

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Comprehensive Nuclear Test Ban Treaty Org.**  
**SAN JUAN, PR**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
June 23, 2017

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## 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.

### 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 06/09/2017.

Company

AT&T Mobility Puerto Rico  
Aeronet Wireless Broadband LLC  
Critical Hub Networks, Inc.  
Evertec, Inc.  
Freedom Networks, LLC  
Iniciativa Tecnologica Centro Oriental  
Neptunomedia, Inc.  
Osnet Wireless Corporation  
PR Wireless, Inc.  
PREPA Networks, LLC.  
Puerto Rico Commonwealth  
Puerto Rico Commonwealth of State Police  
Puerto Rico Electric Power Authority  
Puerto Rico Telephone Company, Inc.  
Sprintcom, Inc  
Sprintcom, Inc. Puerto Rico  
Surge Communications LLC  
T-Mobile Puerto Rico LLC

## **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: 06/23/2017  
Job Number: 170609COMSGE07

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### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign  
Licensee Code CTBTO  
Licensee Name Comprehensive Nuclear Test Ban Treaty Org.

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### Site Information

**SAN JUAN, PR**  
Venue Name  
Latitude (NAD 83) 18° 6' 37.0" N  
Longitude (NAD 83) 66° 9' 8.0" W  
Climate Zone B  
Rain Zone 1  
Ground Elevation (AMSL) 430.0 m / 1410.8 ft

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### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 22° W to 45° West Longitude  
Azimuth Range 107.8° to 128.8°  
Corresponding Elevation Angles 36.0° / 57.8°  
Antenna Centerline (AGL) 2.74 m / 9.0 ft

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### Antenna Information

	Receive - FCC32	Transmit - FCC32
Manufacturer	Prodelin	Prodelin
Model	1251	1251
Gain / Diameter	38.0 dBi / 2.4 m	42.0 dBi / 2.4 m
3-dB / 15-dB Beamwidth	2.30° / 4.60°	1.36° / 2.72°
Max Available RF Power (dBW/4 kHz)		-10.0
(dBW/MHz)		14.0
Maximum EIRP (dBW/4 kHz)		32.0
(dBW/MHz)		56.0
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%

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### Frequency Information

	Receive 4.0 GHz	Transmit 6.1 GHz
Emission / Frequency Range (MHz)	87K0G7D - 100KG7D / 3700.0 - 4200.0	87K0G7D - 100KG7D / 5925.0 - 6047.0 87K0G7D - 100KG7D / 6080.0 - 6171.0 87K0G7D - 100KG7D / 6243.0 - 6270.0 87K0G7D - 100KG7D / 6303.0 - 6319.0 87K0G7D - 100KG7D / 6372.0 - 6425.0

Max Great Circle Coordination Distance 412.2 km / 256.1 mi 162.9 km / 101.2 mi  
Precipitation Scatter Contour Radius 555.5 km / 345.2 mi 100.0 km / 62.1 mi

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## Earth Station Data Sheet

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### Coordination Values

### SAN JUAN, PR

Licensee Name Comprehensive Nuclear Test Ban Treaty Org.  
Latitude (NAD 83) 18° 6' 37.0" N  
Longitude (NAD 83) 66° 9' 8.0" W  
Ground Elevation (AMSL) 430.0 m / 1410.8 ft  
Antenna Centerline (AGL) 2.74 m / 9.0 ft  
Antenna Model Prodelin 2.4 meter  
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 -10.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	1.04	104.48	-10.00	251.16	-10.00	102.48
5	0.70	100.39	-10.00	291.38	-10.00	115.93
10	0.65	96.32	-10.00	298.71	-10.00	118.43
15	0.70	92.25	-10.00	291.22	-10.00	115.87
20	0.58	88.17	-10.00	308.62	-10.00	121.91
25	0.54	84.10	-10.00	315.65	-10.00	124.45
30	0.37	80.07	-10.00	356.03	-10.00	140.46
35	0.46	76.04	-10.00	332.49	-10.00	130.72
40	0.57	72.03	-10.00	310.36	-10.00	122.54
45	0.32	68.16	-10.00	371.76	-10.00	146.69
50	0.00	64.42	-10.00	412.20	-10.00	162.88
55	0.78	60.35	-10.00	279.75	-10.00	113.82
60	1.09	56.53	-10.00	248.19	-10.00	101.29
65	0.65	53.19	-10.00	299.09	-10.00	118.56
70	0.71	49.79	-10.00	289.38	-10.00	117.13
75	0.79	46.57	-9.70	280.84	-9.70	114.11
80	2.26	42.60	-8.73	197.31	-8.73	100.00
85	2.89	39.40	-7.89	179.34	-7.89	100.00
90	4.49	35.68	-6.81	149.05	-6.81	100.00
95	6.03	32.30	-5.73	136.08	-5.73	100.00
100	7.31	29.60	-4.78	136.06	-4.78	100.00
105	7.32	28.77	-4.47	137.26	-4.47	100.00
110	8.32	27.73	-4.08	135.90	-4.08	100.00
115	8.77	28.07	-4.21	134.07	-4.21	100.00
120	9.82	28.69	-4.44	130.27	-4.44	100.00
125	9.26	31.44	-5.44	128.16	-5.44	100.00
130	10.09	33.62	-6.16	123.32	-6.16	100.00
135	10.68	36.50	-7.06	117.71	-7.06	100.00
140	12.81	38.95	-7.76	107.91	-7.76	100.00
145	14.29	42.21	-8.64	100.00	-8.64	100.00
150	12.27	47.07	-9.82	104.16	-9.82	100.00
155	13.30	49.86	-10.00	100.00	-10.00	100.00
160	13.30	52.42	-10.00	100.00	-10.00	100.00
165	13.37	54.83	-10.00	100.00	-10.00	100.00
170	12.86	57.83	-10.00	100.99	-10.00	100.00
175	13.33	60.41	-10.00	100.00	-10.00	100.00
180	12.76	63.74	-10.00	101.46	-10.00	100.00
185	13.69	66.47	-10.00	100.00	-10.00	100.00



# COMSEARCH

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### Coordination Values

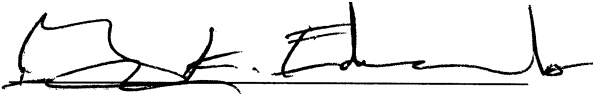
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Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%  
Max Available RF Power -10.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz		Transmit 6.1 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	13.58	69.82	-10.00	100.00	-10.00	100.00
195	12.89	73.41	-10.00	100.87	-10.00	100.00
200	10.77	77.33	-10.00	110.33	-10.00	100.00
205	9.27	80.92	-10.00	115.37	-10.00	100.00
210	8.09	84.34	-10.00	118.00	-10.00	100.00
215	8.09	87.56	-10.00	118.00	-10.00	100.00
220	6.62	90.76	-10.00	119.58	-10.00	100.00
225	5.71	93.82	-10.00	123.95	-10.00	100.00
230	4.71	96.71	-10.00	133.99	-10.00	100.00
235	4.07	99.51	-10.00	139.67	-10.00	100.00
240	3.82	102.29	-10.00	144.30	-10.00	100.00
245	3.87	105.07	-10.00	143.30	-10.00	100.00
250	2.45	107.14	-10.00	182.85	-10.00	100.00
255	2.36	109.58	-10.00	185.95	-10.00	100.00
260	2.51	112.03	-10.00	180.85	-10.00	100.00
265	2.67	114.38	-10.00	175.25	-10.00	100.00
270	2.67	116.46	-10.00	175.44	-10.00	100.00
275	2.33	118.10	-10.00	187.09	-10.00	100.00
280	1.95	119.46	-10.00	202.16	-10.00	100.00
285	0.93	120.00	-10.00	260.97	-10.00	106.92
290	0.52	120.77	-10.00	319.18	-10.00	125.74
295	0.00	121.16	-10.00	412.20	-10.00	162.88
300	0.34	122.11	-10.00	365.41	-10.00	144.17
305	1.15	123.26	-10.00	244.98	-10.00	100.00
310	1.14	123.33	-10.00	245.29	-10.00	100.11
315	1.11	123.08	-10.00	247.29	-10.00	100.93
320	1.23	122.71	-10.00	240.04	-10.00	100.00
325	1.33	122.03	-10.00	234.56	-10.00	100.00
330	1.07	120.75	-10.00	249.60	-10.00	101.86
335	1.05	119.46	-10.00	250.82	-10.00	102.35
340	0.86	117.81	-10.00	269.20	-10.00	110.02
345	0.81	116.07	-10.00	275.76	-10.00	112.40
350	1.00	112.44	-10.00	253.92	-10.00	103.58
355	1.18	108.52	-10.00	242.90	-10.00	100.00

## 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: June 23, 2017