December 14, 2010

Julius Knapp, Chief
Office of Engineering and Technology
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: **Written *Ex Parte* Presentation**
ET Docket Nos. 04-186 & 02-380; GN Docket No. 09-51
Request for Expeditious *Sua Sponte* Reconsideration and Amendment of Sections 15.709(b)(2), 15.712(a)(2) and 15.713(e)(6) of the Commission's Rules

Dear Mr. Knapp:

The undersigned are writing to ask the Commission, on its own motion, to expeditiously reconsider its decision to impose a 76-meter height above average terrain ("HAAT") restriction on the location of sites for fixed TV white space devices, a restriction adopted in the *Second Memorandum Opinion and Order* in this proceeding and codified in Sections 15.709(b)(2) and 15.713(e)(6) of the Commission's Rules.[1] As further described herein, the HAAT restriction will preclude the deployment of fixed base stations in large areas of the country where hills, mountains and high elevations are present. The undersigned propose that Sections 15.709(b)(2) and 15.713(e)(6) be amended to: (a) use HAAT as the sole metric for determining the height of fixed device antennas, and (b) allow operation of fixed device antennas at higher elevations, and propose that Section 15.712(a)(2) be amended to adjust the required co-channel and adjacent-channel distance separation values to ensure and improve the protection of TV stations. The proposed rules are provided in Appendix A hereto.

HAAT is a more accurate predictor of harmful interference than height above ground level ("AGL") and, significantly, has been endorsed by both the IEEE and the Society of Broadcast Engineers, Inc. ("SBE"), an organization of engineers advocating on behalf of the broadcast industry. Based on positions taken by these respected organizations representing the interests of those most affected by the requested rule changes, **we ask the Commission to amend its rules on its own motion if feasible before January 5, 2011**, the deadline prescribed by Section 1.106 of the Commission's Rules for parties to file petitions for reconsideration of the rules. Such expeditious action would avoid the need for a protracted period of reconsideration that will delay initiation of fixed services in white space spectrum. The Commission is authorized to take such action pursuant to Section 1.108.[2]

[1] The rules adopted in the *Second Memorandum Opinion and Order* were published in the Federal Register on December 6, 2010. *See* 75 Fed.Reg. 75814 (Dec. 6, 2010). The deadline for filing petitions for reconsideration is January 5, 2011, and many of the rules will become effective on that date.

[2] To the extent the Commission does not act on its own motion by January 5, 2011 in accordance with this request, the signatories reserve their right to file petitions for reconsideration

Background

The signatories to this letter consist of trade associations representing wireless Internet service providers ("WISPs"), equipment manufacturers and database administrator applicants committed to the development and deployment of broadband fixed white space networks throughout the country, especially rural areas of the country where there is a lack of broadband choice. The undersigned have been frequent advocates before the Commission throughout the rulemaking process.

In the *Second Memorandum Opinion and Order*, the Commission declined requests to increase the maximum permissible height AGL for fixed devices. In addition, the Commission added a new requirement limiting the HAAT of tower locations to 76 meters. While the Commission recognized "the increased potential for interference in instances where a fixed TV bands device is located on a local geographic high point such as a hill or mountain," it also stated that "we do not want to preclude fixed white space devices from a large number of sites in areas where there are rolling hills or a large number of relatively high points that do not generally provide open, line-of-sight paths for propagation over long distances."[3]

Following release of the *Second Memorandum Opinion and Order*, certain signatories prepared information illustrating the preclusive effect of the 76-meter HAAT restriction. On October 13, 2010, representatives from the Wireless Internet Service Providers Association, Motorola, Spectrum Bridge and Comsearch met with OET staff to discuss the adverse consequences that the HAAT restriction created.[4] The group showed OET staff: (a) a map of the United States prepared by Comsearch showing areas where the HAAT exceeds 76 meters, (b) larger scale maps of four regions of the country prepared by Spectrum Bridge showing areas where the HAAT exceeded 76 meters and other elevations, and (c) a table of specific locations prepared by WISPA showing the locations of towers from which WISPs currently provide broadband service, many of which could not be used for white space base stations because the locations exceed the 76-meter HAAT limit. Updated versions of the nationwide map and table are attached as Appendix B hereto.

Since the October 13 meeting, the signatories have worked diligently to consider and analyze alternatives that will enable substantially more underserved areas of the country to be available for the siting of fixed white space facilities. Throughout this process, we have been extremely mindful of the need to protect incumbent TV stations from interference and the need to ensure that any changes be easily incorporated into the geo-location databases. As described below, we believe that our proposal affords broadcast stations greater protection than the existing rules.

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[3] *Second Memorandum Opinion and Order*, ET Docket Nos. 04-186 and 02-380, FCC 10-174 (rel. Sept. 23, 2010), at ¶66.

[4] *See* Notice of Ex Parte Presentation to Marlene H. Dortch, FCC Secretary, from Stephen E. Coran, ET Docket Nos. 04-186 and 02-380, filed Oct. 14, 2010.

The Proposal

Attached as Appendix A are the requested revisions to the Commission's rules. Appendix C contains an Engineering Statement explaining the proposed rules. First, we ask that Sections 15.709(b)(2) and 15.713(e)(6) be amended by eliminating references to the ground elevation of the fixed station, by replacing antenna AGL with antenna HAAT and by replacing the 76-meter HAAT limit with a 250-meter antenna HAAT limit. Second, we propose that the Commission replace the existing table in Section 15.712(a)(2) with new distance separation criteria that (a) permits operation of fixed stations at higher elevations, and (b) relies entirely on antenna HAAT as the height metric rather than an independent treatment of site HAAT and antenna height AGL. As explained in Appendix C, the distance separation criteria we propose provide greater protection to TV broadcast stations and are more conservative than the proposal that the IEEE Local and Metropolitan Area Networks Standards Committee ("IEEE 802 Committee") recommended.

There are several benefits that would result from amending the rules at this time. First, fixed wireless broadband services would be enabled in large areas of the country that are precluded from receiving fixed white space services under current rules. As the map included in Appendix B attests, there are large areas of the country where the current 76-meter HAAT restriction prevents the deployment of white space base stations, and the use of large quantities of otherwise available TV white space spectrum. Further, WISPA's analysis of existing towers shows that, because of the 76-meter HAAT restriction, WISPs cannot use many of these existing towers to provide broadband service with TV white space spectrum. This forces WISPs to engineer new sites (if available), obtain zoning/FAA approval and construct new towers, delaying service in areas where suitable tower sites are already available. In addition to the significant increases in infrastructure costs, service areas would be reduced because of the lower elevations where transmit facilities can be located. Increasing the permissible transmit antenna height to 250 meters HAAT will dramatically reduce those areas where service would otherwise be precluded. The map at Appendix D shows the large increase in the areas where white space devices can operate under our proposal. By comparing this map to the map at Appendix B, one can readily see the tremendous difference this rule change will have on the ability of consumers throughout the country to receive broadband service with white space spectrum.

Second, the areas that exceed the 76-meter limit are mostly rural areas located in hilly and mountainous regions where population density is low and the broadband service availability is lacking. These are precisely the areas of the country where TV white space spectrum can do the most good because of the superior propagation characteristics of UHF and VHF spectrum. As Appendix D depicts, adopting our proposal will enable these areas to be served, consistent with Commission objectives.

Third, HAAT is a much more accurate predictor of harmful interference than AGL and, significantly, has been endorsed by both the IEEE and the Society of Broadcast Engineers, Inc. ("SBE"), an organization of engineers advocating on behalf of the

broadcast industry. In its petition for reconsideration of the white space rules adopted in November 2008,[5] the IEEE 802 Committee "recommend[ed] that the antenna height for such fixed stations should be expressed in terms of HAAT . . . rather than height above ground level (AGL) to allow the determination of the appropriate separation distances necessary to protect the incumbents while allowing to achieve extended coverage."[6] IEEE 802 recommended supporting antenna heights (HAAT) beyond 600 meters. SBE observed that "[a] maximum that turns on height above ground level would permit fixed antennas to be placed on mountains and other high-elevation sites, undermining the effectiveness of the maximum antenna height requirements. . . . HAAT requirements can be easily implemented as part of the computations performed by the database manager from the existing geo-location information required to be submitted by the registrant."[7] In each case, IEEE and SBE advocated use of HAAT as an alternative – not as an addition – to AGL. As noted above and in Appendix C, the undersigned hereby propose distance separations that exceed those in the current rules as well as those recommended by the IEEE 802 Committee, and therefore offers greater protection to TV broadcast stations. In addition, the geo-location database will require only one metric – TVBD antenna height AGL – to be sent to the database in order to compute the antenna's effective HAAT for the incumbent protection calculations. By using a more accurate predictor of interference and relying on the database to consistently perform HAAT computations, any opportunity for harmful interference will be diminished.

Fourth, the proposal increases the size of the protection zones afforded to TV stations under Section 15.712(a)(2). The proposed co-channel and adjacent-channel distance separation criteria exceed the current AGL values in Section 15.712(a)(2), meaning that at comparable antenna heights, there will be greater distance between TV contours and fixed white space stations. Above 30 meters, the required distance separation increases as well. The Engineering Statement at Appendix C explains this in greater detail. Furthermore, this approach beneficially results in increased separation distances for devices that might have relaxed transmit spectral masks, as recently proposed by Motorola.[8]

Fifth, in areas where the distance separation requirements reduce or eliminate the number of available white space channels at higher antenna elevations, fixed operators will have the flexibility to operate from lower antenna elevations and take advantage of the greater number of available channels. The current 30-meter antenna height restriction is much more confining and does not provide this operational flexibility.

In addition, we note that the current rules appear to limit the heights of receive-only TVBDs in the same manner that transmit devices are restricted. We believe that the Commission did not intend to apply height requirements on devices used solely for reception of signals. The rule changes proposed in Appendix A eliminate the height restrictions for receive-only devices.

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[5] *Second Report and Order and Memorandum Opinion and Order*, 23 FCC Rcd 16807 (2008).
[6] IEEE 802 Petition for Reconsideration, ET Docket Nos. 04-186 and 02-380, filed March 19, 2009, at 4.
[7] SBE Petition for Reconsideration, ET Docket Nos. 04-186 and 02-380, filed March 19, 2009, at 13-14.
[8] *See* Motorola Ex Parte letter, ET Docket Nos. 04-186, filed Dec. 7, 2010, at 6-8.

In sum, we believe that our attached proposal strikes a better balance between the interests of fixed wireless operators and those of TV broadcasters, and thereby provides substantial benefits to the public. We ask the Commission to adopt the rule amendments proposed herein.

Justification for Expeditious Action

We believe the Commission should make the requested rule changes on its own motion prior to January 5, 2011, the date on which petitions for reconsideration of the rules adopted in the *Second Memorandum Opinion and Order* would be due. Such *sua sponte* action by January 5, 2011 would be permissible under Section 1.108.

The proposal is not controversial because it relies on well-accepted spectrum engineering practices. Consequently, it would save us time and expense in preparing and filing petitions for reconsideration, and save Commission resources in acting on the petitions some time in the future. Because broadcasters have previously supported these methods, a formal reconsideration process on this issue would be unnecessary. In addition, making changes at this time will enable the database administrators to easily incorporate the rule changes as they establish their databases.

Perhaps most importantly, significant areas of the country could receive fixed broadband service via white space spectrum much more quickly than they would under the current rules. This fact alone is sufficient basis for the Commission to act on its own motion to expeditiously approve our request.

Conclusion

We appreciate your prompt attention to this matter. Please contact Stephen Coran at (202) 463-4310 or scoran@rinicoran.com if there are questions.

Respectfully submitted,

The Wireless Internet Service Providers Association
Motorola, Inc.
Spectrum Bridge, Inc.
Comsearch
Carlson Wireless Technologies, Inc.
Federation of Internet Solution Providers of the Americas

Appendix A

Proposed Rule Changes

Part 15 of the Code of Federal Regulations is amended as follows:

PART 15 RADIO FREQUENCY DEVICES

1. Section 15.709 is amended by revising paragraph (b)(2) to read as follows:

§ 15.709 General Technical Requirements.

(b) * * *

(2) The transmit antenna used with fixed devices may not be more than 250 meters height above average terrain (HAAT). The HAAT is to be calculated by the TV bands database that the device contacts for available channels using computational software employing the methodology in section 73.684(d) of this chapter.

2. Section 15.712 is amended by revising paragraph (a)(2) to read as follows:

§ 15.712 Interference protection requirements.

(a) * * *

(2) Required separation distance. TVBDs must be located outside the contours indicated in paragraph (a)(1) of this section of co-channel and adjacent channel stations by at least the minimum distances specified in the following table. Personal/portable TVBDs operating in Mode II must comply with the distance separation distances specified for an unlicensed device with an antenna height of less than 3 meters. Alternatively, Mode II personal/portable TVBDs may operate a closer separation distances, including inside the contour of adjacent channel stations, provided the power level is reduced to 40 mW or less as specified in § 15.709(a)(2).

Antenna Height Above Average Terrain for Unlicensed Device	Required Separation (km) From Digital or Analog TV (Full Service or Low Power) Protected Contour	
	Co-channel	Adjacent Channel
Less than 3 meters	6.0 km	0.4 km
3 – Less than 10 meters	8.0 km	0.7 km
10 – Less than 30 meters	14.4 km	1.5 km
30 – Less than 50 meters	20.0 km	1.6 km
50 – Less than 75 meters	24.7 km	1.9 km
75 – Less than 100 meters	28.2 km	2.2 km
100 – Less than 150 meters	33.4 km	2.4 km
150 – Less than 200 meters	37.5 km	2.6 km
200 – Less than 250 meters	40.7 km	2.7 km

3. Section 15.713 is amended by revising paragraph (e)(6) to read as follows:

§ 15.713 TV bands database.

(e) * * *

(6) A fixed device that attempts to utilize an antenna height above average terrain (HAAT) greater than 250 meters shall not be provided a list of available channels. The HAAT is to be calculated using computational software employing the methodology in section 73.684(d) of this chapter.

Appendix B

Map of Locations Where HAAT Exceeds 76 Meters
Table of Selected Tower Locations

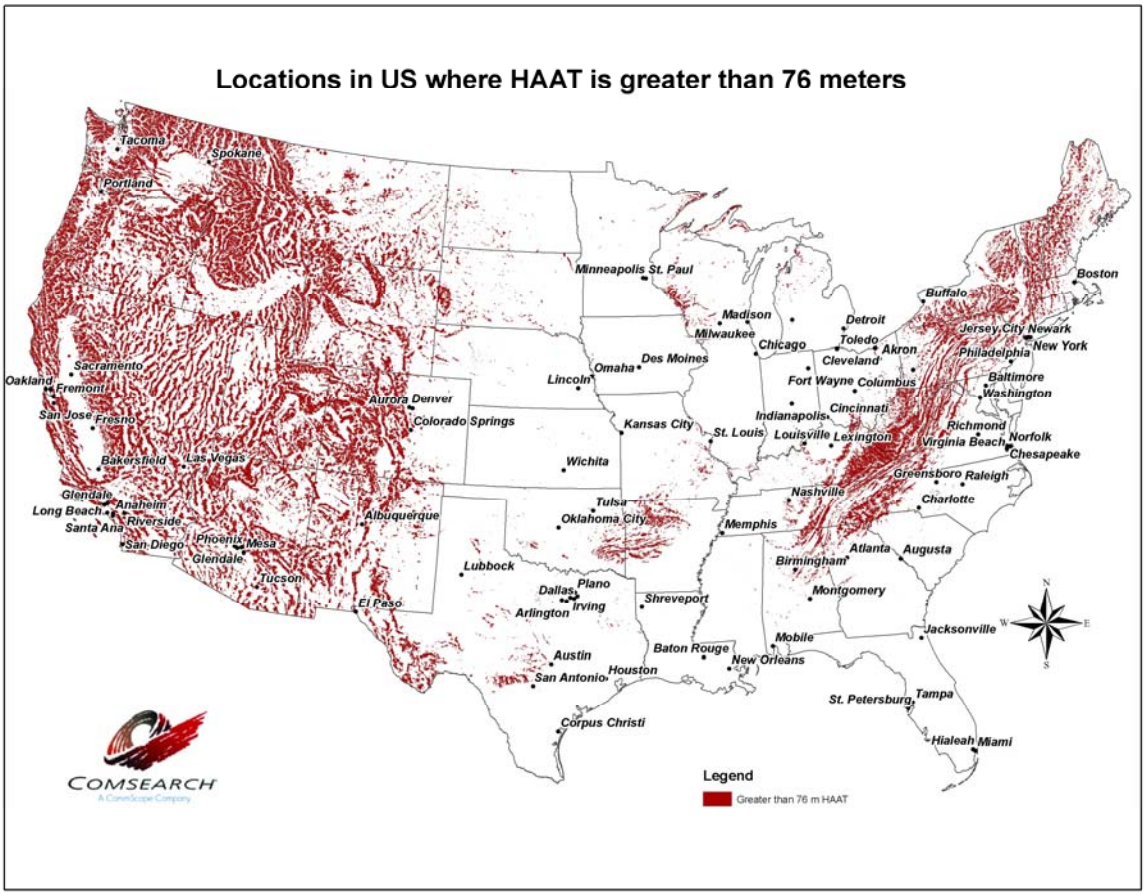

Table of Selected Tower Locations

Site State	Site Designation	Latitude	Longitude	White Space Channels Available?	Site Elevation (M)	Site HAAT (M)	PASS
Vermont	BM-1	44.24124	-72.42659	15	485.4	84	NO
Vermont	BM-2	44.30029	-72.41573	15	346.8	46	YES
Vermont	BM-3	44.31866	-72.5085	13	357.0	2	YES
Vermont	BM-4	44.37299	-72.50707	13	438.7	57	YES
Vermont	BM-5	44.34086	-72.42399	15	376.2	-8	YES
Vermont	BM-6	44.44096	-72.39307	18	576.0	166	NO
Vermont	BM-7	44.48362	-72.33789	18	461.8	24	YES
Vermont	BM-8	44.5205	-72.35456	18	404.9	-22	YES
Vermont	BM-9	44.58051	-72.39427	16	575.6	180	NO
West Virginia	IR-1	40.09108	-80.71114	4	372.4	53	YES
West Virginia	IR-2	40.36658	-80.59024	2	386.8	71	YES
West Virginia	IR-3	40.17706	-80.59553	2	398.5	73	YES
West Virginia	IR-4	40.0605	-80.59064	4	400.7	59	YES
West Virginia	IR-5	40.05472	-80.76004	5	374.5	60	YES
West Virginia	IR-6	39.66015	-80.81557	18	435.5	125	NO
West Virginia	IR-7	39.54241	-80.63222	16	377.4	38	YES
West Virginia	IR-8	39.81294	-80.59781	7	447.1	87	NO
West Virginia	IR-9	40.0605	-80.59064	4	400.7	59	YES
West Virginia	IR-10	39.41864	-78.95389	8	596.6	209	NO
West Virginia	IR-11	39.51931	-78.79475	7	294.0	-13	YES
Virginia	PA-1	38.59997	-78.63314	10	894.7	515	NO
Virginia	PA-2	38.44814	-78.73267	5	959.0	543	NO
Virginia	PA-3	38.39547	-78.76868	5	817.9	398	NO
Virginia	PA-4	38.56398	-78.9499	10	813.5	281	NO
Virginia	PA-5	38.69218	-79.09074	16	1226.9	534	NO
Virginia	PA-6	38.16773	-79.31398	19	1343.4	698	NO
Virginia	PA-7	38.74461	-78.35692	11	523.4	109	NO
Utah	CD-1	41.34084	-112.0191	1	1467.1	-94	YES
Utah	CD-2	41.33881	-111.8163	1	1847.6	-107	YES
Utah	CD-3	41.41777	-112.0208	2	1595.6	-13	YES
Utah	CD-4	41.50148	-112.0044	2	1397.0	-226	YES
Utah	CD-5	41.77923	-112.1775	1	1474.8	-8	YES
Washington	SM-1	47.32041	-119.5734	16	600.4	96	NO
Washington	SM-2	47.45137	-119.5543	18	801.0	244	NO
Wyoming	MS-1	43.0434	-108.4386	13	1634.7	66	YES

Wyoming	MS-2	43.07164	-108.4958	13	1706.9	119	NO
Wyoming	MS-3	43.17046	-108.4456	16	1733.6	151	NO
Wyoming	MS-4	43.19514	-108.2159	12	1559.9	58	YES
Wyoming	MS-5	42.90506	-108.7057	22	1761.0	96	NO
California	SB-1	39.24612	-120.9665	22	1162.8	301	NO
California	SB-2	39.26314	-121.0863	8	769.0	99	NO
California	SB-3	39.0461	-121.0301	8	627.7	87	NO
California	SB-4	39.17227	-120.8323	10	1156.9	167	NO
California	SB-5	39.25205	-121.1506	8	665.7	114	NO
California	SB-6	39.18429	-121.0359	8	916.9	222	NO
California	SB-7	39.16951	-121.1824	8	674.1	237	NO
California	SB-8	39.1849	-120.9635	10	927.7	126	NO
California	SB-9	39.16368	-121.0574	8	681.7	36	YES
California	SB-10	39.13388	-121.0994	8	793.4	241	NO
California	SB-11	39.13564	-120.9252	10	914.6	132	NO

Number of Sites:	50
Number of Sites to Fail:	28
Percentage Failure:	56.0%

Hardin & Associates, Inc.
11-Oct-10

Appendix C

Engineering Statement

The current FCC TVWS rules (FCC 10-174) utilize only TVBD antenna height above ground level (AGL) to compute incumbent protection requirements (i.e., antenna height above average terrain (HAAT) is not considered in the analysis). While this simplifies the incumbent protection calculations, it is significantly different from well accepted FCC practices for computing protected service areas[9], and may significantly under-estimate incumbent protection levels in cases where the TVBD transmitter site elevation is at a high level. For example, if a TVBD transmitter site is located at 75 m HAAT, and a 30 m TVBD antenna height (AGL) is deployed, the antenna is effectively at 105 m HAAT, which would normally result in a larger required separation distance than the 30 m AGL separation distance computation specified under the current rules. This oversight can be best addressed by considering the composite TVBD antenna height above average terrain in the protection computations (i.e., TVBD antenna height AGL + transmitter site HAAT, in a combined value). This approach provides significantly better overall protection to TV broadcast operations than under the current rules.

The fixed TVBD would still report its antenna height AGL to the database, and the database would add that value to the computed site HAAT for the specified location, resulting in a single accurate antenna height relative to local terrain features. The combined antenna height above average terrain value would be utilized to determine the required separation distance, as shown in the table below. The HAAT computations for the transmitter site would be specified as in Section 73.684(d), as is utilized under the current rules.

The required separation distances for TVBD co-channel operation are based again on the minimum 41 dBμ contour level, and a 16 dB DTV receiver required co-channel D/U ratio, with approximately 3 dB of polarization mismatch, as was utilized in the current rules.[10] Note that these values are also very conservative, since they do not account at all for the roughly 14 dB of TV receiver antenna pattern discrimination (front-to-back ratio, as specified in OET Bulletin 69) that would significantly improve the DTV receiver D/U ratio. Nevertheless, a consistent methodology was retained in the values shown in the table. The values shown utilize the FCC's R-6602 F(50,10) curves to compute the TVBD induced interference level at the edge of the TV station's protected service contour, and ensure that the interference level does not exceed 27.5 dBμ. (accounting for the required 16 dB required D/U ratio and approximately 3 dB of polarization mismatch).

Note that the required separation distances for TVBD adjacent channel operation are based on the minimum 41 dBμ contour level, and a highly conservative -26 dB DTV receiver required adjacent channel D/U ratio, with 3 dB of polarization mismatch. Note

[9] *See* FCC Section 73.684 and Section 73.699.
[10] *See* "*Second Report and Order and Memorandum Opinion and Order*," FCC 08-260, released Nov. 14, 2008.

that these values are additionally conservative, since they do not account for the roughly 14 dB of TV receiver antenna pattern discrimination that would significantly improve the DTV receiver D/U ratio. The calculations utilize the FCC's TM-91 propagation model[11] for TVBD antenna heights below 10 m, and the FCC's R-6602 F(50,10) curves for TVBD antenna heights of 30 m and above, to compute the TVBD induced interference level at the edge of the TV station's protected service contour, to ensure that it meets the specified -26 dB D/U ratio. This overall approach is more conservative than the current TVWS rules, and should provide better interference protection to TV broadcasters.

[11] *See* "*Propagation in Suburban Areas at Distances less than Ten Miles*", FCC/OET TM 91-1, January 25, 1991. Note that this model is functionally equivalent to the Egli propagation model.

Appendix D

Map of Locations Where HAAT Exceeds 250 Meters