NewCom International Inc.
Modification of Earth Station License

Technical Appendix

I. Radiation Hazard Analysis

II. Frequency Coordination Report

I. Analysis of Non-Ionizing Radiation for a 7.6-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 7.6-meter earth station system. The analysis and calculations performed in this report comply 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 dependent 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. The transmit power (P) is chosen to equalize the transmit EIRP with the previously licensed 7.3 m antenna.

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

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

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

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	**7.6**	m
Antenna Surface Area	$A_{surface}$	πD^2/4	45.36	m^2
Subreflector Diameter	D_{sr}	Input	**137.2**	cm
Area of Subreflector	A_{sr}	πDsr^2/4	14784.21	cm^2
Frequency	F	Input	**6175**	MHz
Wavelength	λ	300 / F	0.048583	m
Transmit Power	P	Input	**102**	W
Antenna Gain (dBi)	Ges	Input	52.6	dBi
Antenna Gain (factor)	G	10^(Ges/10)	181,970.1	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.75	n/a

1. Far Field Distance Calculation

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

Distance to the Far Field Region, $R_{ff} = 0.60\ D^2 / \lambda$ (1)

$= 713.3$ m

The maximum main beam power density in the far field can be determined from the following equation:

On-Axis Power Density in the Far Field, $S_{ff} = G\ P / (4\ \pi\ R_{ff}^2)$ (2)

$= 2.903$ W/m^2

$= 0.290$ mW/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:

Extent of the Near Field, $R_{nf} = D^2 / (4\ \lambda)$ (3)

$= 297.2$ m

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

Near Field Power Density, $S_{nf} = 16.0\ \eta\ P / (\pi\ D^2)$ (4)

$= 6.776$ W/m^2

$= 0.678$ mW/cm^2

3. Transition Region Calculation

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 R_t can be determined from the following equation:

Transition Region Power Density, $S_t = S_{nf}\ R_{nf} / R_t$ (5)

$= 0.0.678$ mW/cm^2 when $R_t = R_n$f

4. Region between the Main Reflector and the Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:

Power Density at the Subreflector, $S_{sr} = 4000\ P / A_{sr}$ (6)

$= 27.597$ mW/cm^2

5. Main Reflector Region

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

Power Density at the Main Reflector Surface $S_{surface} = 4\ P\ /\ A_{surface}$ (7)

$= 8.994\ W/m^2$

$= 0.899\ mW/cm^2$

6. Region between the Main Reflector and the Ground

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

Power Density between Reflector and Ground, $S_g = P\ /\ A_{surface}$ (8)

$= 2.248\ W/m^2$

$= 0.225\ mW/cm^2$

7. Summary of Calculations

Table 4. Summary of Expected Radiation Levels for Uncontrolled Environment

Calculated Maximum

Radiation Power Density Level (mW/cm2)

Region	Distance	Value	Unit	Power Density Symbol	Value	Unit	Hazard Assessment
1. Far Field	R_{ff}	713.3	m	S_{ff}	0.290	mW/m^2	Satisfies FCC MPE
2. Near Field	R_{nf}	297.2	m	S_{nf}	0.678	mW/m^2	Satisfies FCC MPE
3. Transition Region	$R_{nf} < R_t < R_{ff}$			S_t	0.678	mW/m^2	Satisfies FCC MPE
4. Between Main Reflector and Subreflector				S_{sr}	27.597	mW/m^2	Potential Hazard
5. Main Reflector				$S_{surface}$	0.899	mW/m^2	Satisfies FCC MPE
6. Between Main Reflector and Ground				S_g	0.225	mW/m^2	Satisfies FCC MPE

Table 5. Summary of Expected Radiation Levels for Controlled Environment

Calculated Maximum

Radiation Power Density Level (mW/cm2)

Region	Distance	Value	Unit	Power Density Symbol	Value	Unit	Hazard Assessment
1. Far Field	R_{ff}	713.3	m	S_{ff}	0.290	mW/m^2	Satisfies FCC MPE
2. Near Field	R_{nf}	297.2	m	S_{nf}	0.678	mW/m^2	Satisfies FCC MPE
3. Transition Region	$R_{nf} < R_t < R_{ff}$			S_t	0.678	mW/m^2	Satisfies FCC MPE
4. Between Main Reflector and Subreflector				S_{sr}	27.597	mW/m^2	Potential Hazard
5. Main Reflector				$S_{surface}$	0.899	mW/m^2	Satisfies FCC MPE
6. Between Main Reflector and Ground				S_g	0.225	mW/m^2	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.

8. Conclusions

Based on the above analysis it is concluded that the FCC RF Guidelines have been exceeded in the specified region(s) of Tables 4 and 5. The applicant proposes to comply with the Maximum Permissible Exposure (MPE) limits of 1 mW/cm^2 for the Uncontrolled areas and the MPE limits of 5 mW/cm^2 for the Controlled areas by restricting access to the antenna and posting warning signs. The antenna is located within the Miami Teleport which is enclosed by fencing, thus restricting access to the public. Only personnel with knowledge of the radiation hazards associated with the antennas at this facility will have access to those regions that exceed the MPE levels. The antenna transmitter will be turned off during maintenance in order to comply with the MPE limit of 5 mW/cm^2 at the Reflector Surface.

II. FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Newcom International
MIAMI, FL
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
October 16, 2018

TABLE OF CONTENTS

1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-receive earth station.

Company

Verizon Wireless (VAW) LLC - S Florida
Verizon Wireless Personal Comm, LP(S FL)
Miami-Dade County

No other carriers reported potential interference cases.

3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 10/04/2018.

Company
Alltel Communications LLC - S Florida
Broward County Board of Commissioners
CBS Radio East, LLC.
COLLIER, COUNTY OF
Charlotte County Board of County Comm
Computer Office Solutions, Inc.
Embarq Florida, Inc.
Entercom Miami License, LLC
Florida Power and Light Company
Florida RSA No. 2B (Indian River) LP
Florida Rural Broadband Alliance, LLC
Florida State
Harris Corporation - Florida
HiQ Data Corporation
Indian River, County of
Lee County - BOCC
Martin County Sheriffs Office
Miami-Dade County
New Cingular Wireless PCS LLC - N FL
New Cingular Wireless PCS LLC - S FL
Olympic Wireless, LLC
Palm Beach, County of
Saint Lucie, County of
South Florida Water Management District
Sprint Spectrum L.P.
Sun Broadcasting, Inc.
T-Mobile License LLC
Verizon Wireless (VAW) LLC - S Florida
Verizon Wireless Personal Comm, LP(S FL)

4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

Date: 10/16/2018
Job Number: 181004COMSGE08

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	E040267
Licensee Code	NCOMIN
Licensee Name	Newcom International

Site Information — MIAMI, FL

Venue Name	
Latitude (NAD 83)	25° 54' 59.3" N
Longitude (NAD 83)	80° 13' 29.2" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	1.83 m / 6.0 ft

Link Information

Satellite Type	Geostationary
Mode	TR - Transmit-Receive
Modulation	Digital
Satellite Arc	11° W to 143° West Longitude
Azimuth Range	99.4° to 257.3°
Corresponding Elevation Angles	10.0° / 15.9°
Antenna Centerline (AGL)	5.49 m / 18.0 ft

Antenna Information		Receive - A40761		Transmit - A60761	
Manufacturer		ANDREW CORPORATION		COMMSCOPE	
Model		ES76		ES76	
Gain / Diameter		49.0 dBi / 7.6 m		52.7 dBi / 7.6 m	
3-dB / 15-dB Beamwidth		0.58° / 1.18°		0.40° / 0.76°	
Max Available RF Power	(dBW/4 kHz)			(**Power 1**) -3.7	(**Power 2**) -15.4
	(dBW/MHz)			20.3	8.6
Maximum EIRP	(dBW/4 kHz)			49.0	37.3
	(dBW/MHz)			73.0	61.3
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%

Frequency Information	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	128KG7D - 45M0G7W / 3700.0 - 4200.0	(Power 1) 128KG7D - 45M0G7W / 5925.0 - 5929.0 128KG7D - 45M0G7W / 5961.0 - 5988.0 128KD7W - 45M0G7W / 6020.0 - 6047.0 128KG7D - 45M0G7W / 6079.0 - 6107.0 128KG7D - 45M0G7W / 6168.0 - 6240.0 128KG7D - 45M0G7W / 6331.0 - 6359.0 128KG7D - 45M0G7W / 6391.0 - 6425.0 (Power 2) 128KG7D - 45M0G7W / 5925.0 - 6425.0
Max Great Circle Coordination Distance	608.6 km / 378.1 mi	191.4 km / 118.9 mi
Precipitation Scatter Contour Radius	626.3 km / 389.1 mi	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

Coordination Values	**MIAMI, FL**			
Licensee Name	Newcom International			
Latitude (NAD 83)	25° 54' 59.3" N			
Longitude (NAD 83)	80° 13' 29.2" W			
Ground Elevation (AMSL)	1.83 m / 6.0 ft			
Antenna Centerline (AGL)	5.49 m / 18.0 ft			
Antenna Model	Commscope ES76			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-3.7 (dBW/4 kHz)	

			Receive 4.0 GHz		Transmit 6.1 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	99.27	-8.00	437.80	-10.30	193.10
5	0.00	94.35	-8.00	437.80	-10.30	193.10
10	0.00	89.43	-8.00	437.80	-10.30	193.10
15	0.00	84.50	-8.00	437.80	-10.30	193.10
20	0.00	79.58	-8.00	437.80	-10.30	193.10
25	0.00	74.66	-8.00	437.80	-10.30	193.10
30	0.00	69.75	-8.00	437.80	-10.30	193.10
35	0.00	64.84	-8.00	437.80	-10.30	193.10
40	0.00	59.93	-8.00	437.80	-10.30	193.10
45	0.00	55.04	-8.00	437.80	-10.30	193.10
50	0.00	50.16	-8.00	437.80	-10.30	193.10
55	0.00	45.31	-8.00	437.80	-10.30	193.10
60	0.00	40.47	-8.00	437.80	-9.39	198.53
65	0.00	35.68	-7.14	449.36	-8.44	204.01
70	0.00	30.94	-7.00	451.20	-8.30	204.79
75	0.00	26.28	-5.51	471.25	-8.30	204.79
80	0.00	21.77	-5.00	478.60	-4.42	228.23
85	0.00	17.51	-3.50	500.72	-2.30	241.89
90	0.00	13.73	-0.46	548.78	-2.30	241.89
95	0.00	10.96	3.00	608.60	-0.26	255.57
100	0.00	10.06	3.00	608.60	0.64	264.34
105	0.00	11.47	2.53	600.09	-1.25	248.87
110	0.00	14.55	-1.55	531.15	-2.30	241.89
115	0.00	18.47	-4.08	492.05	-2.30	241.89
120	0.00	22.78	-5.00	478.60	-5.63	220.71
125	0.00	27.08	-5.83	466.73	-8.30	204.79
130	0.00	31.32	-7.00	451.20	-8.30	204.79
135	0.00	35.46	-7.09	449.95	-8.39	204.26
140	0.00	39.48	-7.90	439.17	-9.20	199.65
145	0.00	43.35	-8.00	437.80	-9.97	194.93
150	0.00	47.01	-8.00	437.80	-10.30	193.10
155	0.00	50.41	-8.00	437.80	-10.30	193.10
160	0.00	53.45	-8.00	437.80	-10.30	193.10
165	0.00	56.03	-8.00	437.80	-10.30	193.10
170	0.00	58.02	-8.00	437.80	-10.30	193.10
175	0.00	59.28	-8.00	437.80	-10.30	193.10
180	0.00	59.71	-8.00	437.80	-10.30	193.10
185	0.00	59.28	-8.00	437.80	-10.30	193.10

COMSEARCH

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Coordination Values	**MIAMI, FL**			
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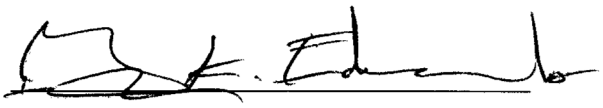
Antenna Centerline (AGL)	5.49 m / 18.0 ft			
Antenna Model	Commscope ES76			
Antenna Mode	Receive 4.0 GHz		Transmit 6.1 GHz	
Interference Objectives: Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%
Max Available RF Power			-3.7 (dBW/4 kHz)	

			Receive 4.0 GHz		Transmit 6.1 GHz	
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	58.01	-8.00	437.80	-10.30	193.10
195	0.00	56.03	-8.00	437.80	-10.30	193.10
200	0.00	53.45	-8.00	437.80	-10.30	193.10
205	0.00	50.41	-8.00	437.80	-10.30	193.10
210	0.00	47.02	-8.00	437.80	-10.30	193.10
215	0.00	43.35	-8.00	437.80	-9.97	194.93
220	0.00	39.48	-7.90	439.17	-9.20	199.65
225	0.00	35.46	-7.09	449.95	-8.39	204.26
230	0.00	31.32	-7.00	451.20	-8.30	204.79
235	0.00	27.19	-5.88	466.11	-8.30	204.79
240	0.00	23.37	-5.00	478.60	-6.35	216.35
245	0.00	20.05	-5.00	478.60	-2.36	241.51
250	0.00	17.50	-3.50	500.79	-2.30	241.89
255	0.00	16.10	-2.66	513.64	-2.30	241.89
260	0.00	16.15	-2.69	513.15	-2.30	241.89
265	0.00	17.64	-3.59	499.47	-2.30	241.89
270	0.00	20.26	-5.00	478.60	-2.61	239.85
275	0.00	23.63	-5.00	478.60	-6.65	214.52
280	0.00	27.47	-5.99	464.54	-8.30	204.79
285	0.00	31.62	-7.00	451.20	-8.30	204.79
290	0.00	35.96	-7.19	448.59	-8.49	203.68
295	0.00	40.44	-8.00	437.80	-9.39	198.57
300	0.00	45.01	-8.00	437.80	-10.30	193.10
305	0.00	49.65	-8.00	437.80	-10.30	193.10
310	0.00	54.34	-8.00	437.80	-10.30	193.10
315	0.00	59.06	-8.00	437.80	-10.30	193.10
320	0.00	63.81	-8.00	437.80	-10.30	193.10
325	0.00	68.58	-8.00	437.80	-10.30	193.10
330	0.00	73.36	-8.00	437.80	-10.30	193.10
335	0.00	78.16	-8.00	437.80	-10.30	193.10
340	0.00	82.96	-8.00	437.80	-10.30	193.10
345	0.00	87.76	-8.00	437.80	-10.30	193.10
350	0.00	92.57	-8.00	437.80	-10.30	193.10
355	0.00	97.38	-8.00	437.80	-10.30	193.10

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: _ 

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: October 16, 2018