<u>United Teleports</u>
7 Meter Gateway Earth Station License Application

Technical Appendix

I. Supplemental Schedule S Technical Information

1. PURPOSE AND SCOPE

The purpose of this Attachment is to provide the Commission with the technical characteristics of the EUTELSAT 65 WEST A ("E65WA") satellite in support of the earth station application filed by United Teleports. This attachment, prepared with the cooperation of the satellite operator Eutelsat do Brasil LTDA ("Eutelsat"), contains information required by the Commission that cannot be entered online into the Schedule S submission.

2. GENERAL DESCRIPTION

Eutelsat operates the E65WA satellite at the nominal 65° W.L. location. The satellite is capable of providing a wide range of FSS services using the C-, Ku- and Ka-bands. For purposes of the instant application, U.S. market access is being sought only for Ku-band uplink frequencies. Accordingly, only the characteristics of the Ku-band payload are described herein and in the Schedule S submission.

The Ku-band frequencies used by the satellite are the International Telecommunications Union ("ITU") Appendix 30B bands: 12.75-13.25 GHz uplink band and the 10.7-10.95 GHz and 11.2-11.45 GHz downlink bands. The satellite employs twenty-four 36 MHz Ku-band transponders. There are two Ku-band beams in both the uplink and downlink directions: the "South American" beam, which includes coverage of southern Florida, and the Brazil beam. Twelve transponders are switchable between the South American and Brazil beams.

3. FREQUENCY PLAN AND POLARIZATION

The E65WA satellite's Ku-band frequency and polarization plan, including beam connectivity options, are provided in the associated Schedule S submission. The satellite provides full frequency reuse as required by Section 25.210(f) of the Commission's rules, 47 C.F.R. § 25.210(f)

4. SPACE STATION TRANSMIT & RECEIVE CAPABILITIES

The transmit and receive antenna gain contours of the satellite's Ku-band beams are provided in GXT format and are embedded in the associated Schedule S submission. The maximum EIRP and EIRP densities for each of the downlink beams are listed in Table 1. Also listed are the maximum and minimum saturating flux-density ("SFD") levels, referenced at the beam peak, for each of the uplink beams.

Table 1. Maximum Downlink EIRP and EIRP Densities. Maximum and Minimum SFD's.

Beam	Maximum Downlink EIRP (dBW)	Maximum Downlink EIRP Density (dBW/Hz)	Maximum SFD (dBW/m^2)	Minimum SFD (dBW/m^2)
Brazil	51.9	-23.0	-70	-92
South America	50.4	-23.0	-70	-92

In addition, authorized uplink transmissions towards the E65WA satellite will not exceed an input power density of -47 dBW/Hz. The E65WA satellite network will be operated in a manner consistent with ITU coordination agreements reached by Brazil.

5. ARRANGEMENT FOR TELEMETRY, TRACKING & COMMUNICATIONS

Telemetry, tracking and communications ("TT&C") will not be conducted from U.S. territory. The satellite control center and primary TT&C site is located in Brazil. The backup TT&C site is located in Portugal.

Information for the satellite control center and TT&C stations is provided below:

Satellite Control Center and Primary TT&C Station:

Avenida Valville, 450 – Sítio Tanquinho – Santana do Parnaíba
SP CEP 06532-010, Brazil
24/7 contact phone numbers: +55 11 2110-3365 / +55 11 2110-3353 / +55 11 4196-5594

Backup TT&C Station Location:

Zona Franca Industrial da Madeira – Lote 27 B/C 9200-047 Caniçal, Madeira, Portugal

Contact phone number: +351 291 969 905

6. POWER FLUX DENSITY ANALYSIS

The Commission's Part 25 rules do not contain power flex density ("PFD") limits applicable to the ITU Appendix 30B downlink bands at 10.7-10.95 GHz and 11.2-11.45 GHz. However, it is noted that Article 21 of the ITU Radio Regulations includes PFD limits that are applicable to GSO satellites using these bands. The ITU limits are identical to those of Section 25.208(b) of the Commission's rules, 47 C.F.R. § 25208(b).

Tables 2 and 3 show the PFD levels that will occur at various angles of arrival for the two downlink beams when transmitting with a maximum downlink EIRP density of -23 dBW/Hz. These two tables demonstrate compliance with the ITU's Article 21 PFD limits.

Table 2. Maximum PFD Levels of Beam SADH

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4$ kHz)	PFD Margin (dB)
0°	-150.0	-163.4	-20	-170.4	20.4
5°	-150.0	-163.3	-19	-169.3	19.3
10°	-147.5	-163.2	-17	-167.1	19.6
15°	-145.0	-163.0	-14.8	-164.8	19.8
20°	-142.5	-162.9	-14.6	-164.5	22.0
25°	-140.0	-162.8	-14.2	-164.0	24.0
72.4° (Peak)	-140.0	-162.1	0.0	-149.1	9.1

Table 3. Maximum PFD Levels of Beams BDH and BDV

Angle of Arrival	Applicable PFD Limit for Angle of Arrival ($dBW/m^2/4$ kHz)	Spreading Loss (dBW/m^2)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival ($dBW/m^2/4$ kHz)	PFD Margin (dB)
0°	-150.0	-163.4	-20	-170.4	20.4
5°	-150.0	-163.3	-19	-166.1	19.3
10°	-147.5	-163.2	-19	-165.3	21.6
15°	-145.0	-163.0	-18	-164.2	23.0
20°	-142.5	-162.9	-17	-163.1	24.4
25°	-140.0	-162.8	-16	-160.0	25.8
66.4° (Peak)	-140.0	-162.2	0.0	-149.2	9.2

This information is provided for completeness; United Teleports does not seek to downlink from the E65WA satellite in the United States.

7. TWO-DEGREE COMPATIBILITY ANALYSIS

This section demonstrates that the E65WA satellite network's operations are two-degree compatible.

Currently there are no operational Ku-band satellites two degrees away from the nominal 65° W.L. location using the Appendix 30B bands, nor are there any pending applications before the Commission requesting to use the Ku-band at a location two degrees or less from the nominal 65° W.L. location. In order to demonstrate two-degree compatibility, the transmission parameters of the E65WA satellite network have been used as both the wanted and interfering transmissions.

Table 4 provides a summary of the typical transmission parameters used by the E65WA satellite network and which were used in the interference analysis.

Table 5 shows the results of the interference calculations in terms of the overall C/I margins. The interference calculations assume a 1 dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of 29-25 log(θ). The C/I calculations were performed on a per Hz basis.

These tables indicate that all the C/I margins are positive, thereby demonstrating the two-degree compatibility of the E65WA satellite network.

Table 4. Typical Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	49K0G7W	0.0486	42.4	41.0	12.3	56.5	16.5
2	1M34G7W	1.34	53.9	59.7	30.8	47.2	16.5
3	6M33G7W	6.33	53.9	67.1	38.2	44.7	17.7
4	10M0G7W	10.0	57.3	70.1	40.9	44.7	16.5
5	36M0G7W	36.0	57.3	79.1	48.9	41.1	20.5

Table 5. Summary of the overall link C/I margins (dB).

		Interfering Carriers				
	Carrier ID	1	2	3	4	5
Wanted Carriers	1	5.4	10.9	10.2	11.3	8.3
	2	8.5	9.4	8.8	8.4	5.9
	3	7.2	6.7	6.1	5.6	3.1
	4	9.3	8.8	8.1	7.5	5.1
	5	6.3	3.9	3.3	2.6	0.1

8. ORBITAL DEBRIS MITIGATION PLAN

8.1 Spacecraft Hardware Design

Eutelsat confirms that the E65WA satellite, based on the Space Systems Loral 1300 series spacecraft, will not undergo any planned release of debris during its operation. Furthermore, all separation and deployment mechanisms, and any other potential source of debris, will be retained by the spacecraft.

In conjunction with Space Systems Loral, Eutelsat has assessed and limited the probability of the satellite becoming a source of debris by collisions with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. Eutelsat has taken steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems.

The EW65A satellite includes separate TT&C and propulsion subsystems that are necessary for end-of-life disposal. The spacecraft TT&C system, vital for orbit raising, is extremely rugged with regard to meteoroids smaller than 1 cm, by virtue of its redundancy, shielding, separation of components and physical characteristics. Omni-directional antennas are mounted on opposite sides of the spacecraft. These antennas are extremely rugged and capable of providing adequate coverage even if struck, bent or otherwise damaged by a small or medium sized particle. Either one of the two omni-directional antennas, for both command and telemetry, will be sufficient to enable orbit raising.

The redundant command receivers and decoders and redundant telemetry encoders and transmitters are located within a shielded area. A single rugged thruster and shielded propellant tank provides the energy for orbit-raising. Otherwise, there are no single points of failure in the system.

8.2 Minimizing Accidental Explosions

In conjunction with Space Systems/Loral, Eutelsat has assessed and limited the probability of accidental explosions during and after completion of mission operations. The satellite manufacturer has taken steps to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite.

In particular, the satellite manufacturer advises that burst tests are performed on all pressure vessels during qualification testing to demonstrate a margin of safety against burst. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. All batteries and fuel tanks are monitored for pressure and temperature. Excessive battery charging or discharging is limited by a monitoring and control system which will automatically limit the possibility of fragmentation.

Corrective action, if not automatically undertaken, will be immediately undertaken by the spacecraft operator to avoid destruction and fragmentation. Thruster temperatures, impulse and thrust duration are carefully monitored, and any thruster may be turned off via redundant valves. Consequently, there is no possibility of explosion during the operating mission. Space Systems/Loral has also conducted a failure mode effects and criticality analysis as part of the design process.

In order to ensure that the spacecraft has no explosive risk after it has been successfully de-orbited, all stored energy onboard the spacecraft will be removed. Upon successful de-orbit of the spacecraft, all propulsion lines and latch valves will be vented and left open. Battery chargers will be turned off and all batteries will be left in a permanent discharge state.

8.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the E65WA satellite, Eutelsat has reviewed the lists of FCC licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, satellite networks for which a request for coordination has been published by the ITU within ±0.2 degrees of 65.2° W.L. have also been reviewed.

The Brazilian satellite operator Star One operates the STAR ONE C1 satellite at the 65.0° W.L orbital location. The satellite operates with an east-west station-keeping tolerance of ±0.05°. The E65WA satellite operates at 65.2° W.L, and with an east-west station-keeping tolerance of ±0.05°, thereby eliminating the possibility of any station-keeping volume overlap with the STAR ONE C1 satellite.

There are no pending applications before the Commission requesting authorization to use an orbital location within ±0.2° of 65.2° W.L. and Eutelsat is not aware of any satellite with an overlapping station-keeping volume with the E65WA satellite that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

Based on the preceding discussion, Eutelsat concludes that physical coordination of the E65WA satellite with another party is not required at the present time.

8.4 Post-Mission Disposal Plan

At the end of the operational life of the E65WA satellite, it will be maneuvered to a disposal orbit with a minimum perigee of 300 km above the normal GSO operational orbit. This proposed disposal orbit altitude is based on the following calculation, as required by Section 25.283:

Total Solar Pressure Area "A" = 97.5 m^2
"M" = Dry Mass of Satellite = 2757.5 kg
"C_R" = Solar Pressure Radiation Coefficient = 1.24

Therefore, the Minimum Disposal Orbit Perigee Altitude is:

= 36,021 km + 1000 x C_R x A/M
= 36,021 km + 1000 x 1.24 x 97.5/2757.5
= 36,035 km
= 279 km above GSO (35,786 km)

To provide margin, the nominal disposal orbit will be increased to 300 km. This will require 10.8 kg of propellant that will be reserved, taking account of all fuel measurement uncertainties, to perform the final orbit-raising maneuvers.

9. ITU Filings

The E65WA satellite network operates under the following two ITU Appendix 30B filings:

B-SAT-3R – AP30B/A6A/254 published in IFIC 2744.
B-SAT-3R-1 – AP30B/A6A/333 published in IFIC 2774.

II. Radiation Hazard Study

Scientific-Atlanta 7 Meter Gateway Earth Station

This study analyzes the non-ionizing radiation levels for a Scientific-Atlanta 7 meter gateway earth station antenna transmitting in the 12.75-13.25 GHz band. 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.

Bulletin No. 65 specifies that there are two separate tiers of exposure limits that are dependent on the area of exposure and/or the status of the individuals who are subject to the exposure -- the General Population/Uncontrolled Environment and the Controlled Environment, where the general population cannot access.

The maximum level of non-ionizing radiation to which individuals may be exposed is limited to a power density level of 5 milliwatts per square centimeter (5 mW/cm^2) 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/cm^2) averaged over any 30 minute period in a uncontrolled environment.

In the normal range of transmit powers for satellite antennas, the power densities at or around the antenna surface are expected to exceed safe levels. The purpose of this study is to determine the power flux density levels for the earth station under study as compared with the MPE limits. This comparison is done in each of the following regions:

1. Far-field region
2. Near-field region
3. Transition region
4. The region between the subreflector or feed and main reflector surface
5. The main reflector region
6. The region between the antenna edge and the ground

Input Parameters

The following input parameters were used in the calculations:

Parameters:	Value	Unit	Symbol
Antenna Diameter	7	m	*D*
Antenna Transmit Gain	57.3	dBi	*G*
Transmit Frequency	13000	MHz	*f*
Subreflector Diameter	61	cm	*d*
Power Input to the Antenna	1000	W	*P*

Calculated Parameters:

The following values were calculated using the above input parameters and the corresponding formulas:

Parameter	Value	Unit	Symbol	Formula
Antenna Surface Area	38.48	m^2	A	$\pi D^2/4$
Area of Subreflector	2922.5	cm^2	a	$\pi d^2/4$
Antenna Efficiency	0.59		η	$G\lambda^2/(\pi^2 D^2)$
Gain Factor	537232		g	$10^{G/10}$
Wavelength	0.02306	m	λ	$300/f$

Behavior of EM Fields as a Function of Distance

The behavior of the characteristics of EM fields varies depending on the distance from the radiating antenna. These characteristics are analyzed in three primary regions: the near-field region, the far-field region and the transition region. Of interest also are the region between the antenna main reflector and the subreflector, the region of the main reflector area and the region between the main reflector and ground.

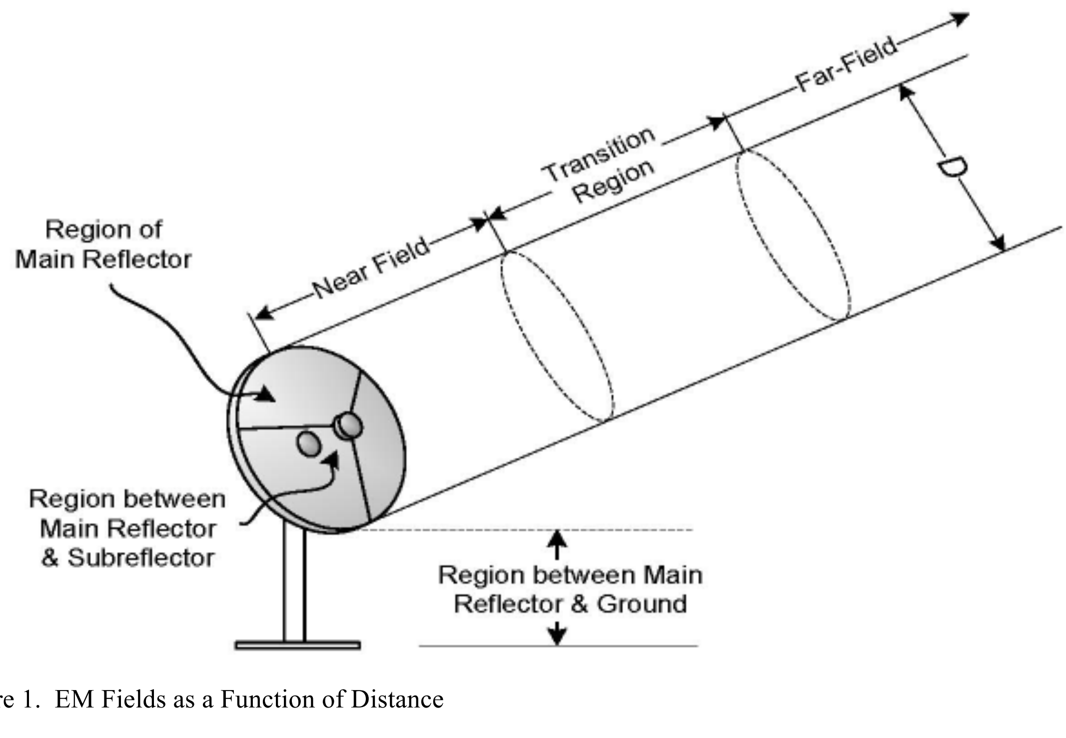

Figure 1. EM Fields as a Function of Distance

For parabolic aperture antennas with circular cross sections, such as the antenna under study, the near-field, far-field and transition region distances are calculated as follows:

Parameter	Value	Unit	Formula
Near-Field Distance	531.2	m	$R_{nf} = D^2/(4\lambda)$
Distance to Far-Field	1275	m	$R_{ff} = 0.60D^2/(\lambda)$
Minimum Transition Region Distance	531.2	m	$R_t = R_{nf}$

The distance in the transition region is between the near and far fields. Thus, $R_{nf} \le R_t \le R_{ff}$. However, the power density in the transition region will not exceed the power density in the near-field. Therefore, for purposes of the present analysis, the distance of the transition region can equate the distance to the near-field.

Power Flux Density Calculations

The power flux density is considered to be at a maximum through the entire length of the near-field. This region is contained within a cylindrical volume with a diameter, D, equal to the diameter of the antenna. In the transition region and the far-field, the power density decreases inversely with the square of the distance. The following equations are used to calculate power density in these regions.

Parameter	Value	Unit	Symbol	Formula
Power Density in the Near-Field	6.15	mW/cm^2	S_{nf}	$16.0\ \eta\ P/(\pi D^2)$
Power Density in the Far-Field	2.63	mW/cm^2	S_{ff}	$GP/(4\pi\ Rff^2)$
Power Density in the Transition Region	6.15	mW/cm^2	S_t	$S_{nf}\, R_{nf}/(R_t)$

Transmissions from the feed assembly are directed towards the subreflector surface and are reflected back towards the main reflector. The energy between the subreflector and main reflector can be determined by calculating the power density at the subreflector surface.

Parameter	Value	Unit	Symbol	Formula
Power Density at the Subreflector	1369	mW/cm^2	S_{fa}	$4P / a$

The power density in the main reflector is determined similarly to the power density calculation at the subreflector, except that the area of the reflector is used.

Parameter	Value	Unit	Symbol	Formula
Power Density at Main Reflector	10.4	mW/cm^2	$S_{surface}$	$4P / A$

The power density between the reflector and ground, assuming uniform illumination of the reflector surface, is calculated as follows:

Parameter	Value	Unit	Symbol	Formula
Power Density b/w Reflector and Ground	2.60	mW/cm^2	S_g	P / A

The table below summarizes the calculated power density levels for each region and compares those levels to those allowed in an occupational/controlled environment.

Region	**Radiation Power Density Level (mW/cm^2)**	**Occupational/Controlled Environment (5.0 mW/cm^2)**
Near Field (R_{nf} = 531.2 m)	6.15	Exceeds Limits
Far Field (R_{ff} = 1275 m)	2.63	Satisfies FCC MPE
Transition Region ($R_{nf} \leq R_t \leq R_{ff}$)	6.15	Exceeds Limits
Region between Subreflector and Main Reflector	1369	Exceeds Limits
Main Reflector Surface	10.4	Exceeds Limits
Region between Main Reflector and Ground	2.60	Satisfies FCC MPE

The results show that a potential radiation hazard exists in the regions noted above. The applicant has taken proper measures to ensure that it meets the requirements specified in 47 C.F.R. § 1.1310.

Specifically, the antenna is installed at the United Teleports facility in Port St. Lucie, Florida, and is an occupational/controlled environment. The facility is located within an enclosed walled courtyard, which restricts any public access. The earth station is marked with the standard radiation hazard warnings, as is the area in the vicinity of the antenna.

The applicant will ensure that the main beam of the antenna will be pointed at least one diameter away from any building, or other obstacles in those areas that exceed the MPE limits. Since one diameter removed from the center of the main beam the levels are down at least 20 dB, or by a factor of 100, public safety will be ensured.

Finally, the earth station's operational personnel will not have access to the regions where the MPE levels are exceeded when the earth station is in operation. As a matter of procedure, the transmitter will be turned off during periods of antenna maintenance, thereby eliminating any potential radiation hazard.

III. FCC Letter to ANATEL

FEDERAL COMMUNICATIONS COMMISSION
INTERNATIONAL BUREAU
WASHINGTON, D.C. 20554

fax: +1 202 418 1208; TWX: 710 822 0160

In reply,refer to:
800C2/SEB16174

Telefax message:

To: Agência Nacional de Telecomunicações - ANATEL
Assessoria Internacional
SAUS-Quadra 6 - Bloco H - 4th Floor
70070-940 BRASILIA, DF
Brazil
TELEFAX NO.: 011 + 55 61 23122244 C

CC: ITU Radiocommunication Bureau
Geneva, Switzerland
Telefax no.: 41 22 730 5785

Date: 27 April 2016

Subject: Agreement under §6.6 of Article 6 of Appendix 30B

References: 1) Special Section AP30B/A6A/333, BRIFIC 2744 dated 22.07.2014, concerning the
B-SAT-3R-1 satellite network.
2) Our letter 800C2/SEB14393, dated 30.10.2014
3) Your letter CT. n°163/ORER-Anatel dated 25.09.2015

The US administration thanks the administration of Brazil for its request for agreement regarding the operation of the B-SAT-3R-1 satellite network in the 6725-7025 MHz (Earth to space) and 4500-4800 MHz (space to Earth), 10.70-10.95 GHz (space to Earth), 11.20-11.45 GHz (space to Earth) and 12.75-13.25 GHz (Earth to space) planned bands of APP30B. The US administration is pleased to provide its agreement under the provision §6.6 of Appendix 30B for inclusion of its territory in the service area of the B-SAT-3R-1 satellite network. However, this agreement does not guarantee market access to the US. Any earth station located within US territory seeking to communicate with the B-SAT-3R-1 satellite network must first be licensed in accordance with US laws and regulations. Any operation of the satellites would be in accordance with international Radio Regulations and relevant provisions. Any such license application may or may not be granted.

REGARDS
FEDCOMCOM
SATELLITE DIVISION
Direct Fax No.: +1 202 418 1208 (preferred)
or +1 202 418 0398 (alternative)
Email: IBmail@fcc.gov

Authorized: J. Payton
International Bureau/SD

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IV. Frequency Coordination Notice

COMSEARCH
A CommScope Company

May 03, 2016

Re: United Teleports
PORT ST LUCIE, FL
Extended Ku-Band Transmit/Only Earth Station
Job Number: 160503COMSGE06

Dear Frequency Coordinator:

This notice is being provided in accordance with Section 25.203(c) of the FCC Rules and Regulations. We are forwarding the attached coordination data on behalf of United Teleports, 19000 NE 5th Avenue Miami, FL 33179 for a Ku-Band Transmit Only Earth Station to be located in PORT ST LUCIE, FL.

The coordination notice is being circulated to the owners (or their protection agents) of all existing or proposed terrestrial facilities operating in a shared frequency band within the coordination contours of the proposed station(s).

We respectfully request that you examine this data for its interference potential with your system(s). In the event that your analysis identifies potential interference cases that have not been resolved, please contact us by May 30, 2016.

If there are any questions concerning this coordination notice, please contact Comsearch.

Sincerely,

COMSEARCH

Gary K. Edwards
Senior Manager
gedwards@comsearch.com

Enclosure(s)

Date:	05/03/2016
Job Number:	160503COMSGE06

Administrative Information	
Status	ENGINEER PROPOSAL
Call Sign	
Licensee Code	UNTELE
Licensee Name	United Teleports

Site Information	**PORT ST LUCIE, FL**
Venue Name	
Latitude (NAD 83)	27° 16' 56.5" N
Longitude (NAD 83)	80° 28' 58.6" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	7.46 m / 24.5 ft

Link Information	
Satellite Type	Geostationary
Mode	TO - Transmit-Only
Modulation	Digital
Satellite Arc	64° W to 66° West Longitude
Azimuth Range	147.2° to 150.6°
Corresponding Elevation Angles	53.3° / 54.3°
Antenna Centerline (AGL)	3.66 m / 12.0 ft

Antenna Information		**Transmit - FCC32**	
Manufacturer		Scientific-Atlanta	
Model		7 Meter	
Gain / Diameter		57.3 dBi / 7.0 m	
3-dB / 15-dB Beamwidth		0.22° / 0.38°	
Max Available RF Power	(dBW/4 kHz)	-17.7	
	(dBW/MHz)	6.3	
Maximum EIRP	(dBW/4 kHz)	39.6	
	(dBW/MHz)	63.6	
Interference Objectives:	Long Term	-151.0 dBW/4 kHz	20%
	Short Term	-128.0 dBW/4 kHz	0.0025%

Frequency Information	**Transmit 13.0 GHz**
Emission / Frequency Range (MHz)	10M0G7W - 36M0G7W / 12750.0 - 13250.0
Max Great Circle Coordination Distance	117.2 km / 72.8 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

Coordination Values	PORT ST LUCIE, FL		
Licensee Name	United Teleports		
Latitude (NAD 83)	27° 16' 56.5" N		
Longitude (NAD 83)	80° 28' 58.6" W		
Ground Elevation (AMSL)	7.46 m / 24.5 ft		
Antenna Centerline (AGL)	3.66 m / 12.0 ft		
Antenna Model	Scientific-Atlanta 7 meter		
Antenna Mode		Transmit 13.0 GHz	
Interference Objectives: Long Term		-151.0 dBW/4 kHz	20%
Short Term		-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.7 (dBW/4 kHz)		

			Transmit 13.0 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	120.17	-10.00	117.17
5	0.00	118.19	-10.00	117.17
10	0.00	116.01	-10.00	117.17
15	0.00	113.67	-10.00	117.17
20	0.00	111.18	-10.00	117.17
25	0.00	108.56	-10.00	117.17
30	0.00	105.84	-10.00	117.17
35	0.00	103.04	-10.00	117.17
40	0.00	100.16	-10.00	117.17
45	0.00	97.24	-10.00	117.17
50	0.00	94.27	-10.00	117.17
55	0.00	91.29	-10.00	117.17
60	0.00	88.30	-10.00	117.17
65	0.00	85.32	-10.00	117.17
70	0.00	82.36	-10.00	117.17
75	0.00	79.44	-10.00	117.17
80	0.00	76.58	-10.00	117.17
85	0.00	73.78	-10.00	117.17
90	0.00	71.07	-10.00	117.17
95	0.00	68.48	-10.00	117.17
100	0.00	66.00	-10.00	117.17
105	0.00	63.68	-10.00	117.17
110	0.00	61.53	-10.00	117.17
115	0.00	59.58	-10.00	117.17
120	0.00	57.85	-10.00	117.17
125	0.00	56.36	-10.00	117.17
130	0.00	55.15	-10.00	117.17
135	0.00	54.22	-10.00	117.17
140	0.00	53.60	-10.00	117.17
145	0.00	53.30	-10.00	117.17
150	0.00	53.32	-10.00	117.17
155	0.00	53.67	-10.00	117.17
160	0.00	54.33	-10.00	117.17
165	0.00	55.30	-10.00	117.17
170	0.00	56.55	-10.00	117.17
175	0.00	57.91	-10.00	117.17
180	0.00	59.46	-10.00	117.17
185	0.00	61.23	-10.00	117.17

Coordination Values	**PORT ST LUCIE, FL**		
Licensee Name	United Teleports		
Latitude (NAD 83)	27° 16' 56.5" N		
Longitude (NAD 83)	80° 28' 58.6" W		
Ground Elevation (AMSL)	7.46 m / 24.5 ft		
Antenna Centerline (AGL)	3.66 m / 12.0 ft		
Antenna Model	Scientific-Atlanta 7 meter		
Antenna Mode		Transmit 13.0 GHz	
Interference Objectives: Long Term		-151.0 dBW/4 kHz	20%
Short Term		-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.7 (dBW/4 kHz)		

			Transmit 13.0 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	63.21	-10.00	117.17
195	0.00	65.37	-10.00	117.17
200	0.00	67.69	-10.00	117.17
205	0.00	70.15	-10.00	117.17
210	0.00	72.73	-10.00	117.17
215	0.00	75.40	-10.00	117.17
220	0.00	78.16	-10.00	117.17
225	0.00	80.97	-10.00	117.17
230	0.00	83.84	-10.00	117.17
235	0.00	86.74	-10.00	117.17
240	0.00	89.65	-10.00	117.17
245	0.00	92.56	-10.00	117.17
250	0.00	95.47	-10.00	117.17
255	0.00	98.34	-10.00	117.17
260	0.00	101.17	-10.00	117.17
265	0.00	103.94	-10.00	117.17
270	0.00	106.64	-10.00	117.17
275	0.00	109.24	-10.00	117.17
280	0.00	111.73	-10.00	117.17
285	0.00	114.09	-10.00	117.17
290	0.00	116.29	-10.00	117.17
295	0.00	118.31	-10.00	117.17
300	0.00	120.14	-10.00	117.17
305	0.00	121.74	-10.00	117.17
310	0.00	123.10	-10.00	117.17
315	0.00	124.18	-10.00	117.17
320	0.00	124.99	-10.00	117.17
325	0.00	125.49	-10.00	117.17
330	0.00	125.68	-10.00	117.17
335	0.00	125.56	-10.00	117.17
340	0.00	125.13	-10.00	117.17
345	0.00	124.40	-10.00	117.17
350	0.00	123.38	-10.00	117.17
355	0.00	121.93	-10.00	117.17

V. CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

/s/

Stephen D. McNeil
Telecomm Strategies Canada, Inc.
Ottawa, Ontario, Canada
(613) 270-1177

May 13, 2016