

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
HUGHES NETWORK SYSTEMS LIMITED
BISMARCK, ND
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
March 03, 2017

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1. CONCLUSIONS

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

2. SUMMARY OF RESULTS

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

3. SUPPLEMENTAL SHOWING

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

Coordination data for this earth station was sent to the below listed carriers with a letter dated 02/15/2017.

Company
Bismarck, City of
Mandan, City of

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: 03/03/2017
Job Number: 170215COMSGE07

Administrative Information

Status ENGINEER PROPOSAL
Call Sign E150082
Licensee Code HUNESY
Licensee Name HUGHES NETWORK SYSTEMS LIMITED

Site Information BISMARCK, ND

Venue Name
Latitude (NAD 83) 46° 51' 6.7" N
Longitude (NAD 83) 100° 46' 57.8" W
Climate Zone A
Rain Zone 5
Ground Elevation (AMSL) 584.77 m / 1918.5 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 97.1° W to 97.1° West Longitude
Azimuth Range 175.0° to 175.0°
Corresponding Elevation Angles 36.0° / 36.0°
Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		ASC Signal		ASC Signal	
Model		KA 8.1M		KA 8.1M	
Gain / Diameter		62.0 dBi / 8.1 m		65.3 dBi / 8.1 m	
3-dB / 15-dB Beamwidth		1.00° / 2.00°		0.10° / 0.23°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-38.0 -14.0	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			27.3 51.3	
Interference Objectives:	Long Term Short Term	-156.0 dBW/MHz -146.0 dBW/MHz	20% 0.01%	-151.0 dBW/4 kHz -128.0 dBW/4 kHz	20% 0.0025%

Frequency Information

	Receive 18.0 GHz	Transmit 28.0 GHz
Emission / Frequency Range (MHz)	100KG7W - 250MG7W / 18300.0 - 19300.0 100KG7W - 250MG7W / 19700.0 - 20200.0	100KG7W - 250MG7W / 27850.0 - 30000.0
Max Great Circle Coordination Distance	145.0 km / 90.1 mi	100.0 km / 62.1 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

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Coordination Values

BISMARCK, ND

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
Latitude (NAD 83) 46° 51' 6.7" N
Longitude (NAD 83) 100° 46' 57.8" W
Ground Elevation (AMSL) 584.77 m / 1918.5 ft
Antenna Centerline (AGL) 5.49 m / 18.0 ft
Antenna Model ASC Signal 8.1 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 -35.0 (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	0.00	143.69	-10.00	136.18	-10.00	100.00
5	0.00	142.80	-10.00	136.18	-10.00	100.00
10	0.00	141.37	-10.00	136.18	-10.00	100.00
15	0.00	139.46	-10.00	136.18	-10.00	100.00
20	0.00	137.13	-10.00	136.18	-10.00	100.00
25	0.00	134.45	-10.00	136.18	-10.00	100.00
30	0.00	131.48	-10.00	136.18	-10.00	100.00
35	0.00	128.27	-10.00	136.18	-10.00	100.00
40	0.00	124.86	-10.00	136.18	-10.00	100.00
45	0.00	121.30	-10.00	136.18	-10.00	100.00
50	0.00	117.61	-10.00	136.18	-10.00	100.00
55	0.00	113.83	-10.00	136.18	-10.00	100.00
60	0.00	109.96	-10.00	136.18	-10.00	100.00
65	0.00	106.03	-10.00	136.18	-10.00	100.00
70	0.00	102.05	-10.00	136.18	-10.00	100.00
75	0.00	98.04	-10.00	136.18	-10.00	100.00
80	0.00	94.01	-10.00	136.18	-10.00	100.00
85	0.00	89.97	-10.00	136.18	-10.00	100.00
90	0.00	85.93	-10.00	136.18	-10.00	100.00
95	0.00	81.89	-10.00	136.18	-10.00	100.00
100	0.00	77.88	-10.00	136.18	-10.00	100.00
105	0.00	73.91	-10.00	136.18	-10.00	100.00
110	0.00	69.98	-10.00	136.18	-10.00	100.00
115	0.00	66.11	-10.00	136.18	-10.00	100.00
120	0.00	62.33	-10.00	136.18	-10.00	100.00
125	0.00	58.64	-10.00	136.18	-10.00	100.00
130	0.00	55.08	-10.00	136.18	-10.00	100.00
135	0.00	51.68	-10.00	136.18	-10.00	100.00
140	0.00	48.48	-10.00	136.18	-10.00	100.00
145	0.00	45.51	-9.45	137.69	-9.45	100.00
150	0.00	42.83	-8.79	139.54	-8.79	100.00
155	0.00	40.51	-8.19	141.27	-8.19	100.00
160	0.00	38.60	-7.67	142.79	-7.67	100.00
165	0.00	37.18	-7.26	143.98	-7.26	100.00
170	0.00	36.31	-7.00	144.75	-7.00	100.00
175	0.00	36.01	-6.91	145.01	-6.91	100.00
180	0.00	36.31	-7.00	144.74	-7.00	100.00
185	0.00	37.20	-7.26	143.97	-7.26	100.00

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Coordination Values

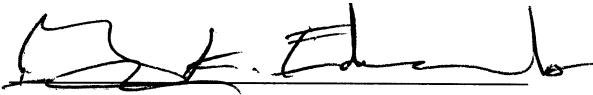
BISMARCK, ND

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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	-35.0 (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	0.00	38.63	-7.67	142.76	-7.67	100.00
195	0.00	40.54	-8.20	141.24	-8.20	100.00
200	0.00	42.87	-8.80	139.51	-8.80	100.00
205	0.00	45.55	-9.46	137.66	-9.46	100.00
210	0.00	48.52	-10.00	136.18	-10.00	100.00
215	0.00	51.73	-10.00	136.18	-10.00	100.00
220	0.00	55.14	-10.00	136.18	-10.00	100.00
225	0.00	58.70	-10.00	136.18	-10.00	100.00
230	0.00	62.39	-10.00	136.18	-10.00	100.00
235	0.00	66.17	-10.00	136.18	-10.00	100.00
240	0.00	70.04	-10.00	136.18	-10.00	100.00
245	0.00	73.97	-10.00	136.18	-10.00	100.00
250	0.00	77.95	-10.00	136.18	-10.00	100.00
255	0.00	81.96	-10.00	136.18	-10.00	100.00
260	0.00	85.99	-10.00	136.18	-10.00	100.00
265	0.00	90.03	-10.00	136.18	-10.00	100.00
270	0.00	94.07	-10.00	136.18	-10.00	100.00
275	0.35	98.14	-10.00	125.02	-10.00	100.00
280	0.34	102.17	-10.00	125.70	-10.00	100.00
285	0.26	106.15	-10.00	131.18	-10.00	100.00
290	0.30	110.10	-10.00	128.60	-10.00	100.00
295	0.00	113.89	-10.00	136.18	-10.00	100.00
300	0.00	117.67	-10.00	136.18	-10.00	100.00
305	0.00	121.36	-10.00	136.18	-10.00	100.00
310	0.00	124.92	-10.00	136.18	-10.00	100.00
315	0.00	128.32	-10.00	136.18	-10.00	100.00
320	0.00	131.52	-10.00	136.18	-10.00	100.00
325	0.00	134.49	-10.00	136.18	-10.00	100.00
330	0.00	137.17	-10.00	136.18	-10.00	100.00
335	0.00	139.49	-10.00	136.18	-10.00	100.00
340	0.00	141.40	-10.00	136.18	-10.00	100.00
345	0.00	142.82	-10.00	136.18	-10.00	100.00
350	0.00	143.69	-10.00	136.18	-10.00	100.00
355	0.00	143.99	-10.00	136.18	-10.00	100.00

5. CERTIFICATION

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

BY: 

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

DATED: March 03, 2017