

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications, LLC
ASHLAND CITY, TN
Satellite Earth Station

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

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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

No great circle interference cases were identified during the interference study of the proposed earth station.

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 07/16/2018.

<u>Company</u>
Comsearch

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: 07/16/2018
Job Number: 180716COMSTW05

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code ZCATEC
Licensee Name Comcast Cable Communications, LLC

Site Information ASHLAND CITY, TN

Venue Name
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Climate Zone A
Rain Zone 1
Ground Elevation (AMSL) 196.85 m / 645.8 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 139.1° to 248.1°
Corresponding Elevation Angles 39.1° / 18.6°
Antenna Centerline (AGL) 0.91 m / 3.0 ft

Antenna Information

Manufacturer PRODELIN
Model 3.0 METER
Gain / Diameter 40.1 dBi / 3.0 m
3-dB / 15-dB Beamwidth 1.70° / 3.40°

Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Frequency Information Receive 4.0 GHz

Emission / Frequency Range (MHz) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 358.0 km / 222.4 mi
Precipitation Scatter Contour Radius 584.0 km / 362.9 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
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Coordination Values

ASHLAND CITY, TN

Licensee Name Comcast Cable Communications, LLC
Latitude (NAD 83) 36° 16' 50.0" N
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Antenna Centerline (AGL) 0.91 m / 3.0 ft
Antenna Model PRODELIN 3.0 METER
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	110.65	-10.00	285.28
5	0.00	115.34	-10.00	285.28
10	0.00	119.31	-10.00	285.28
15	0.00	115.80	-10.00	285.28
20	0.00	112.19	-10.00	285.28
25	0.00	108.49	-10.00	285.28
30	0.00	104.72	-10.00	285.28
35	0.00	100.91	-10.00	285.28
40	0.00	97.07	-10.00	285.28
45	0.00	93.20	-10.00	285.28
50	0.00	89.32	-10.00	285.28
55	0.00	85.44	-10.00	285.28
60	0.00	81.58	-10.00	285.28
65	0.00	77.74	-10.00	285.28
70	0.00	73.95	-10.00	285.28
75	0.00	70.20	-10.00	285.28
80	0.00	66.53	-10.00	285.28
85	0.38	62.79	-10.00	263.22
90	0.66	59.16	-10.00	239.59
95	0.89	55.67	-10.00	226.37
100	0.73	52.54	-10.00	235.44
105	0.00	50.03	-10.00	285.28
110	0.00	47.32	-9.88	286.07
115	0.00	44.91	-9.31	289.71
120	0.00	42.85	-8.80	293.04
125	0.33	40.88	-8.29	279.49
130	0.26	39.74	-7.98	291.24
135	0.49	38.80	-7.72	264.85
140	0.56	38.56	-7.65	259.96
145	0.41	39.08	-7.80	273.80
150	0.25	40.12	-8.08	291.16
155	0.26	41.49	-8.45	287.78
160	0.56	43.05	-8.85	252.89
165	0.66	44.79	-9.28	243.66
170	0.47	46.31	-9.64	255.07
175	0.74	46.89	-9.78	236.37
180	0.50	47.40	-9.90	250.61
185	0.32	47.30	-9.87	271.30

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

ASHLAND CITY, TN

Licensee Name Comcast Cable Communications, LLC
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Ground Elevation (AMSL) 196.85 m / 645.8 ft
Antenna Centerline (AGL) 0.91 m / 3.0 ft
Antenna Model PRODELIN 3.0 METER
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.48	46.30	-9.64	253.87
195	0.34	45.07	-9.35	271.84
200	0.21	43.35	-8.93	291.21
205	0.22	41.09	-8.34	293.68
210	0.00	38.65	-7.68	300.47
215	0.00	35.75	-6.83	306.23
220	0.00	32.61	-5.83	313.80
225	0.00	29.27	-4.66	322.11
230	0.00	25.79	-3.29	332.02
235	0.00	22.68	-1.89	342.31
240	0.00	20.29	-0.68	351.40
245	0.00	18.90	0.09	357.27
250	0.00	18.74	0.18	358.01
255	0.00	19.83	-0.43	353.32
260	0.00	21.98	-1.55	344.85
265	0.00	24.93	-2.92	334.71
270	0.00	28.43	-4.34	324.37
275	0.00	32.29	-5.73	314.54
280	0.00	36.41	-7.03	304.88
285	0.00	40.70	-8.24	296.73
290	0.00	45.11	-9.36	289.40
295	0.00	49.61	-10.00	285.28
300	0.00	54.18	-10.00	285.28
305	0.00	58.80	-10.00	285.28
310	0.00	63.45	-10.00	285.28
315	0.00	68.13	-10.00	285.28
320	0.00	72.84	-10.00	285.28
325	0.00	77.55	-10.00	285.28
330	0.20	82.27	-10.00	284.73
335	0.00	87.02	-10.00	285.28
340	0.00	91.76	-10.00	285.28
345	0.00	96.49	-10.00	285.28
350	0.00	101.22	-10.00	285.28
355	0.00	105.94	-10.00	285.28

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: _____

Twila Meyer
DB Technician IV
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: July 16, 2018

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Comm Management LLC
ASHLAND, TN
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
June 20, 2018

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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

No great circle interference cases were identified during the interference study of the proposed earth station.

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 06/19/2018.

<u>Company</u>
Comsearch

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: 06/20/2018
Job Number: 180619COMSTW28

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code CCCMGT
Licensee Name Comcast Cable Comm Management LLC

Site Information ASHLAND, TN

Venue Name
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Climate Zone A
Rain Zone 1
Ground Elevation (AMSL) 199.02 m / 653.0 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 139.1° to 248.1°
Corresponding Elevation Angles 39.1° / 18.6°
Antenna Centerline (AGL) 2.74 m / 9.0 ft

Antenna Information

Manufacturer PRODELIN
Model 3.5
Gain / Diameter 41.9 dBi / 3.5 m
3-dB / 15-dB Beamwidth 1.40° / 2.80°

Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Frequency Information Receive 4.0 GHz

Emission / Frequency Range (MHz) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 361.7 km / 224.7 mi
Precipitation Scatter Contour Radius 584.0 km / 362.9 mi

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

ASHLAND, TN

Licensee Name Comcast Cable Comm Management LLC
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Ground Elevation (AMSL) 199.02 m / 653.0 ft
Antenna Centerline (AGL) 2.74 m / 9.0 ft
Antenna Model PRODELIN 3.5
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	110.65	-10.10	284.64
5	0.00	115.34	-10.10	284.64
10	0.00	119.31	-10.10	284.64
15	0.00	115.80	-10.10	284.64
20	0.00	112.19	-10.10	284.64
25	0.00	108.49	-10.10	284.64
30	0.00	104.72	-10.10	284.64
35	0.00	100.91	-10.10	284.64
40	0.00	97.07	-10.10	284.64
45	0.00	93.20	-10.10	284.64
50	0.00	89.32	-10.10	284.64
55	0.00	85.44	-10.10	284.64
60	0.00	81.58	-10.10	284.64
65	0.00	77.74	-10.10	284.64
70	0.00	73.95	-10.10	284.64
75	0.00	70.20	-10.10	284.64
80	0.00	66.53	-10.10	284.64
85	0.00	62.95	-10.10	284.64
90	0.00	59.48	-10.10	284.64
95	0.00	56.15	-10.10	284.64
100	0.00	52.99	-10.10	284.64
105	0.00	50.03	-10.10	284.64
110	0.00	47.32	-9.56	288.07
115	0.00	44.91	-9.08	291.19
120	0.00	42.85	-8.67	293.88
125	0.00	41.19	-8.34	296.07
130	0.00	39.99	-8.10	297.67
135	0.26	39.04	-7.91	291.72
140	0.24	38.88	-7.88	294.54
145	0.23	39.25	-7.95	295.14
150	0.00	40.36	-8.17	297.18
155	0.21	41.54	-8.41	294.55
160	0.33	43.25	-8.75	277.58
165	0.50	44.93	-9.09	255.38
170	0.31	46.47	-9.39	275.48
175	0.55	47.07	-9.51	249.03
180	0.30	47.61	-9.62	275.69
185	0.28	47.34	-9.57	278.34

COMSEARCH

Earth Station Data Sheet

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

Coordination Values

ASHLAND, TN

Licensee Name Comcast Cable Comm Management LLC
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Ground Elevation (AMSL) 199.02 m / 653.0 ft
Antenna Centerline (AGL) 2.74 m / 9.0 ft
Antenna Model PRODELIN 3.5
Antenna Mode Receive 4.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.30	46.47	-9.39	276.32
195	0.26	45.15	-9.13	283.16
200	0.00	43.53	-8.81	292.99
205	0.00	41.27	-8.35	295.97
210	0.00	38.65	-7.83	299.45
215	0.00	35.75	-7.25	303.38
220	0.00	32.61	-6.14	311.01
225	0.00	29.27	-4.81	321.06
230	0.00	25.79	-3.42	331.07
235	0.00	22.68	-1.71	343.68
240	0.00	20.29	-0.28	354.50
245	0.00	18.90	0.56	360.90
250	0.00	18.74	0.66	361.67
255	0.00	19.83	0.00	356.64
260	0.00	21.98	-1.29	346.82
265	0.00	24.93	-3.06	333.68
270	0.00	28.43	-4.47	323.45
275	0.00	32.29	-6.02	311.88
280	0.00	36.41	-7.38	302.48
285	0.00	40.70	-8.24	296.73
290	0.00	45.11	-9.12	290.93
295	0.00	49.61	-10.02	285.14
300	0.00	54.18	-10.10	284.64
305	0.00	58.80	-10.10	284.64
310	0.00	63.45	-10.10	284.64
315	0.00	68.13	-10.10	284.64
320	0.00	72.84	-10.10	284.64
325	0.00	77.55	-10.10	284.64
330	0.00	82.28	-10.10	284.64
335	0.00	87.02	-10.10	284.64
340	0.00	91.76	-10.10	284.64
345	0.00	96.49	-10.10	284.64
350	0.00	101.22	-10.10	284.64
355	0.00	105.94	-10.10	284.64

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: _____

Twila Meyer
DB Technician IV
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: June 20, 2018

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
Comcast Cable Communications, LLC
ASHLAND CITY, TN
Satellite Earth Station

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

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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

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3. SUPPLEMENTAL SHOWING

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Date: 07/16/2018
Job Number: 180716COMSTW06

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code ZCATEC
Licensee Name Comcast Cable Communications, LLC

Site Information

ASHLAND CITY, TN
Venue Name
Latitude (NAD 83) 36° 16' 50.0" N
Longitude (NAD 83) 87° 7' 26.0" W
Climate Zone A
Rain Zone 1
Ground Elevation (AMSL) 196.85 m / 645.8 ft

Link Information

Satellite Type Geostationary
Mode RO - Receive-Only
Modulation Digital
Satellite Arc 60° W to 143° West Longitude
Azimuth Range 139.1° to 248.1°
Corresponding Elevation Angles 39.1° / 18.6°
Antenna Centerline (AGL) 0.91 m / 3.0 ft

Antenna Information

Manufacturer PRODELIN
Model 3.4 METER
Gain / Diameter 41.7 dBi / 3.4 m
3-dB / 15-dB Beamwidth 1.40° / 2.80°

Interference Objectives: Long Term -156.0 dBW/MHz 20%
Short Term -146.0 dBW/MHz 0.01%

Frequency Information

Receive 4.0 GHz
Emission / Frequency Range (MHz) 36M0G7W / 3700.0 - 4200.0

Max Great Circle Coordination Distance 358.0 km / 222.4 mi
Precipitation Scatter Contour Radius 584.0 km / 362.9 mi

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			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	110.65	-10.00	285.28
5	0.00	115.34	-10.00	285.28
10	0.00	119.31	-10.00	285.28
15	0.00	115.80	-10.00	285.28
20	0.00	112.19	-10.00	285.28
25	0.00	108.49	-10.00	285.28
30	0.00	104.72	-10.00	285.28
35	0.00	100.91	-10.00	285.28
40	0.00	97.07	-10.00	285.28
45	0.00	93.20	-10.00	285.28
50	0.00	89.32	-10.00	285.28
55	0.00	85.44	-10.00	285.28
60	0.00	81.58	-10.00	285.28
65	0.00	77.74	-10.00	285.28
70	0.00	73.95	-10.00	285.28
75	0.00	70.20	-10.00	285.28
80	0.00	66.53	-10.00	285.28
85	0.38	62.79	-10.00	263.22
90	0.66	59.16	-10.00	239.59
95	0.89	55.67	-10.00	226.37
100	0.73	52.54	-10.00	235.44
105	0.00	50.03	-10.00	285.28
110	0.00	47.32	-9.88	286.07
115	0.00	44.91	-9.31	289.71
120	0.00	42.85	-8.80	293.04
125	0.33	40.88	-8.29	279.49
130	0.26	39.74	-7.98	291.24
135	0.49	38.80	-7.72	264.85
140	0.56	38.56	-7.65	259.96
145	0.41	39.08	-7.80	273.80
150	0.25	40.12	-8.08	291.16
155	0.26	41.49	-8.45	287.78
160	0.56	43.05	-8.85	252.89
165	0.66	44.79	-9.28	243.66
170	0.47	46.31	-9.64	255.07
175	0.74	46.89	-9.78	236.37
180	0.50	47.40	-9.90	250.61
185	0.32	47.30	-9.87	271.30

COMSEARCH

Earth Station Data Sheet

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ASHLAND CITY, TN

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Antenna Mode Receive 4.0 GHz
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Short Term -146.0 dBW/MHz 0.01%

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 4.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.48	46.30	-9.64	253.87
195	0.34	45.07	-9.35	271.84
200	0.21	43.35	-8.93	291.21
205	0.22	41.09	-8.34	293.68
210	0.00	38.65	-7.68	300.47
215	0.00	35.75	-6.83	306.23
220	0.00	32.61	-5.83	313.80
225	0.00	29.27	-4.66	322.11
230	0.00	25.79	-3.29	332.02
235	0.00	22.68	-1.89	342.31
240	0.00	20.29	-0.68	351.40
245	0.00	18.90	0.09	357.27
250	0.00	18.74	0.18	358.01
255	0.00	19.83	-0.43	353.32
260	0.00	21.98	-1.55	344.85
265	0.00	24.93	-2.92	334.71
270	0.00	28.43	-4.34	324.37
275	0.00	32.29	-5.73	314.54
280	0.00	36.41	-7.03	304.88
285	0.00	40.70	-8.24	296.73
290	0.00	45.11	-9.36	289.40
295	0.00	49.61	-10.00	285.28
300	0.00	54.18	-10.00	285.28
305	0.00	58.80	-10.00	285.28
310	0.00	63.45	-10.00	285.28
315	0.00	68.13	-10.00	285.28
320	0.00	72.84	-10.00	285.28
325	0.00	77.55	-10.00	285.28
330	0.20	82.27	-10.00	284.73
335	0.00	87.02	-10.00	285.28
340	0.00	91.76	-10.00	285.28
345	0.00	96.49	-10.00	285.28
350	0.00	101.22	-10.00	285.28
355	0.00	105.94	-10.00	285.28

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: _____

Twila Meyer
DB Technician IV
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: July 16, 2018