mail: William.Harbison@l-3com.com |

6 Signatures


This Agreement is being made in good faith by both parties and is effective on the date on which the last party signs it. It may be executed in one or more counterparts, each of which will be deemed an original and all of which together will constitute one and the same instrument.

For the National Science Foundation

For Intellicom Technologies, Inc.

By: 

Name: Dr. Andrew Clegg
Title: Electromagnetic Spectrum Manager

By:  Paul Moller
2009.12.03
15:38:59 -07'00'

Name: Paul Moller
Title: Vice President, Engineering

Date: December 8th 2009

Date: December 3, 2009

Technical Annex

This annex shows the calculations upon which the coordination distances were based. The operating parameters of L-3 Communication On-The-Move terminals and technical data upon which the calculations are based are as follows:

| | In-Band | Out-of-Band |
|---|-------------------------------|-------------------------------|
| Maximum Power | 43 dBm | 43 dBm |
| Maximum PSD | -21.7 dB(W/4 kHz) | -21.7 dB(W/4 kHz) |
| Maximum PSD | -57.7 dB(W/Hz) | -57.7 dB(W/Hz) |
| Minimum Elevation | 20 degrees | 20 degrees |
| Gain at 20 Degrees Off Main Beam | 3 dBi | 3 dBi |
| EIRP PSD Towards Horizon | -54.7 dB(W/Hz) | -54.7 dB(W/Hz) |
| Transmit PSD | -54.7 dB(W/Hz) | -54.7 dB(W/Hz) |
| OOB Supression | 0 dB | -70 dB |
| In-Band EIRP | -54.7 dB(W/Hz) | -124.7 dB(W/Hz) |
| Wavelength @ 14.5 GHz | 0.02 m | 0.02 m |
| Isotropic Collecting Area | 3.4E-05 m ² | 3.4E-05 m ² |
| Isotropic Collecting Area | -44.7 dB(m ²) | -44.7 dB(m ²) |
| Green Bank, VLA, Arecibo Objective | -221 dB(W/m ² /Hz) | -221 dB(W/m ² /Hz) |
| Green Bank, VLA, Arecibo Objective | -265.7 dB(W/Hz) | -265.7 dB(W/Hz) |
| Required Prop Loss to meet GB/VLA/AO Obj | -211.0 dB | -141.0 dB |
| VLBA Objective | -189 dB(W/m ² /Hz) | -189 dB(W/m ² /Hz) |
| VLBA Objective | -233.7 dB(W/Hz) | -233.7 dB(W/Hz) |
| Required Prop Loss to meet VLBA Obj | -179.0 dB | -109.0 dB |

Because On-The-Move terminals will not operate in-band, the required propagation loss to meet radio astronomy objectives is 141 dB. This loss objective can be met with a separation of at least 25 km, assuming free space loss.