

Ka-Band Earth Station – Asheville, NC

Frequency Coordination Report

28 GHz



Prepared on Behalf of
O3b Networks USA, LLC

July 30, 2014



Table of Contents

1.	Summary of Results	- 1 -
2.	28 GHz Common Carrier and LTTS Coordination	- 1 -
3.	28 GHz LMDS Coordination	- 2 -
4.	Earth Station Coordination Data	- 3 -
5.	Contact Information	- 7 -

1. Summary of Results

On behalf of Ob3 Networks, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band earth station in Asheville, NC, which will transmit at 28 GHz¹. 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 July 30, 2014.

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 earth station 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 earth station in Asheville, NC was prior-coordinated by Comsearch. A notification letter and datasheets for this earth station were sent to the following 28 GHz common carrier fixed microwave licensee on June 26, 2014. This licensee is authorized to operate temporary fixed operations from 27.5 – 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Verizon	Continental US

A notification letter and datasheets for the Ka-Band earth station in Asheville, NC were also sent to the following 28 GHz local television transmission licensee on June 26, 2014. This licensee is authorized to operate temporary fixed operations from 27.5 – 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 earth station will operate in the 27.6 – 28.4 GHz portion of the Ka-Band.

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on June 26, 2014. 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
Highland Holdings, LLC	BTA020 ²	Asheville-Hendersonville, NC
Nextlink/XO	BTA024	Atlanta, GA
T-Mobile ³	BTA024	Atlanta, GA
Nextlink/XO	BTA074	Charlotte-Gastonia, NC
Straight Path Spectrum	BTA174	Greensboro-Winston-Salem-High Point, NC
Nextlink/XO	BTA177	Greenville-Spartanburg, SC
Nextlink/XO	BTA189	Hickory-Lenoir-Morganton, NC
Virginia Tech Foundation	BTA229	Kingsport-Johnston City, TN; Bristol, VA
Nextlink/XO	BTA232	Knoxville, TN

No objections were received from the LMDS incumbents.

² The proposed earth station will be located inside BTA020.

³ T-Mobile has acquired a portion of LMDS spectrum from Nextlink Wireless / XO in the Atlanta, GA Basic Trading Area (BTA).

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band earth station in Asheville, NC. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

Date: 06/25/2014
Job Number: <PCNJobCode>

Administrative Information

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

Site Information**ASHEVILLE, NC**

Venue Name
Latitude (NAD 83) 35° 38' 24.0" N
Longitude (NAD 83) 82° 34' 30.0" W
Climate Zone A
Rain Zone 1
Ground Elevation (AMSL) 639.94 m / 2099.5 ft

Link Information

Satellite Type Medium Earth Orbit
Mode TR - Transmit-Receive
Modulation Digital
Minimum Elevation Angle 15.0°
Azimuth Range 0.0° to 360°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information**Receive - FCC32****Transmit - FCC32**

Manufacturer	AVL	AVL
Model	0.85 Meter	0.85 Meter
Gain / Diameter	42.6 dBi / 0.8 m	46.0 dBi / 0.8 m
3-dB / 15-dB Beamwidth	1.30° / 3.20°	0.90° / 2.10°
Max Available RF Power (dBW/4 kHz)		-11.8
	(dBW/MHz)	12.2
Maximum EIRP (dBW/4 kHz)		34.2
	(dBW/MHz)	58.2
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%
	Short Term	-146.0 dBW/MHz 0.01%
		-151.0 dBW/4 kHz 20%
		-128.0 dBW/4 kHz 0.0025%

Frequency Information**Receive 18.0 GHz****Transmit 28.0 GHz**

Emission / Frequency Range (MHz)	1M00G7D - 216MG7D / 17852.0 - 18068.0	1M00G7D - 216MG7D / 27652.0 - 27868.0
	1M00G7D - 216MG7D / 18112.0 - 18328.0	1M00G7D - 216MG7D / 27912.0 - 28128.0
	1M00G7D - 216MG7D / 18372.0 - 18588.0	1M00G7D - 216MG7D / 28172.0 - 28388.0

Max Great Circle Coordination Distance	158.8 km / 98.7 mi	124.7 km / 77.5 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

Coordination Values		ASHEVILLE, NC			
Licensee Name		O3b Networks USA, LLC.			
Latitude (NAD 83)		35° 38' 24.0" N			
Longitude (NAD 83)		82° 34' 30.0" W			
Ground Elevation (AMSL)		639.94 m / 2099.5 ft			
Antenna Centerline (AGL)		2.74 m / 9.0 ft			
Antenna Model		AVL 0.85 Meter			
Antenna Mode		Receive 18.0 GHz		Transmit 28.0 GHz	
Interference Objectives:	Long Term	-156.0 dBW/MHz		-151.0 dBW/4 kHz	
	Short Term	-146.0 dBW/MHz		-128.0 dBW/4 kHz	
Max Available RF Power		20%		20%	
		0.01%		0.0025%	
		-11.8 (dBW/4 kHz)			

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	6.41	94.29	-10.00	100.00	-10.00	100.00
5	6.78	89.35	-10.00	100.00	-10.00	100.00
10	7.72	84.44	-10.00	100.00	-10.00	100.00
15	9.24	79.58	-10.00	100.00	-10.00	100.00
20	10.70	74.78	-10.00	100.00	-10.00	100.00
25	12.34	70.08	-10.00	100.00	-10.00	100.00
30	12.56	65.31	-10.00	100.00	-10.00	100.00
35	11.10	60.31	-10.00	100.00	-10.00	100.00
40	9.09	55.20	-10.00	100.00	-10.00	100.00
45	8.25	50.23	-10.00	100.00	-10.00	100.00
50	8.64	45.47	-10.00	100.00	-10.00	100.00
55	7.59	40.45	-10.00	100.00	-10.00	100.00
60	5.93	35.27	-10.00	100.00	-10.00	100.00
65	4.61	30.15	-9.14	100.00	-9.14	100.00
70	3.87	25.15	-7.94	100.00	-7.94	100.00
75	3.84	20.37	-6.56	100.00	-6.56	100.00
80	3.47	15.57	-5.05	100.00	-5.05	100.00
85	3.69	11.28	-3.26	100.00	-3.26	100.00
90	3.79	7.77	-1.23	100.00	-1.23	100.00
95	3.75	6.44	1.01	100.00	1.01	100.00
100	4.06	8.78	3.54	100.00	3.54	100.00
105	4.41	12.77	5.78	100.00	5.78	100.00
110	4.16	17.04	5.84	100.00	5.84	100.00
115	4.40	21.78	4.41	100.00	4.41	100.00
120	4.24	26.51	1.89	100.00	1.89	100.00
125	4.15	31.33	-0.41	100.00	-0.41	100.00
130	3.94	36.18	-2.29	100.00	-2.29	100.00
135	3.58	41.05	-3.88	100.00	-3.58	100.00
140	3.23	45.95	-5.21	100.00	-5.21	100.00
145	2.90	50.88	-6.33	100.00	-6.33	100.00
150	2.39	55.81	-7.31	100.00	-7.31	100.00
155	2.18	60.77	-8.08	100.00	-8.08	100.00
160	1.67	65.73	-8.77	100.00	-8.77	100.00
165	1.82	70.72	-9.19	100.00	-9.19	100.00
170	0.95	75.68	-9.70	100.00	-9.70	100.00
175	0.78	80.67	-9.94	104.60	-9.94	100.00
180	0.94	85.66	-9.96	100.00	-9.96	100.00
185	0.94	90.65	-9.89	100.00	-9.89	100.00

Coordination Values		ASHEVILLE, NC			
Licensee Name		O3b Networks USA, LLC.			
Latitude (NAD 83)		35° 38' 24.0" N			
Longitude (NAD 83)		82° 34' 30.0" W			
Ground Elevation (AMSL)		639.94 m / 2099.5 ft			
Antenna Centerline (AGL)		2.74 m / 9.0 ft			
Antenna Model		AVL 0.85 Meter			
Antenna Mode		Receive 18.0 GHz		Transmit 28.0 GHz	
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-151.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-128.0 dBW/4 kHz	0.0025%
Max Available RF Power			-11.8 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	1.30	95.64	-9.62	100.00	-9.62	100.00
195	0.68	100.64	-9.44	107.80	-9.44	100.00
200	0.95	105.62	-8.93	100.00	-8.93	100.00
205	0.84	110.61	-8.37	104.10	-8.37	100.00
210	1.54	115.58	-7.50	100.00	-7.50	100.00
215	2.20	120.53	-6.49	100.00	-6.49	100.00
220	1.83	125.53	-5.55	100.00	-5.55	100.00
225	1.16	130.55	-4.52	103.60	-4.52	100.00
230	1.55	135.50	-3.00	100.00	-3.00	100.00
235	1.69	140.45	-1.25	100.20	-1.25	100.00
240	1.72	145.41	0.73	104.90	0.73	100.00
245	0.76	150.47	1.93	134.90	1.93	103.50
250	0.56	155.46	2.74	146.90	2.74	114.20
255	0.54	160.40	2.54	146.90	2.54	114.30
260	0.37	165.35	1.24	156.00	1.24	122.40
265	0.28	170.21	-0.49	158.80	-0.49	124.70
270	0.27	174.76	-2.27	153.00	-2.27	120.80
275	0.52	176.75	-3.92	128.50	-3.92	100.00
280	0.92	173.31	-5.44	108.10	-5.44	100.00
285	1.06	168.72	-6.87	100.00	-6.87	100.00
290	1.82	163.73	-8.12	100.00	-8.12	100.00
295	2.36	158.77	-9.29	100.00	-9.29	100.00
300	3.04	153.76	-10.00	100.00	-10.00	100.00
305	3.61	148.77	-10.00	100.00	-10.00	100.00
310	3.27	143.92	-10.00	100.00	-10.00	100.00
315	2.98	139.02	-10.00	100.00	-10.00	100.00
320	2.39	134.13	-10.00	100.00	-10.00	100.00
325	2.24	129.17	-10.00	100.00	-10.00	100.00
330	2.20	124.20	-10.00	100.00	-10.00	100.00
335	2.67	119.21	-10.00	100.00	-10.00	100.00
340	3.17	114.21	-10.00	100.00	-10.00	100.00
345	3.36	109.23	-10.00	100.00	-10.00	100.00
350	4.72	104.22	-10.00	100.00	-10.00	100.00
355	5.39	99.25	-10.00	100.00	-10.00	100.00

Date: 06/25/2014
Job Number: <PCNJobCode>

Administrative Information

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

Site Information**ASHEVILLE, NC**

Venue Name
Latitude (NAD 83) 35° 38' 24.0" N
Longitude (NAD 83) 82° 34' 30.0" W
Climate Zone A
Rain Zone 1
Ground Elevation (AMSL) 639.94 m / 2099.5 ft

Link Information

Satellite Type Medium Earth Orbit
Mode TR - Transmit-Receive
Modulation Digital
Minimum Elevation Angle 15.0°
Azimuth Range 0.0° to 360°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information**Receive - FCC32****Transmit - FCC32**

Manufacturer	AVL	AVL
Model	2.4 Meter	2.4 Meter
Gain / Diameter	51.3 dBi / 2.4 m	54.7 dBi / 2.4 m
3-dB / 15-dB Beamwidth	0.23° / 0.60°	0.14° / 0.32°
Max Available RF Power (dBW/4 kHz)		-9.8
	(dBW/MHz)	14.2
Maximum EIRP (dBW/4 kHz)		44.9
	(dBW/MHz)	68.9
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%
	Short Term	-146.0 dBW/MHz 0.01%
		-151.0 dBW/4 kHz 20%
		-128.0 dBW/4 kHz 0.0025%

Frequency Information**Receive 18.0 GHz****Transmit 28.0 GHz**

Emission / Frequency Range (MHz)	1M00G7D - 216MG7D / 17852.0 - 18068.0	1M00G7D - 216MG7D / 27652.0 - 27868.0
	1M00G7D - 216MG7D / 18112.0 - 18328.0	1M00G7D - 216MG7D / 27912.0 - 28128.0
	1M00G7D - 216MG7D / 18372.0 - 18588.0	1M00G7D - 216MG7D / 28172.0 - 28388.0

Max Great Circle Coordination Distance	158.8 km / 98.7 mi	124.7 km / 77.5 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

Coordination Values		ASHEVILLE, NC			
Licensee Name		O3b Networks USA, LLC.			
Latitude (NAD 83)		35° 38' 24.0" N			
Longitude (NAD 83)		82° 34' 30.0" W			
Ground Elevation (AMSL)		639.94 m / 2099.5 ft			
Antenna Centerline (AGL)		2.74 m / 9.0 ft			
Antenna Model		AVL 2.4 Meter			
Antenna Mode		Receive 18.0 GHz		Transmit 28.0 GHz	
Interference Objectives:	Long Term	-156.0 dBW/MHz		20%	-151.0 dBW/4 kHz 20%
	Short Term	-146.0 dBW/MHz		0.01%	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power		-11.8 (dBW/4 kHz)			

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	6.41	94.29	-10.00	100.00	-10.00	100.00
5	6.78	89.35	-10.00	100.00	-10.00	100.00
10	7.72	84.44	-10.00	100.00	-10.00	100.00
15	9.24	79.58	-10.00	100.00	-10.00	100.00
20	10.70	74.78	-10.00	100.00	-10.00	100.00
25	12.34	70.08	-10.00	100.00	-10.00	100.00
30	12.56	65.31	-10.00	100.00	-10.00	100.00
35	11.10	60.31	-10.00	100.00	-10.00	100.00
40	9.09	55.20	-10.00	100.00	-10.00	100.00
45	8.25	50.23	-10.00	100.00	-10.00	100.00
50	8.64	45.47	-10.00	100.00	-10.00	100.00
55	7.59	40.45	-10.00	100.00	-10.00	100.00
60	5.93	35.27	-10.00	100.00	-10.00	100.00
65	4.61	30.15	-9.14	100.00	-9.14	100.00
70	3.87	25.15	-7.94	100.00	-7.94	100.00
75	3.84	20.37	-6.56	100.00	-6.56	100.00
80	3.47	15.57	-5.05	100.00	-5.05	100.00
85	3.69	11.28	-3.26	100.00	-3.26	100.00
90	3.79	7.77	-1.23	100.00	-1.23	100.00
95	3.75	6.44	1.01	100.00	1.01	100.00
100	4.06	8.78	3.54	100.00	3.54	100.00
105	4.41	12.77	5.78	100.00	5.78	100.00
110	4.16	17.04	5.84	100.00	5.84	100.00
115	4.40	21.78	4.41	100.00	4.41	100.00
120	4.24	26.51	1.89	100.00	1.89	100.00
125	4.13	31.33	-0.41	100.00	-0.41	100.00
130	3.94	36.18	-2.29	100.00	-2.29	100.00
135	3.58	41.05	-3.88	100.00	-3.88	100.00
140	3.23	45.95	-5.21	100.00	-5.21	100.00
145	2.90	50.88	-6.33	100.00	-6.33	100.00
150	2.39	55.81	-7.31	100.00	-7.31	100.00
155	2.18	60.77	-8.08	100.00	-8.08	100.00
160	1.67	65.73	-8.77	100.00	-8.77	100.00
165	1.82	70.72	-9.19	100.00	-9.19	100.00
170	0.95	75.68	-9.70	100.00	-9.70	100.00
175	0.73	80.67	-9.94	104.60	-9.94	100.00
180	0.94	85.66	-9.96	100.00	-9.96	100.00
185	0.94	90.65	-9.89	100.00	-9.89	100.00

Coordination Values		ASHEVILLE, NC	
Licensee Name		O3b Networks USA, LLC.	
Latitude (NAD 83)		35° 38' 24.0" N	
Longitude (NAD 83)		82° 34' 30.0" W	
Ground Elevation (AMSL)		639.94 m / 2099.5 ft	
Antenna Centerline (AGL)		2.74 m / 9.0 ft	
Antenna Model		AVL 2.4 Meter	
Antenna Mode		Receive 18.0 GHz	Transmit 28.0 GHz
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%
	Short Term	-146.0 dBW/MHz	0.01%
Max Available RF Power			-11.8 (dBW/4 kHz)

Azimuth (°)	Transmit 28.0 GHz	Antenna Discrimination (°)	Receive 18.0 GHz	Coordination Distance (km)	Transmit 28.0 GHz	Coordination Distance (km)
	Horizon Elevation (°)		Horizon Gain (dBi)		Horizon Gain (dBi)	
190	1.30	95.64	-9.62	100.00	-9.62	100.00
195	0.68	100.64	-9.44	107.80	-9.44	100.00
200	0.95	105.62	-8.93	100.00	-8.93	100.00
205	0.84	110.61	-8.37	104.10	-8.37	100.00
210	1.54	115.58	-7.50	100.00	-7.50	100.00
215	2.20	120.53	-6.49	100.00	-6.49	100.00
220	1.83	125.53	-5.55	100.00	-5.55	100.00
225	1.16	130.55	-4.52	103.60	-4.52	100.00
230	1.55	135.50	-3.00	100.00	-3.00	100.00
235	1.69	140.45	-1.25	100.20	-1.25	100.00
240	1.72	145.41	0.73	104.90	0.73	100.00
245	0.76	150.47	1.93	134.90	1.93	103.50
250	0.56	155.46	2.74	146.90	2.74	114.20
255	0.54	160.40	2.54	146.90	2.54	114.30
260	0.37	165.35	1.24	156.00	1.24	122.40
265	0.28	170.21	-0.49	158.80	-0.49	124.70
270	0.27	174.76	-2.27	153.00	-2.27	120.80
275	0.52	176.75	-3.92	128.50	-3.92	100.00
280	0.92	173.31	-5.44	108.10	-5.44	100.00
285	1.06	168.72	-6.87	100.00	-6.87	100.00
290	1.82	163.73	-8.12	100.00	-8.12	100.00
295	2.36	158.77	-9.29	100.00	-9.29	100.00
300	3.04	153.76	-10.00	100.00	-10.00	100.00
305	3.61	148.77	-10.00	100.00	-10.00	100.00
310	3.27	143.92	-10.00	100.00	-10.00	100.00
315	2.98	139.02	-10.00	100.00	-10.00	100.00
320	2.39	134.13	-10.00	100.00	-10.00	100.00
325	2.24	129.17	-10.00	100.00	-10.00	100.00
330	2.20	124.20	-10.00	100.00	-10.00	100.00
335	2.67	119.21	-10.00	100.00	-10.00	100.00
340	3.17	114.21	-10.00	100.00	-10.00	100.00
345	3.36	109.23	-10.00	100.00	-10.00	100.00
350	4.72	104.22	-10.00	100.00	-10.00	100.00
355	5.39	99.25	-10.00	100.00	-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