Ka-Band Earth Station – Ft. Lauderdale, FL

Frequency Coordination Report

28 GHz

Prepared on Behalf of
O3b Networks USA, LLC

September 16, 2015

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Table of Contents

1. Summary of Results

On behalf of O3b Networks, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band Earth Stations on Vessels (ESV) in Ft. Lauderdale, Florida, which will transmit at 28 GHz[1]. Prior-notification letters were sent to the licensees and a copy of the notification data is provided in section four of this report. The earth station coordination was finalized on September 15, 2015.

No objections were received from any of the incumbent 28 GHz licensees. Our notification to the LMDS incumbents was performed under the assumption that the ESV system would be operating on a secondary basis to LMDS Block A operations and a contact at O3b Networks has been provided in case any concerns may arise in the future.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band ESV system in Ft. Lauderdale, Florida was prior-coordinated by Comsearch. A notification letter and datasheets for this system were sent to the following 28 GHz common carrier fixed microwave licensees on August 13, 2015. These licensees are authorized to operate temporary fixed operations from 27.5 to 29.5 GHz within specified geographic areas.

Licensee	Authorized Geographic Area
AT&T	Statewide: AL, FL, GA, KY, LA, MS, NC, SC, and TN
Verizon	Continental US

A notification letter and datasheets for the Ka-Band ESV system in Ft. Lauderdale, Florida were also sent to the following 28 GHz local television transmission licensee on August 13, 2015. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Information Super Station, LLC	Continental US

No objections were received from the common carrier or local television transmission service incumbents.

[1] The proposed ESV system will operate in the 27.6 – 28.35 GHz portion of the Ka-Band.

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on August 13, 2015. The proposed earth station will operate on frequencies that overlap Block A of the LMDS service. The total frequency allocation for Block A of the LMDS spectrum appears below.

Block A: 27.500-28.350 GHz
29.100-29.250 GHz
31.075-31.225 GHz

Licensee	Market	Market Name
Nextlink/XO	BTA293[2]	Miami-Ft. Lauderdale, FL
T-Mobile[3]	BTA293	Miami-Ft. Lauderdale, FL
Nextlink/XO	BTA469	West Palm Beach-Boca Raton, FL
T-Mobile[4]	BTA469	West Palm Beach-Boca Raton, FL

No objections were received from the LMDS incumbents.

[2] The proposed ESV system will be located inside BTA293.

[3] T-Mobile has acquired spectrum from Nextlink/XO in the Miami-Ft. Lauderdale, FL Basic Trading Area (BTA).

[4] T-Mobile has acquired spectrum from Nextlink/XO in the West Palm Beach-Boca Raton, FL BTA.

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band ESV system in Ft. Lauderdale, Florida. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — FT LAUDERDALE, FL

Venue Name	
Latitude (NAD 83)	26° 5' 9.6" N
Longitude (NAD 83)	80° 6' 52.2" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		1.2 Meter
Gain / Diameter		48.0 dBi / 1.2 m
3-dB / 15-dB Beamwidth		0.60° / 1.40°
Max Available RF Power	(dBW/4 kHz)	-17.1
	(dBW/MHz)	6.9
Maximum EIRP	(dBW/4 kHz)	30.9
	(dBW/MHz)	54.9
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	137.5 km / 85.4 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

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Coordination Values	**FT LAUDERDAL, FL**	
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Longitude (NAD 83)	80° 6' 52.2" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.38	-10.00	100.00
5	0.00	89.38	-10.00	100.00
10	0.00	84.38	-10.00	100.00
15	0.00	79.38	-10.00	100.00
20	0.00	74.38	-10.00	100.00
25	0.00	69.38	-10.00	100.00
30	0.00	64.38	-10.00	100.00
35	0.00	59.38	-10.00	100.00
40	0.00	54.38	-10.00	100.00
45	0.00	49.38	-10.00	100.00
50	0.00	44.38	-10.00	100.00
55	0.00	39.38	-9.43	100.00
60	0.00	34.38	-8.21	100.00
65	0.00	29.38	-6.85	100.00
70	0.00	24.38	-5.31	100.00
75	0.00	19.38	-3.54	109.40
80	0.00	14.39	-1.51	116.20
85	0.00	9.39	0.84	123.60
90	0.00	4.39	3.46	131.10
95	0.00	0.64	5.90	134.80
100	0.00	5.62	6.87	137.50
105	0.00	10.62	5.50	133.70
110	0.00	15.62	2.95	129.70
115	0.00	20.62	0.37	122.10
120	0.00	25.62	-1.91	114.90
125	0.00	30.62	-3.79	108.50
130	0.00	35.62	-5.37	100.00
135	0.00	40.62	-6.71	100.00
140	0.00	45.62	-7.88	100.00
145	0.00	50.62	-8.90	100.00
150	0.00	55.62	-9.78	100.00
155	0.00	60.62	-10.00	100.00
160	0.00	65.62	-10.00	100.00
165	0.00	70.62	-10.00	100.00
170	0.00	75.62	-10.00	100.00
175	0.00	80.62	-10.00	100.00
180	0.00	85.62	-10.00	100.00
185	0.00	90.62	-10.00	100.00

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Coordination Values	**FT LAUDERDAL, FL**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	26° 5' 9.6" N
Longitude (NAD 83)	80° 6' 52.2" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 1.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.62	-10.00	100.00
195	0.00	100.62	-10.00	100.00
200	0.00	105.62	-10.00	100.00
205	0.00	110.62	-10.00	100.00
210	0.00	115.62	-9.78	100.00
215	0.00	120.62	-8.90	100.00
220	0.00	125.62	-7.88	100.00
225	0.00	130.62	-6.71	100.00
230	0.00	135.62	-5.37	100.00
235	0.00	140.62	-3.79	100.00
240	0.00	145.62	-1.91	108.50
245	0.00	150.62	0.36	114.90
250	0.00	155.62	2.90	122.10
255	0.00	160.62	5.37	129.60
260	0.00	165.62	6.65	133.30
265	0.00	170.61	5.67	136.80
270	0.00	175.61	3.28	134.10
275	0.00	179.36	0.71	130.60
280	0.00	174.38	-1.61	123.20
285	0.00	169.38	-3.62	115.90
290	0.00	164.38	-5.36	109.10
295	0.00	159.38	-6.90	100.00
300	0.00	154.38	-8.25	100.00
305	0.00	149.38	-9.47	100.00
310	0.00	144.38	-10.00	100.00
315	0.00	139.38	-10.00	100.00
320	0.00	134.38	-10.00	100.00
325	0.00	129.38	-10.00	100.00
330	0.00	124.38	-10.00	100.00
335	0.00	119.38	-10.00	100.00
340	0.00	114.38	-10.00	100.00
345	0.00	109.38	-10.00	100.00
350	0.00	104.38	-10.00	100.00
355	0.00	99.38	-10.00	100.00

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Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — FT LAUDERDALE, FL

Venue Name	
Latitude (NAD 83)	26° 5' 9.6" N
Longitude (NAD 83)	80° 6' 52.2" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 Meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	137.5 km / 85.4 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

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Antenna Centerline (AGL)	15.54 m / 51.0 ft
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Antenna Mode	Transmit 28.0 GHz
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Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.38	-10.00	100.00
5	0.00	89.38	-10.00	100.00
10	0.00	84.38	-10.00	100.00
15	0.00	79.38	-10.00	100.00
20	0.00	74.38	-10.00	100.00
25	0.00	69.38	-10.00	100.00
30	0.00	64.38	-10.00	100.00
35	0.00	59.38	-10.00	100.00
40	0.00	54.38	-10.00	100.00
45	0.00	49.38	-10.00	100.00
50	0.00	44.38	-10.00	100.00
55	0.00	39.38	-9.43	100.00
60	0.00	34.38	-8.21	100.00
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70	0.00	24.38	-5.31	100.00
75	0.00	19.38	-3.54	109.40
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90	0.00	4.39	3.46	131.10
95	0.00	0.64	5.90	134.80
100	0.00	5.62	6.87	137.50
105	0.00	10.62	5.50	133.70
110	0.00	15.62	2.95	129.70
115	0.00	20.62	0.37	122.10
120	0.00	25.62	-1.91	114.90
125	0.00	30.62	-3.79	108.50
130	0.00	35.62	-5.37	100.00
135	0.00	40.62	-6.71	100.00
140	0.00	45.62	-7.88	100.00
145	0.00	50.62	-8.90	100.00
150	0.00	55.62	-9.78	100.00
155	0.00	60.62	-10.00	100.00
160	0.00	65.62	-10.00	100.00
165	0.00	70.62	-10.00	100.00
170	0.00	75.62	-10.00	100.00
175	0.00	80.62	-10.00	100.00
180	0.00	85.62	-10.00	100.00
185	0.00	90.62	-10.00	100.00

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Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.62	-10.00	100.00
195	0.00	100.62	-10.00	100.00
200	0.00	105.62	-10.00	100.00
205	0.00	110.62	-10.00	100.00
210	0.00	115.62	-9.78	100.00
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310	0.00	144.38	-10.00	100.00
315	0.00	139.38	-10.00	100.00
320	0.00	134.38	-10.00	100.00
325	0.00	129.38	-10.00	100.00
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335	0.00	119.38	-10.00	100.00
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350	0.00	104.38	-10.00	100.00
355	0.00	99.38	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com

Ka-Band Earth Station – Tampa, FL

Frequency Coordination Report

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Block A: 27.500-28.350 GHz
29.100-29.250 GHz
31.075-31.225 GHz

Licensee	Market	Market Name
Wireless Distribution Services	BTA159	Gainesville, FL
Wireless Distribution Services	BTA239	Lakeland-Winter Haven, FL
Rainier Connect	BTA326	Ocala, FL
Straight Path Spectrum	BTA336	Orlando, FL
T-Mobile[2]	BTA336	Orlando, FL
Nextlink/XO	BTA440[3]	Tampa-St. Petersburg-Clearwater, FL
T-Mobile[4]	BTA440	Tampa-St. Petersburg-Clearwater, FL
Nextlink/XO	BTA469	West Palm Beach-Boca Raton, FL
T-Mobile[5]	BTA469	West Palm Beach-Boca Raton, FL

No objections were received from the LMDS incumbents.

[2] T-Mobile has acquired spectrum from Straight Path in the Orlando, FL Basic Trading Area (BTA).

[3] The proposed ESV system will be located inside BTA440.

[4] T-Mobile has acquired spectrum from Nextlink/XO in the Tampa-St. Petersburg-Clearwater, FL BTA.

[5] T-Mobile has acquired spectrum from Nextlink/XO in the West Palm Beach-Boca Raton, FL BTA

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Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — TAMPA, FL

Venue Name	
Latitude (NAD 83)	27° 56' 43.7" N
Longitude (NAD 83)	82° 26' 44.6" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		1.2 Meter
Gain / Diameter		48.0 dBi / 1.2 m
3-dB / 15-dB Beamwidth		0.60° / 1.40°
Max Available RF Power	(dBW/4 kHz)	-17.1
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Coordination Values	**TAMPA, FL**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	27° 56' 43.7" N
Longitude (NAD 83)	82° 26' 44.6" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 1.2 Meter
Antenna Mode	Transmit 28.0 GHz
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Max Available RF Power	-17.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	93.56	-10.00	100.00
5	0.00	88.56	-10.00	100.00
10	0.00	83.56	-10.00	100.00
15	0.00	78.57	-10.00	100.00
20	0.00	73.57	-10.00	100.00
25	0.00	68.57	-10.00	100.00
30	0.00	63.58	-10.00	100.00
35	0.00	58.58	-10.00	100.00
40	0.00	53.58	-10.00	100.00
45	0.00	48.59	-10.00	100.00
50	0.00	43.60	-10.00	100.00
55	0.00	38.60	-9.66	100.00
60	0.00	33.61	-8.47	100.00
65	0.00	28.62	-7.14	100.00
70	0.00	23.64	-5.64	100.00
75	0.00	18.66	-3.94	108.00
80	0.00	13.71	-1.98	114.70
85	0.00	8.79	0.28	121.80
90	0.00	4.09	2.80	129.30
95	0.00	2.48	5.27	133.10
100	0.00	6.75	6.58	136.60
105	0.00	11.62	5.66	134.10
110	0.00	16.56	3.31	130.70
115	0.00	21.53	0.75	123.30
120	0.00	26.51	-1.55	116.10
125	0.00	31.50	-3.45	109.70
130	0.00	36.49	-5.04	100.90
135	0.00	41.48	-6.39	100.00
140	0.00	46.48	-7.56	100.00
145	0.00	51.47	-8.57	100.00
150	0.00	56.47	-9.44	100.00
155	0.00	61.46	-10.00	100.00
160	0.00	66.46	-10.00	100.00
165	0.00	71.45	-10.00	100.00
170	0.00	76.45	-10.00	100.00
175	0.00	81.45	-10.00	100.00
180	0.00	86.44	-10.00	100.00
185	0.00	91.44	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**TAMPA, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	27° 56' 43.7" N	
Longitude (NAD 83)	82° 26' 44.6" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	96.44	-10.00	100.00
195	0.00	101.43	-10.00	100.00
200	0.00	106.43	-10.00	100.00
205	0.00	111.43	-10.00	100.00
210	0.00	116.42	-9.44	100.00
215	0.00	121.42	-8.57	100.00
220	0.00	126.42	-7.56	100.00
225	0.00	131.41	-6.39	100.00
230	0.00	136.40	-5.04	100.90
235	0.00	141.40	-3.45	108.70
240	0.00	146.39	-1.55	116.10
245	0.00	151.38	0.76	123.30
250	0.00	156.36	3.34	130.80
255	0.00	161.34	5.73	134.30
260	0.00	166.29	6.68	136.90
265	0.00	171.21	5.37	133.30
270	0.00	175.91	2.88	129.50
275	0.00	177.52	0.33	122.00
280	0.00	173.25	-1.94	114.80
285	0.00	168.38	-3.91	108.10
290	0.00	163.44	-5.62	100.00
295	0.00	158.47	-7.12	100.00
300	0.00	153.49	-8.45	100.00
305	0.00	148.50	-9.65	100.00
310	0.00	143.51	-10.00	100.00
315	0.00	138.52	-10.00	100.00
320	0.00	133.52	-10.00	100.00
325	0.00	128.53	-10.00	100.00
330	0.00	123.53	-10.00	100.00
335	0.00	118.54	-10.00	100.00
340	0.00	113.54	-10.00	100.00
345	0.00	108.55	-10.00	100.00
350	0.00	103.55	-10.00	100.00
355	0.00	98.55	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — TAMPA, FL

Venue Name	
Latitude (NAD 83)	27° 56' 43.7" N
Longitude (NAD 83)	82° 26' 44.6" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 Meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.9 km / 85.1 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**TAMPA, FL**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	27° 56' 43.7" N
Longitude (NAD 83)	82° 26' 44.6" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 2.2 meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	93.56	-10.00	100.00
5	0.00	88.56	-10.00	100.00
10	0.00	83.56	-10.00	100.00
15	0.00	78.57	-10.00	100.00
20	0.00	73.57	-10.00	100.00
25	0.00	68.57	-10.00	100.00
30	0.00	63.58	-10.00	100.00
35	0.00	58.58	-10.00	100.00
40	0.00	53.58	-10.00	100.00
45	0.00	48.59	-10.00	100.00
50	0.00	43.60	-10.00	100.00
55	0.00	38.60	-9.66	100.00
60	0.00	33.61	-8.47	100.00
65	0.00	28.62	-7.14	100.00
70	0.00	23.64	-5.64	100.00
75	0.00	18.66	-3.94	108.00
80	0.00	13.71	-1.98	114.70
85	0.00	8.79	0.28	121.80
90	0.00	4.09	2.80	129.30
95	0.00	2.48	5.27	133.10
100	0.00	6.75	6.58	136.60
105	0.00	11.62	5.66	134.10
110	0.00	16.56	3.31	130.70
115	0.00	21.53	0.75	123.30
120	0.00	26.51	-1.55	116.10
125	0.00	31.50	-3.45	109.70
130	0.00	36.49	-5.04	100.90
135	0.00	41.48	-6.39	100.00
140	0.00	46.48	-7.56	100.00
145	0.00	51.47	-857.00	100.00
150	0.00	56.47	-9.44	100.00
155	0.00	61.46	-10.00	100.00
160	0.00	66.46	-10.00	100.00
165	0.00	71.45	-10.00	100.00
170	0.00	76.45	-10.00	100.00
175	0.00	81.45	-10.00	100.00
180	0.00	86.44	-10.00	100.00
185	0.00	91.44	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

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Coordination Values	**TAMPA, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	27° 56' 43.7" N	
Longitude (NAD 83)	82° 26' 44.6" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 2.2 meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	96.44	-10.00	100.00
195	0.00	101.43	-10.00	100.00
200	0.00	106.43	-10.00	100.00
205	0.00	111.43	-10.00	100.00
210	0.00	116.42	-9.44	100.00
215	0.00	121.42	-8.57	100.00
220	0.00	126.42	-7.56	100.00
225	0.00	131.41	-6.39	100.00
230	0.00	136.40	-5.04	100.90
235	0.00	141.40	-3.45	109.70
240	0.00	146.39	-1.55	116.10
245	0.00	151.38	0.76	123.30
250	0.00	156.36	3.34	130.80
255	0.00	161.34	5.73	134.30
260	0.00	166.29	6.68	136.90
265	0.00	171.21	5.37	133.30
270	0.00	175.91	2.88	129.50
275	0.00	177.52	0.33	122.00
280	0.00	173.25	-1.94	114.80
285	0.00	168.38	-3.91	108.10
290	0.00	163.44	-5.62	100.00
295	0.00	158.47	-7.12	100.00
300	0.00	153.49	-8.45	100.00
305	0.00	148.50	-9.65	100.00
310	0.00	143.51	-10.00	100.00
315	0.00	138.52	-10.00	100.00
320	0.00	133.52	-10.00	100.00
325	0.00	128.53	-10.00	100.00
330	0.00	123.53	-10.00	100.00
335	0.00	118.54	-10.00	100.00
340	0.00	113.54	-10.00	100.00
345	0.00	108.55	-10.00	100.00
350	0.00	103.55	-10.00	100.00
355	0.00	98.55	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com

Ka-Band Earth Station – San Juan, PR

Frequency Coordination Report

28 GHz

Prepared on Behalf of
O3b Networks USA, LLC

September 16, 2015

COMSEARCH®
A CommScope Company

Table of Contents

1. Summary of Results

On behalf of O3b Networks, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band Earth Stations on Vessels (ESV) in San Juan, Puerto Rico, which will transmit at 28 GHz[1]. Prior-notification letters were sent to the licensees and a copy of the notification data is provided in section four of this report. The earth station coordination was finalized on September 15, 2015.

No objections were received from any of the incumbent 28 GHz licensees. Our notification to the LMDS incumbents was performed under the assumption that the ESV system would be operating on a secondary basis to LMDS Block A operations and a contact at O3b Networks has been provided in case any concerns may arise in the future.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band ESV system in San Juan, Puerto Rico was prior-coordinated by Comsearch. A notification letter and datasheets for this system were sent to the following 28 GHz common carrier fixed microwave licensee on August 13, 2015. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Verizon	Continental US

A notification letter and datasheets for the Ka-Band ESV system in San Juan, Puerto Rico were also sent to the following 28 GHz local television transmission licensee on August 13, 2015. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Information Super Station, LLC	Continental US

No objections were received from the common carrier or local television transmission service incumbents.

[1] The proposed ESV system will operate in the 27.6 – 28.35 GHz portion of the Ka-Band.

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on August 13, 2015. The proposed earth station will operate on frequencies that overlap Block A of the LMDS service. The total frequency allocation for Block A of the LMDS spectrum appears below.

Block A: 27.500-28.350 GHz
29.100-29.250 GHz
31.075-31.225 GHz

Licensee	Market	Market Name
Lightspeed PR LP	BTA488[2]	San Juan, PR
Lightspeed PR LP	BTA489	Mayaguez-Aguadilla-Ponce, PR

No objections were received from the LMDS incumbents.

[2] The proposed ESV system will be located inside BTA488.

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band ESV system in San Juan, Puerto Rico. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — SAN JUAN, PR

Venue Name	
Latitude (NAD 83)	18° 27' 32.4" N
Longitude (NAD 83)	66° 5' 51.7" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		1.2 Meter
Gain / Diameter		48.0 dBi / 1.2 m
3-dB / 15-dB Beamwidth		0.60° / 1.40°
Max Available RF Power	(dBW/4 kHz)	-17.1
	(dBW/MHz)	6.9
Maximum EIRP	(dBW/4 kHz)	30.9
	(dBW/MHz)	54.9
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.1 km / 84.6 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**SAN JUAN, PR**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	18° 27' 32.4" N
Longitude (NAD 83)	66° 5' 51.7" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 1.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	97.75	-10.00	100.00
5	0.00	92.90	-10.00	100.00
10	0.00	88.05	-10.00	100.00
15	0.00	83.20	-10.00	100.00
20	0.00	78.36	-10.00	100.00
25	0.00	73.52	-10.00	100.00
30	0.00	68.69	-10.00	100.00
35	0.00	63.88	-10.00	100.00
40	0.00	59.07	-10.00	100.00
45	0.00	54.29	-10.00	100.00
50	0.00	49.54	-10.00	100.00
55	0.00	44.83	-9.29	100.00
60	0.00	40.17	-8.10	100.00
65	0.00	35.59	-6.78	100.00
70	0.00	31.11	-5.32	100.00
75	0.00	26.80	-3.70	108.80
80	0.00	22.75	-1.93	114.80
85	0.00	19.13	-0.04	120.90
90	0.00	16.23	1.74	126.20
95	0.00	14.48	2.98	129.80
100	0.00	14.31	3.11	130.20
105	0.00	15.78	2.05	127.10
110	0.00	18.50	0.32	122.00
115	0.00	22.00	-1.50	114.50
120	0.00	25.99	-3.37	110.00
125	0.00	30.25	-5.02	100.90
130	0.00	34.70	-6.51	100.00
135	0.00	39.26	-7.84	100.00
140	0.00	43.91	-9.01	100.00
145	0.00	48.61	-10.00	100.00
150	0.00	53.36	-10.00	100.00
155	0.00	58.13	-10.00	100.00
160	0.00	62.93	-10.00	100.00
165	0.00	67.75	-10.00	100.00
170	0.00	72.58	-10.00	100.00
175	0.00	77.41	-10.00	100.00
180	0.00	82.25	-10.00	100.00
185	0.00	87.10	-10.00	100.00

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**SAN JUAN, PR**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	18° 27' 32.4" N	
Longitude (NAD 83)	66° 5' 51.7" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	91.95	-10.00	100.00
195	0.00	96.80	-10.00	100.00
200	0.00	101.64	-10.00	100.00
205	0.00	106.48	-10.00	100.00
210	0.00	111.31	-10.00	100.00
215	0.00	116.13	-10.00	100.00
220	0.00	120.93	-8.96	100.00
225	0.00	125.71	-7.84	100.00
230	0.00	130.46	-6.51	100.00
235	0.00	135.17	-4.96	104.40
240	0.00	139.83	-3.17	110.70
245	0.00	144.41	-1.09	117.50
250	0.00	148.89	1.28	124.90
255	0.00	153.20	3.83	132.10
260	0.00	157.25	5.97	134.90
265	0.00	160.87	6.38	136.10
270	0.00	163.77	4.70	134.50
275	0.00	165.52	2.18	127.50
280	0.00	165.69	-0.28	120.10
285	0.00	164.22	-2.46	113.10
290	0.00	161.50	-4.30	100.00
295	0.00	158.00	-5.96	100.00
300	0.00	154.01	-7.44	100.00
305	0.00	149.75	-8.73	100.00
310	0.00	145.30	-9.91	100.00
315	0.00	140.74	-10.00	100.00
320	0.00	136.09	-10.00	100.00
325	0.00	131.39	-10.00	100.00
330	0.00	126.64	-10.00	100.00
335	0.00	121.87	-10.00	100.00
340	0.00	117.07	-10.00	100.00
345	0.00	112.25	-10.00	100.00
350	0.00	107.42	-10.00	100.00
355	0.00	102.59	-10.00	100.00

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — SAN JUAN, PR

Venue Name	
Latitude (NAD 83)	18° 27' 32.4" N
Longitude (NAD 83)	66° 5' 51.7" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 Meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.1 km / 84.6 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
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Coordination Values	**SAN JUAN, PR**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	18° 27' 32.4" N
Longitude (NAD 83)	66° 5' 51.7" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 2.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	97.75	-10.00	100.00
5	0.00	92.90	-10.00	100.00
10	0.00	88.05	-10.00	100.00
15	0.00	83.20	-10.00	100.00
20	0.00	78.36	-10.00	100.00
25	0.00	73.52	-10.00	100.00
30	0.00	68.69	-10.00	100.00
35	0.00	63.88	-10.00	100.00
40	0.00	59.07	-10.00	100.00
45	0.00	54.29	-10.00	100.00
50	0.00	49.54	-10.00	100.00
55	0.00	44.83	-9.29	100.00
60	0.00	40.17	-8.10	100.00
65	0.00	35.59	-6.78	100.00
70	0.00	31.11	-5.32	100.00
75	0.00	26.80	-3.70	108.80
80	0.00	22.75	-1.93	114.80
85	0.00	19.13	-0.04	120.90
90	0.00	16.23	1.74	126.20
95	0.00	14.48	2.98	129.80
100	0.00	14.31	3.11	130.20
105	0.00	15.78	2.05	127.10
110	0.00	18.50	0.32	122.00
115	0.00	22.00	-1.50	114.50
120	0.00	25.99	-3.37	110.00
125	0.00	30.25	-5.02	100.90
130	0.00	34.70	-6.51	100.00
135	0.00	39.26	-7.84	100.00
140	0.00	43.91	-9.01	100.00
145	0.00	48.61	-10.00	100.00
150	0.00	53.36	-10.00	100.00
155	0.00	58.13	-10.00	100.00
160	0.00	62.93	-10.00	100.00
165	0.00	67.75	-10.00	100.00
170	0.00	72.58	-10.00	100.00
175	0.00	77.41	-10.00	100.00
180	0.00	82.25	-10.00	100.00
185	0.00	87.10	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**SAN JUAN, PR**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	18° 27' 32.4" N	
Longitude (NAD 83)	66° 5' 51.7" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 2.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	91.95	-10.00	100.00
195	0.00	96.80	-10.00	100.00
200	0.00	101.64	-10.00	100.00
205	0.00	106.48	-10.00	100.00
210	0.00	111.31	-10.00	100.00
215	0.00	116.13	-10.00	100.00
220	0.00	120.93	-8.96	100.00
225	0.00	125.71	-7.84	100.00
230	0.00	130.46	-6.51	100.00
235	0.00	135.17	-4.96	104.40
240	0.00	139.83	-3.17	110.70
245	0.00	144.41	-1.09	124.90
250	0.00	148.89	1.28	132.10
255	0.00	153.20	3.83	134.90
260	0.00	157.25	5.97	136.10
265	0.00	160.87	6.38	134.50
270	0.00	163.77	4.70	127.50
275	0.00	165.52	2.18	120.10
280	0.00	165.69	-0.28	113.10
285	0.00	164.22	-2.46	100.00
290	0.00	161.50	-4.30	100.00
295	0.00	158.00	-5.96	100.00
300	0.00	154.01	-7.44	100.00
305	0.00	149.75	-8.73	100.00
310	0.00	145.30	-9.91	100.00
315	0.00	140.74	-10.00	100.00
320	0.00	136.09	-10.00	100.00
325	0.00	131.39	-10.00	100.00
330	0.00	126.64	-10.00	100.00
335	0.00	121.87	-10.00	100.00
340	0.00	117.07	-10.00	100.00
345	0.00	112.25	-10.00	100.00
350	0.00	107.42	-10.00	100.00
355	0.00	102.59	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com

Ka-Band Earth Station – Port Canaveral, FL

Frequency Coordination Report

28 GHz

Prepared on Behalf of
O3b Networks USA, LLC

September 16, 2015

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Table of Contents

1. Summary of Results

On behalf of O3b Networks, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band Earth Stations on Vessels (ESV) in Port Canaveral, Florida, which will transmit at 28 GHz[1]. Prior-notification letters were sent to the licensees and a copy of the notification data is provided in section four of this report. The earth station coordination was finalized on September 15, 2015.

No objections were received from any of the incumbent 28 GHz licensees. Our notification to the LMDS incumbents was performed under the assumption that the ESV system would be operating on a secondary basis to LMDS Block A operations and a contact at O3b Networks has been provided in case any concerns may arise in the future.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band ESV system in Port Canaveral, Florida was prior-coordinated by Comsearch. A notification letter and datasheets for this system were sent to the following 28 GHz common carrier fixed microwave licensees on August 13, 2015. These licensees are authorized to operate temporary fixed operations from 27.5 to 29.5 GHz within specified geographic areas.

Licensee	Authorized Geographic Area
AT&T	Statewide: AL, FL, GA, KY, LA, MS, NC, SC, and TN
Verizon	Continental US

A notification letter and datasheets for the Ka-Band ESV system in Port Canaveral, Florida were also sent to the following 28 GHz local television transmission licensee on August 13, 2015. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Information Super Station, LLC	Continental US

No objections were received from the common carrier or local television transmission service incumbents.

[1] The proposed ESV system will operate in the 27.6 – 28.35 GHz portion of the Ka-Band.

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on August 13, 2015. The proposed earth station will operate on frequencies that overlap Block A of the LMDS service. The total frequency allocation for Block A of the LMDS spectrum appears below.

Block A: 27.500-28.350 GHz
29.100-29.250 GHz
31.075-31.225 GHz

Licensee	Market	Market Name
Nextlink/XO	BTA212	Jacksonville, FL
T-Mobile[2]	BTA212	Jacksonville, FL
Wireless Distribution Services	BTA239	Lakeland-Winter Haven, FL
Rainier Connect	BTA326	Ocala, FL
Straight Path Spectrum	BTA336	Orlando, FL
T-Mobile[3]	BTA336	Orlando, FL
Nextlink/XO	BTA440	Tampa-St. Petersburg-Clearwater, FL
T-Mobile[4]	BTA440	Tampa-St. Petersburg-Clearwater, FL
Nextlink/XO	BTA469	West Palm Beach-Boca Raton, FL
T-Mobile[5]	BTA469	West Palm Beach-Boca Raton, FL

No objections were received from the LMDS incumbents.

[2] T-Mobile has acquired spectrum from Nextlink/XO in the Jacksonville, FL Basic Trading Area (BTA).

[3] T-Mobile has acquired spectrum from Straight Path in the Orlando, FL BTA.

[4] T-Mobile has acquired spectrum from Nextlink/XO in the Tampa-St. Petersburg-Clearwater, FL BTA.

[5] T-Mobile has acquired spectrum from Nextlink/XO in the West Palm Beach-Boca Raton, FL BTA.

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band ESV system in Port Canaveral, Florida. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — PORT CANAVERAL, FL

Venue Name	
Latitude (NAD 83)	28° 24' 40.2" N
Longitude (NAD 83)	80° 37' 42.5" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		1.2 Meter
Gain / Diameter		48.0 dBi / 1.2 m
3-dB / 15-dB Beamwidth		0.60° / 1.40°
Max Available RF Power	(dBW/4 kHz)	-17.1
	(dBW/MHz)	6.9
Maximum EIRP	(dBW/4 kHz)	30.9
	(dBW/MHz)	54.9
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	137.4 km / 85.4 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**PORT CANAVER, FL**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	28° 24' 40.2" N
Longitude (NAD 83)	80° 37' 42.5" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 1.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.49	-10.00	100.00
5	0.00	89.49	-10.00	100.00
10	0.00	84.49	-10.00	100.00
15	0.00	79.49	-10.00	100.00
20	0.00	74.49	-10.00	100.00
25	0.00	69.49	-10.00	100.00
30	0.00	64.49	-10.00	100.00
35	0.00	59.49	-10.00	100.00
40	0.00	54.49	-10.00	100.00
45	0.00	49.49	-10.00	100.00
50	0.00	44.49	-10.00	100.00
55	0.00	39.49	-9.67	100.00
60	0.00	34.49	-8.47	100.00
65	0.00	29.50	-7.14	100.00
70	0.00	24.50	-5.64	100.00
75	0.00	19.50	-3.93	108.00
80	0.00	14.50	-1.96	114.70
85	0.00	9.50	0.33	122.00
90	0.00	4.52	2.90	129.60
95	0.00	0.69	5.45	133.50
100	0.00	5.53	6.84	137.40
105	0.00	10.52	5.91	134.80
110	0.00	15.51	3.49	131.20
115	0.00	20.51	0.87	123.70
120	0.00	25.51	-1.46	116.40
125	0.00	30.51	-3.36	110.00
130	0.00	35.51	-4.95	104.40
135	0.00	40.51	-6.31	100.00
140	0.00	45.51	-7.47	100.00
145	0.00	50.51	-8.48	100.00
150	0.00	55.51	-9.35	100.00
155	0.00	60.51	-10.00	100.00
160	0.00	65.51	-10.00	100.00
165	0.00	70.51	-10.00	100.00
170	0.00	75.51	-10.00	100.00
175	0.00	80.51	-10.00	100.00
180	0.00	85.51	-10.00	100.00
185	0.00	90.51	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**PORT CANAVER, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	28° 24' 40.2" N	
Longitude (NAD 83)	80° 37' 42.5" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.51	-10.00	100.00
195	0.00	100.51	-10.00	100.00
200	0.00	105.51	-10.00	100.00
205	0.00	110.51	-10.00	100.00
210	0.00	115.51	-9.35	100.00
215	0.00	120.51	-8.48	100.00
220	0.00	125.51	-7.47	100.00
225	0.00	130.51	-6.31	100.00
230	0.00	135.51	-4.95	104.40
235	0.00	140.51	-3.36	110.00
240	0.00	145.51	-1.45	116.40
245	0.00	150.50	0.86	123.60
250	0.00	155.50	3.43	131.00
255	0.00	160.50	5.76	134.40
260	0.00	165.50	6.59	136.70
265	0.00	170.50	5.20	132.90
270	0.00	175.48	2.71	129.00
275	0.00	179.31	0.19	121.60
280	0.00	174.47	-2.06	114.40
285	0.00	169.48	-4.01	107.80
290	0.00	164.49	-5.70	100.00
295	0.00	159.49	-7.20	100.00
300	0.00	154.49	-8.52	100.00
305	0.00	149.49	-9.71	100.00
310	0.00	144.49	-10.00	100.00
315	0.00	139.49	-10.00	100.00
320	0.00	134.49	-10.00	100.00
325	0.00	129.49	-10.00	100.00
330	0.00	124.49	-10.00	100.00
335	0.00	119.49	-10.00	100.00
340	0.00	114.49	-10.00	100.00
345	0.00	109.49	-10.00	100.00
350	0.00	104.49	-10.00	100.00
355	0.00	99.49	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — PORT CANAVERAL, FL

Venue Name	
Latitude (NAD 83)	28° 24' 40.2" N
Longitude (NAD 83)	80° 37' 42.5" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 Meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.7 km / 84.9 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**PORT CANAVER, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	28° 24' 40.2" N	
Longitude (NAD 83)	80° 37' 42.5" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 2.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.49	-10.00	100.00
5	0.00	89.49	-10.00	100.00
10	0.00	84.49	-10.00	100.00
15	0.00	79.49	-10.00	100.00
20	0.00	74.49	-10.00	100.00
25	0.00	69.49	-10.00	100.00
30	0.00	64.49	-10.00	100.00
35	0.00	59.49	-10.00	100.00
40	0.00	54.49	-10.00	100.00
45	0.00	49.49	-10.00	100.00
50	0.00	44.49	-10.00	100.00
55	0.00	39.49	-9.67	100.00
60	0.00	34.49	-8.47	100.00
65	0.00	29.50	-7.14	100.00
70	0.00	24.50	-5.64	100.00
75	0.00	19.50	-3.93	100.00
80	0.00	14.50	-1.96	100.00
85	0.00	9.50	0.33	100.00
90	0.00	4.52	2.90	100.00
95	0.00	0.69	5.45	100.00
100	0.00	5.53	6.84	100.00
105	0.00	10.52	5.91	100.00
110	0.00	15.51	3.49	100.00
115	0.00	20.51	0.87	100.00
120	0.00	25.51	-1.46	100.00
125	0.00	30.51	-3.36	100.00
130	0.00	35.51	-4.95	100.00
135	0.00	40.51	-6.31	100.00
140	0.00	45.51	-7.47	100.00
145	0.00	50.51	-8.48	100.00
150	0.00	55.51	-9.35	100.00
155	0.00	60.51	-10.00	100.00
160	0.00	65.51	-10.00	100.00
165	0.00	70.51	-10.00	100.00
170	0.00	75.51	-10.00	100.00
175	0.00	80.51	-10.00	100.00
180	0.00	85.51	-10.00	100.00
185	0.00	90.51	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**PORT CANAVER, FL**
Licensee Name	O3b Networks USA, LLC.
Latitude (NAD 83)	28° 24' 40.2" N
Longitude (NAD 83)	80° 37' 42.5" W
Ground Elevation (AMSL)	0.0 m / 0.0 ft
Antenna Centerline (AGL)	15.54 m / 51.0 ft
Antenna Model	Orbit 2.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.51	-10.00	100.00
195	0.00	100.51	-10.00	100.00
200	0.00	105.51	-10.00	100.00
205	0.00	110.51	-10.00	100.00
210	0.00	115.51	-9.35	100.00
215	0.00	120.51	-8.48	100.00
220	0.00	125.51	-7.47	100.00
225	0.00	130.51	-6.31	100.00
230	0.00	135.51	-4.95	104.40
235	0.00	140.51	-3.36	110.00
240	0.00	145.51	-1.45	116.40
245	0.00	150.50	0.86	123.60
250	0.00	155.50	3.43	131.00
255	0.00	160.50	5.76	134.40
260	0.00	165.50	6.59	136.70
265	0.00	170.50	5.20	132.90
270	0.00	175.48	2.71	129.00
275	0.00	179.31	0.19	121.60
280	0.00	174.47	-2.06	114.40
285	0.00	169.48	-4.01	107.80
290	0.00	164.49	-5.70	100.00
295	0.00	159.49	-7.20	100.00
300	0.00	154.49	-8.52	100.00
305	0.00	149.49	-9.71	100.00
310	0.00	144.49	-10.00	100.00
315	0.00	139.49	-10.00	100.00
320	0.00	134.49	-10.00	100.00
325	0.00	129.49	-10.00	100.00
330	0.00	124.49	-10.00	100.00
335	0.00	119.49	-10.00	100.00
340	0.00	114.49	-10.00	100.00
345	0.00	109.49	-10.00	100.00
350	0.00	104.49	-10.00	100.00
355	0.00	99.49	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com

Ka-Band Earth Station – Miami, FL

Frequency Coordination Report

28 GHz

Prepared on Behalf of
O3b Networks USA, LLC

September 16, 2015

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Table of Contents

1. Summary of Results

On behalf of O3b Networks, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band Earth Stations on Vessels (ESV) in Miami, Florida, which will transmit at 28 GHz[1]. Prior-notification letters were sent to the licensees and a copy of the notification data is provided in section four of this report. The earth station coordination was finalized on September 15, 2015.

No objections were received from any of the incumbent 28 GHz licensees. Our notification to the LMDS incumbents was performed under the assumption that the ESV system would be operating on a secondary basis to LMDS Block A operations and a contact at O3b Networks has been provided in case any concerns may arise in the future.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band ESV system in Miami, Florida was prior-coordinated by Comsearch. A notification letter and datasheets for this system were sent to the following 28 GHz common carrier fixed microwave licensees on August 13, 2015. These licensees are authorized to operate temporary fixed operations from 27.5 to 29.5 GHz within specified geographic areas.

Licensee	Authorized Geographic Area
AT&T	Statewide: AL, FL, GA, KY, LA, MS, NC, SC, and TN
Verizon	Continental US

A notification letter and datasheets for the Ka-Band ESV system in Miami, Florida were also sent to the following 28 GHz local television transmission licensee on August 13, 2015. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Information Super Station, LLC	Continental US

No objections were received from the common carrier or local television transmission service incumbents.

[1] The proposed ESV system will operate in the 27.6 – 28.35 GHz portion of the Ka-Band.

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on August 13, 2015. The proposed earth station will operate on frequencies that overlap Block A of the LMDS service. The total frequency allocation for Block A of the LMDS spectrum appears below.

Block A: 27.500-28.350 GHz
29.100-29.250 GHz
31.075-31.225 GHz

Licensee	Market	Market Name
Nextlink/XO	BTA293[2]	Miami-Ft. Lauderdale, FL
T-Mobile[3]	BTA293	Miami-Ft. Lauderdale, FL
Nextlink/XO	BTA469	West Palm Beach-Boca Raton, FL
T-Mobile[4]	BTA469	West Palm Beach-Boca Raton, FL

No objections were received from the LMDS incumbents.

[2] The proposed ESV system will be located inside BTA293.

[3] T-Mobile has acquired spectrum from Nextlink/XO in the Miami-Ft. Lauderdale, FL Basic Trading Area (BTA).

[4] T-Mobile has acquired spectrum from Nextlink/XO in the West Palm Beach-Boca Raton, FL BTA.

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band ESV system in Miami, Florida. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — MIAMI, FL

Venue Name	
Latitude (NAD 83)	25° 46' 43.5" N
Longitude (NAD 83)	80° 10' 40.4" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		1.2 Meter
Gain / Diameter		48.0 dBi / 1.2 m
3-dB / 15-dB Beamwidth		0.60° / 1.40°
Max Available RF Power	(dBW/4 kHz)	-17.1
	(dBW/MHz)	6.9
Maximum EIRP	(dBW/4 kHz)	30.9
	(dBW/MHz)	54.9
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	137.4 km / 85.4 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

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Coordination Values	**MIAMI, FL**
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Antenna Model	Orbit 1.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.31	-10.00	100.00
5	0.00	89.31	-10.00	100.00
10	0.00	84.31	-10.00	100.00
15	0.00	79.31	-10.00	100.00
20	0.00	74.31	-10.00	100.00
25	0.00	69.31	-10.00	100.00
30	0.00	64.31	-10.00	100.00
35	0.00	59.31	-10.00	100.00
40	0.00	54.31	-10.00	100.00
45	0.00	49.31	-10.00	100.00
50	0.00	44.31	-10.00	100.00
55	0.00	39.31	-9.40	100.00
60	0.00	34.31	-8.18	100.00
65	0.00	29.31	-6.81	100.00
70	0.00	24.31	-5.26	100.10
75	0.00	19.31	-3.49	109.60
80	0.00	14.31	-1.45	116.40
85	0.00	9.31	0.91	123.80
90	0.00	4.31	3.53	131.30
95	0.00	0.71	5.95	134.90
100	0.00	5.69	6.87	137.40
105	0.00	10.69	5.44	133.50
110	0.00	15.69	2.88	129.50
115	0.00	20.69	0.31	121.90
120	0.00	25.69	-1.96	114.70
125	0.00	30.69	-3.84	108.30
130	0.00	35.69	-5.42	100.00
135	0.00	40.69	-6.77	100.00
140	0.00	45.69	-7.93	100.00
145	0.00	50.69	-8.95	100.00
150	0.00	55.69	-9.83	100.00
155	0.00	60.69	-10.00	100.00
160	0.00	65.69	-10.00	100.00
165	0.00	70.69	-10.00	100.00
170	0.00	75.69	-10.00	100.00
175	0.00	80.69	-10.00	100.00
180	0.00	85.69	-10.00	100.00
185	0.00	90.69	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**MIAMI, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	25° 46' 43.5" N	
Longitude (NAD 83)	80° 10' 40.4" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.69	-10.00	100.00
195	0.00	100.69	-10.00	100.00
200	0.00	105.69	-10.00	100.00
205	0.00	110.69	-10.00	100.00
210	0.00	115.69	-9.83	100.00
215	0.00	120.69	-8.95	100.00
220	0.00	125.69	-7.93	100.00
225	0.00	130.69	-6.77	100.00
230	0.00	135.69	-5.42	100.00
235	0.00	140.69	-3.84	108.30
240	0.00	145.69	-1.96	114.70
245	0.00	150.69	0.29	121.90
250	0.00	155.69	2.81	129.30
255	0.00	160.69	5.25	133.00
260	0.00	165.69	6.53	136.50
265	0.00	170.69	5.60	134.00
270	0.00	175.69	3.26	130.60
275	0.00	179.29	0.71	123.20
280	0.00	174.31	-1.60	115.90
285	0.00	169.31	-3.61	109.20
290	0.00	164.31	-5.35	100.00
295	0.00	159.31	-6.88	100.00
300	0.00	154.31	-8.24	100.00
305	0.00	149.31	-9.45	100.00
310	0.00	144.31	-10.00	100.00
315	0.00	139.31	-10.00	100.00
320	0.00	134.31	-10.00	100.00
325	0.00	129.31	-10.00	100.00
330	0.00	124.31	-10.00	100.00
335	0.00	119.31	-10.00	100.00
340	0.00	114.31	-10.00	100.00
345	0.00	109.31	-10.00	100.00
350	0.00	104.31	-10.00	100.00
355	0.00	99.31	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — MIAMI, FL

Venue Name	
Latitude (NAD 83)	25° 46' 43.5" N
Longitude (NAD 83)	80° 10' 40.4" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	137.4 km / 85.4 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

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Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	94.31	-10.00	100.00
5	0.00	89.31	-10.00	100.00
10	0.00	84.31	-10.00	100.00
15	0.00	79.31	-10.00	100.00
20	0.00	74.31	-10.00	100.00
25	0.00	69.31	-10.00	100.00
30	0.00	64.31	-10.00	100.00
35	0.00	59.31	-10.00	100.00
40	0.00	54.31	-10.00	100.00
45	0.00	49.31	-10.00	100.00
50	0.00	44.31	-10.00	100.00
55	0.00	39.31	-9.40	100.00
60	0.00	34.31	-8.18	100.00
65	0.00	29.31	-6.81	100.00
70	0.00	24.31	-5.26	100.10
75	0.00	19.31	-3.49	109.60
80	0.00	14.31	-1.45	116.40
85	0.00	9.31	0.91	123.80
90	0.00	4.31	3.53	131.30
95	0.00	0.71	5.95	134.90
100	0.00	5.69	6.87	137.40
105	0.00	10.69	5.44	133.50
110	0.00	15.69	2.88	129.50
115	0.00	20.69	0.31	121.90
120	0.00	25.69	-1.96	114.70
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130	0.00	35.69	-5.42	100.00
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145	0.00	50.69	-8.95	100.00
150	0.00	55.69	-9.83	100.00
155	0.00	60.69	-10.00	100.00
160	0.00	65.69	-10.00	100.00
165	0.00	70.69	-10.00	100.00
170	0.00	75.69	-10.00	100.00
175	0.00	80.69	-10.00	100.00
180	0.00	85.69	-10.00	100.00
185	0.00	90.69	-10.00	100.00

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Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	95.69	-10.00	100.00
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220	0.00	125.69	-7.93	100.00
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340	0.00	114.31	-10.00	100.00
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350	0.00	104.31	-10.00	100.00
355	0.00	99.31	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com

Ka-Band Earth Station – Key West, FL

Frequency Coordination Report

28 GHz

Prepared on Behalf of
O3b Networks USA, LLC

September 16, 2015

COMSEARCH®
A CommScope Company

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19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — KEY WEST, FL

Venue Name	
Latitude (NAD 83)	24° 33' 35.9" N
Longitude (NAD 83)	81° 48' 24.1" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
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	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.8 km / 85.0 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**KEY WEST, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	24° 33' 35.9" N	
Longitude (NAD 83)	81° 48' 24.1" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	93.43	-10.00	100.00
5	0.00	88.43	-10.00	100.00
10	0.00	83.43	-10.00	100.00
15	0.00	78.43	-10.00	100.00
20	0.00	73.43	-10.00	100.00
25	0.00	68.43	-10.00	100.00
30	0.00	63.43	-10.00	100.00
35	0.00	58.44	-10.00	100.00
40	0.00	53.44	-10.00	100.00
45	0.00	48.44	-10.00	100.00
50	0.00	43.44	-10.00	100.00
55	0.00	38.44	-9.37	100.00
60	0.00	33.45	-8.15	100.00
65	0.00	28.45	-6.78	100.00
70	0.00	23.46	-5.24	100.10
75	0.00	18.47	-3.49	109.60
80	0.00	13.48	-1.47	116.30
85	0.00	8.52	0.83	123.50
90	0.00	3.65	3.34	130.80
95	0.00	2.01	5.56	133.80
100	0.00	6.69	6.28	135.80
105	0.00	11.64	4.90	135.00
110	0.00	16.62	2.49	128.40
115	0.00	21.61	0.02	121.10
120	0.00	26.60	-2.18	114.00
125	0.00	31.60	-4.05	107.60
130	0.00	36.59	-5.62	100.00
135	0.00	41.59	-6.97	100.00
140	0.00	46.59	-8.13	100.00
145	0.00	51.58	-9.15	100.00
150	0.00	56.58	-10.00	100.00
155	0.00	61.58	-10.00	100.00
160	0.00	66.58	-10.00	100.00
165	0.00	71.58	-10.00	100.00
170	0.00	76.58	-10.00	100.00
175	0.00	81.58	-10.00	100.00
180	0.00	86.57	-10.00	100.00
185	0.00	91.57	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5662 http://www.comsearch.com

Coordination Values	**KEY WEST, FL**	
Licensee Name	O3b Networks USA, LLC.	
Latitude (NAD 83)	24° 33' 35.9" N	
Longitude (NAD 83)	81° 48' 24.1" W	
Ground Elevation (AMSL)	0.0 m / 0.0 ft	
Antenna Centerline (AGL)	15.54 m / 51.0 ft	
Antenna Model	Orbit 1.2 Meter	
Antenna Mode	Transmit 28.0 GHz	
Interference Objectives: Long Term	-151.0 dBW/4 kHz	20%
Short Term	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power	-17.1 (dBW/4 kHz)	

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	96.57	-10.00	100.00
195	0.00	101.57	-10.00	100.00
200	0.00	106.57	-10.00	100.00
205	0.00	111.57	-10.00	100.00
210	0.00	116.57	-10.00	100.00
215	0.00	121.56	-9.15	100.00
220	0.00	126.56	-8.13	100.00
225	0.00	131.56	-6.97	100.00
230	0.00	136.56	-5.62	100.00
235	0.00	141.56	-4.05	107.60
240	0.00	146.55	-2.18	114.00
245	0.00	151.55	0.05	121.10
250	0.00	156.54	2.57	128.60
255	0.00	161.53	5.10	132.60
260	0.00	166.52	6.64	136.80
265	0.00	171.48	5.94	134.90
270	0.00	176.35	3.64	131.60
275	0.00	177.99	1.05	124.20
280	0.00	173.31	-1.31	116.80
285	0.00	168.36	-3.36	110.00
290	0.00	163.38	-5.14	100.50
295	0.00	158.39	-6.70	100.00
300	0.00	153.40	-8.08	100.00
305	0.00	148.40	-9.31	100.00
310	0.00	143.41	-10.00	100.00
315	0.00	138.41	-10.00	100.00
320	0.00	133.41	-10.00	100.00
325	0.00	128.42	-10.00	100.00
330	0.00	123.42	-10.00	100.00
335	0.00	118.42	-10.00	100.00
340	0.00	113.42	-10.00	100.00
345	0.00	108.42	-10.00	100.00
350	0.00	103.42	-10.00	100.00
355	0.00	98.42	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

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Date:	08/04/2015
Job Number:	<PCNJobCode>

Administrative Information

Status	ENGINEER PROPOSAL
Call Sign	<PCNCallSign>
Licensee Code	O3BNET
Licensee Name	O3b Networks USA, LLC.

Site Information — KEY WEST, FL

Venue Name	
Latitude (NAD 83)	24° 33' 35.9" N
Longitude (NAD 83)	81° 48' 24.1" W
Climate Zone	B
Rain Zone	1
Ground Elevation (AMSL)	0.0 m / 0.0 ft

Link Information

Satellite Type	Medium Earth Orbit
Mode	TO - Transmit-Only
Modulation	Digital
Minimum Elevation Angle	10.0°
Azimuth Range	0.0° to 360°
Antenna Centerline (AGL)	15.54 m / 51.0 ft

Antenna Information — Transmit - FCC32

Manufacturer		Orbit
Model		2.2 Meter
Gain / Diameter		52.5 dBi / 2.2 m
3-dB / 15-dB Beamwidth		0.14° / 0.32°
Max Available RF Power	(dBW/4 kHz)	-22.1
	(dBW/MHz)	1.9
Maximum EIRP	(dBW/4 kHz)	30.4
	(dBW/MHz)	54.4
Interference Objectives:	Long Term	-151.0 dBW/4 kHz 20%
	Short Term	-128.0 dBW/4 kHz 0.0025%

Frequency Information — Transmit 28.0 GHz

Emission / Frequency Range (MHz)	12M0G7D - 216MG7D / 27600.0 - 28350.0
Max Great Circle Coordination Distance	136.8 km / 85.0 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

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Antenna Model	Orbit 2.2 Meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-22.1 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	93.43	-10.00	100.00
5	0.00	88.43	-10.00	100.00
10	0.00	83.43	-10.00	100.00
15	0.00	78.43	-10.00	100.00
20	0.00	73.43	-10.00	100.00
25	0.00	68.43	-10.00	100.00
30	0.00	63.43	-10.00	100.00
35	0.00	58.44	-10.00	100.00
40	0.00	53.44	-10.00	100.00
45	0.00	48.44	-10.00	100.00
50	0.00	43.44	-10.00	100.00
55	0.00	38.44	-9.37	100.00
60	0.00	33.45	-8.15	100.00
65	0.00	28.45	-6.78	100.00
70	0.00	23.46	-5.24	100.10
75	0.00	18.47	-3.49	109.60
80	0.00	13.48	-1.47	116.30
85	0.00	8.52	0.83	123.50
90	0.00	3.65	3.34	130.80
95	0.00	2.01	5.56	133.80
100	0.00	6.69	6.28	135.80
105	0.00	11.64	4.90	135.00
110	0.00	16.62	2.49	128.40
115	0.00	21.61	0.02	121.10
120	0.00	26.60	-2.18	114.00
125	0.00	31.60	-4.05	100.00
130	0.00	36.59	-5.62	107.60
135	0.00	41.59	-6.97	100.00
140	0.00	46.59	-8.13	100.00
145	0.00	51.58	-9.15	100.00
150	0.00	56.58	-10.00	100.00
155	0.00	61.58	-10.00	100.00
160	0.00	66.58	-10.00	100.00
165	0.00	71.58	-10.00	100.00
170	0.00	76.58	-10.00	100.00
175	0.00	81.58	-10.00	100.00
180	0.00	86.57	-10.00	100.00
185	0.00	91.57	-10.00	100.00

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210	0.00	116.57	-10.00	100.00
215	0.00	121.56	-9.15	100.00
220	0.00	126.56	-8.13	100.00
225	0.00	131.56	-6.97	100.00
230	0.00	136.56	-5.62	100.00
235	0.00	141.56	-4.05	107.60
240	0.00	146.55	-2.18	114.00
245	0.00	151.55	0.05	121.10
250	0.00	156.54	2.57	128.60
255	0.00	161.53	5.10	132.60
260	0.00	166.52	6.64	136.80
265	0.00	171.48	5.94	134.90
270	0.00	176.35	3.64	131.60
275	0.00	177.99	1.05	124.20
280	0.00	173.31	-1.31	116.80
285	0.00	168.36	-3.36	110.00
290	0.00	163.38	-5.14	100.50
295	0.00	158.39	-6.70	100.00
300	0.00	153.40	-8.08	100.00
305	0.00	148.40	-9.31	100.00
310	0.00	143.41	-10.00	100.00
315	0.00	138.41	-10.00	100.00
320	0.00	133.41	-10.00	100.00
325	0.00	128.42	-10.00	100.00
330	0.00	123.42	-10.00	100.00
335	0.00	118.42	-10.00	100.00
340	0.00	113.42	-10.00	100.00
345	0.00	108.42	-10.00	100.00
350	0.00	103.42	-10.00	100.00
355	0.00	98.42	-10.00	100.00

5. Contact Information

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	jlynch@comsearch.com
Web site:	www.comsearch.com