COMSEARCH

Electronic Filing

December 2, 2002

FEDERAL COMMUNICATIONS COMMISSION
Experimental Radio Service
P.O. Box 358320
Pittsburgh, PA 15251-5320

Dear Sir or Madam:

This letter is to request an Special Temporary Authority (STA) to operate transmitters in certain selected bands between 11.7 GHz to 12.2 GHz, and 14.0 to 14.5 at locations in the continental United States as described below. In accordance with 47 CFR chapter 1, (10-1-00 edition), section 5.61, the attached Exhibit A – System Description is being provided to support the application.

EMS is planning a DVB-RCS platform to be used for a satellite 2-way broadband access demonstrations to customers for a limited period of time. Demonstrations are to begin around December 15, 2002 and will run until September 15, 2003. Comsearch respectfully requests the FCC to expedite the approval of this STA request. If you have any questions please call.

Sincerely,
COMSEARCH

Kenneth G. Ryan
Director, Spectrum Management Services
(703) 726-5685
kryan@comsearch.com

Exhibit A– System Description

A.1 - Name, address, phone number of the applicant.

EMS Technologies
21025 Trans Canada Highway
Ste-Anne-De-Bellevue, Quebec
Canada, H9X 3R2

Contact:
EMS Satellite Networks
Roderick Green

514 457-2150 ext. 3402

A.2 - Description of why a Special Temporary Authority (STA) is needed.

EMS Technologies is developing a project to test a DVB-RCS platform out of a satellite earth station hub Montreal, Canada, into remote terminal sites located at potential customer sites within the continental United States. EMS would like to deploy up to ten identical terminals which would be used, for a limited time, for a satellite 2-way broadband access demonstration to customers.

The reason for the STA request is to perform outdoor demonstrations between the hub location in Montreal, Canada and selected CONUS terminals. It is anticipated that these demonstrations will required an STA for at least six (6) months time frame.

A.3 Description of the operation to be conducted and its purpose

EMS will perform real-time satellite link testing of their DVB equipment using a hub earth station located in Montreal, Canada and up to ten US based transmit-receive VSATs, located at various locations in CONUS. Initially it is anticipated that the remote terminals will communicate with either SES AMC 6 satellite at 72 West Longitude or Panamsat Galaxy 10R at 123 West Longitude. It is requested that the STA be granted for operation with all permitted space stations between 72 and 123 W.L.

The points of contact for each transmitting site are as follows:

Myron Oleskewycz
EMS Satellite Networks Operations
514 457-2150 ext. 3225

A.4 Time and dates of proposed operation.

There will be demonstration sessions, from the remote CONUS locations. It is anticipated that tests will be run during business hours and on weekends during daylight, beginning around December 15^{th}, 2002, and extending until about September 15^{th}, 2003.

A.5 Class of station

The transmitters, at all CONUS locations, will be identical and will be fixed all of the time.

A.6 Description of the location and, if applicable, geographic coordinates of the proposed operation.

All transmitting signals will originate from Ku-band VSAT terminals located on rooftops or at secure ground locations within the continental United States.

A.7 Equipment to be used, including name of manufacturer, model and number of units.

The VSATs will use a Channel Master 1.2 meter antenna, model # 123, and 2 watt RFT transmitting at 1.8 watts. The 1.2 meter antenna gain is 43.3 dBi, the maximum EIRP out of both transmitting locations is 45.9 dBW. All remote sites will have the same VSAT configurations.

A.8 Frequencies Desired

The tests will be performed in the US domestic FSS Ku-band. Transmissions will be between 14,000 and 14,500 MHz and reception will be between 11,700 and 12,200 MHz.

A.9 Maximum effective radiated power (ERP) or equivalent isotropically radiated power (EIRP)

The transmit earth stations are Channel Master 1.2 meter earth stations (Model 123), with a gain of 43.3 dBi (at 14.25 GHz). The high powered amplifier is rated for 2 watts maximum. The maximum total EIRP at the feed flange of the earth stations will be 45.9 DBW, or a total RF power of 1.82 Watts.

A.10 Emission designator and description of emission (bandwidth, modulation, etc.)

The VSAT return link transmission is digital data at 210 ksps in an allocated bandwidth of 360 kHz. The received emission is a digital DVB signal at 7373 kbps in an allocated bandwidth of 11 MHz.

A.11 Overall height of antenna structure above the ground

It is anticipated that some of the transmitters will be roof mounted no higher than 6' above roof top level.

EXHIBIT B

SATELLITE EARTH STATION DATA
12/02/2002

Company	EMS
Earth Station Name, State	CONUS
Latitude (DMS) (NAD83)	N/A
Longitude (DMS) (NAD83)	N/A
Ground Elevation AMSL (Ft/m)	N/A
Antenna Centerline AGL (Ft/m)	5 ft
Receive Antenna Type: CM123	FCC Reference 32-25LOG(THETA)
12.0 GHz Gain (dBi) / Diameter (m)	41.8 / 1.2
3 dB / 15 dB Half Beamwidth	0.75 / 1.50
Transmit Antenna Type: CM123	FCC Reference 32-25LOG(THETA)
14.0 GHz Gain (dBi) / Diameter (m)	43.3 / 1.2
3 dB / 15 dB Half Beamwidth	0.60 / 1.20
Operating Mode	TRANSMIT AND RECEIVE
Modulation	DIGITAL
Emission / Receive Band (MHz)	11M0G7D / 11700.0000 - 12200.0000
Emission / Transmit Band (MHz)	360KG7D / 14000.0000 - 14500.0000
Max. Available RF Power (dBW)/4 kHz)	-16.00
(dBW)/MHz)	8.00
Max. EIRP (dBW)/4 kHz)	27.30
(dBW)/MHz)	51.30
(dBW)	45.90
Max permissible Interference Power	
12.0 GHz, 20% (dBW/1 MHz)	-165.0
12.0 GHz, 0.0100% (dBW/1 MHz)	-155.0
14.0 GHz, 20% (dBW/4 kHz)	-151.0
14.0 GHz, 0.0025% (dBW/4 kHz)	-128.0
Range of Satellite Arc (Geostationary) Degrees Longitude	72.0 W / 123.0 W
Azimuth Range (Min/Max)	N/A
Corresponding Elevation Angles	N/A

Exhibit C – Radiation Hazard Study

Analysis of Non-Ionizing Radiation
for a 1.2 Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 1.2 meter earth station system. The analysis and calculations performed in this report are in compliance with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/ Uncontrolled environment are shown in Table 1. The General Population/ Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure(MPE)

Frequency Range (MHz)	Power Density (mWatts/cm**2)
30-300	0.2
300-1500	Frequency(MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure(MPE)

Frequency Range (MHz)	Power Density (mWatts/cm**2)
30-300	1.0
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	5.0

Table 3 contains the parameters that are used to calculate the various power densities for the earth stations.

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Abbreviation	Value	Units
Antenna Diameter	D	1.2	meters
Antenna Surface Area	Sa	II * D**2/4	meters**2
Feed Flange Diameter	Df	7.6	cm
Area of Feed Flange	Fa	II * Df**2/4	cm**2
Frequency	Frequency	14250	MHz
Wavelength	lambda	300/frequency(MHz)	meters
Transmit Power	P	1.8	Watts
Antenna Gain	Ges	43.3	dBi
Pi	II	3.1415927	n/a
Antenna Efficiency	n	0.67	n/a

1. Far Field Distance Calculation

The distance to the beginning of the far field can be determined from the following equation:(1)

Distance to the Far Field Region,(Rf) = 0.60 * D**2 / lambda (1)
= 41.0 meters

The maximum main beam power density in the Far Field can be determined from the following equation:(2)

On-Axis Power Density in the Far Field,(Wf) = Ges * P / 4 * II * Rf**2 (2)
= 1.818 Watts/meters**2
= 0.182 mWatts/cm**2

2. Near Field Calculation

Power flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region the power density from the antenna decreases linearly with respect to increasing distance.

The distance to the end of the Near Field can be determined from the following equation:(3)

Extent of the Near Field,(Rn) = D**2 / (4 * lambda) (3)
= 17.1 meters

The maximum power density in the Near Field can be determined from the following equation:(4)

Near Field Power Density,(Wn) = 16.0 * n * P / II * D**2 (4)
= 4.245 Watts/meters**2
= 0.424 mWatts/cm**2

3. Transition Region Calculations

The Transition region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The maximum power density in the Transition region will not exceed that calculated for the Near Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance Rt can be determined from the following equation:(5)

```
Transition region Power Density,(Tt) = Wn * Rn / Rt                 (5)
                                     =  0.424 mWatts/cm**2
```

4. Region between Feed Assembly and Antenna Reflector

Transmissions from the feed assembly are directed toward the antenna reflector surface, and are confined within a conical shape defined by the type of feed assembly. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the feed assembly and reflector surface can be calculated by determining the power density at the feed assembly surface. This can be determined from the following equation:(6)

```
Power Density at Feed Flange,(Wf) = 4 * P / Fa                      (6)
                                  =  158.714 mWatts/cm**2
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5. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the feed assembly. The area is now the area of the reflector aperture and can be determined from the following equation:(7)

```
Power Density at the Reflector Surface,(Ws) = 4 * P / Sa            (7)
                                            =  6.366 Watts/meters**2
                                            =  0.637 mWatts/cm**2
```

6. Region between Reflector and Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and ground can be determined from the following equation:(8)

```
Power Density between Reflector and Ground,(Wg) = P / Sa            (8)
                                                =  1.592 Watts/meters**2
                                                =  0.159 mWatts/cm**2
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Table 4. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Calculated Maximum Radiation Power Density Level (mWatts/cm**2)	Hazard Assessment
1. Far Field (Rf) = 41.0 meters	0.182	Satisfies FCC MPE
2. Near Field (Rn) = 17.1 meters	0.424	Satisfies FCC MPE
3. Transition Region Rn < Rt < Rf, (Rt)	0.424	Satisfies FCC MPE
4. Between Feed Assembly and Antenna Reflector	158.714	Potential Hazard
5. Main Reflector	0.637	Satisfies FCC MPE
6. Between Reflector and Ground	0.159	Satisfies FCC MPE

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region	Calculated Maximum Radiation Power Density Level (mWatts/cm**2)	Hazard Assessment
1. Far Field (Rf) = 41.0 meters	0.182	Satisfies FCC MPE
2. Near Field (Rn) = 17.1 meters	0.424	Satisfies FCC MPE
3. Transition Region Rn < Rt < Rf, (Rt)	0.424	Satisfies FCC MPE
4. Between Feed Assembly and Antenna Reflector	158.714	Potential Hazard
5. Main Reflector	0.637	Satisfies FCC MPE
6. Between Reflector and Ground	0.159	Satisfies FCC MPE

It is the applicant's responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

7. Conclusions

Based on the above analysis it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the earth station's operating personnel. The transmitter will be turned off during antenna maintenance so that the FCC MPE of 5.0 mW/cm**2 will be complied with for those regions with close proximity to the reflector that exceed acceptable levels.