

ADAPTRUM

Adaptrum, Inc.
25 E. Trimble Road
San Jose, CA 95131
Phone: 408-850-0545
Email: info@adaptrum.com

August 10, 2014

Mr. Julius Knapp
Chief, Office of Engineering and Technology
Federal Communications Commission
445 12th Street, SW
Washington DC 20554

ACCEPTED/FILED

OCT 23 2014

WAIVER--EXPEDITED ACTION REQUESTED

Federal Communications Commission
Office of the Secretary

Dear Mr. Knapp,

Pursuant to §1.925 of the Commission's rules, Adaptrum, Inc. ("Adaptrum"), hereby requests a waiver of §15.709(b)(2) to permit the installation of TV band device at the height up to 250 feet (76 m) to serve a rural area. The general provisions of §15.709(b)(2) would normally preclude heights above 30m.

Details of Waiver Requested

In cooperation with Axiom Technologies, a Wireless ISP based in Machias, Maine, we wish to demonstrate the use of TV band devices in a rural area where there are few alternatives for broadband. The TV white space network is going to cover various areas in Washington County, ME in the Northeast corner of the state. The base station antennas will be mounted on various available towers.

To provide enough clearance above the tree lines, it is desirable to mount the antennas at the highest available spots on the towers sometimes up to 250' above the ground. The tower locations now under consideration include:

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Tower Number	Latitude (DMS)	Longitude DMS	Latitude N (Decimal)	Longitude W (Decimal)	Distance to US/Canada Border (km)
1	44.987458	-67.465994	44°59'14.85"N	67°27'57.58"	18
2	45.147860	-67.505830	45° 8'52.30"	67°30'20.99"	8
3	45.185239	-67.773023	45°11'6.86"	67°46'22.88"	25
5	44.826698	-67.046156	44°49'36.11"	67° 2'46.16"	6
6	44.742035	-67.441265	44°44'31.33"	67°26'28.55"	39
7	44.654454	-67.389063	44°39'16.03"	66°58'21.32"	38
8	44.721890	-67.668613	44°39'47.47	67°40'7.01"	59
9	44.500201	-67.595209	44°30'0.72"	67°35'42.75"	65
10	44.532957,	-67.610632	44°31'58.65"	67°36'38.28"	55
11	44.614279	-67.776780	44°36'51.40"	67°46'36.41"	67
12	44.619343	-67.929063	44°37'9.63"	67°13'18.95"	24

Table 1: Initial tower locations- note there is no Tower 4

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The location of these sites and the US/Canada border are shown below:

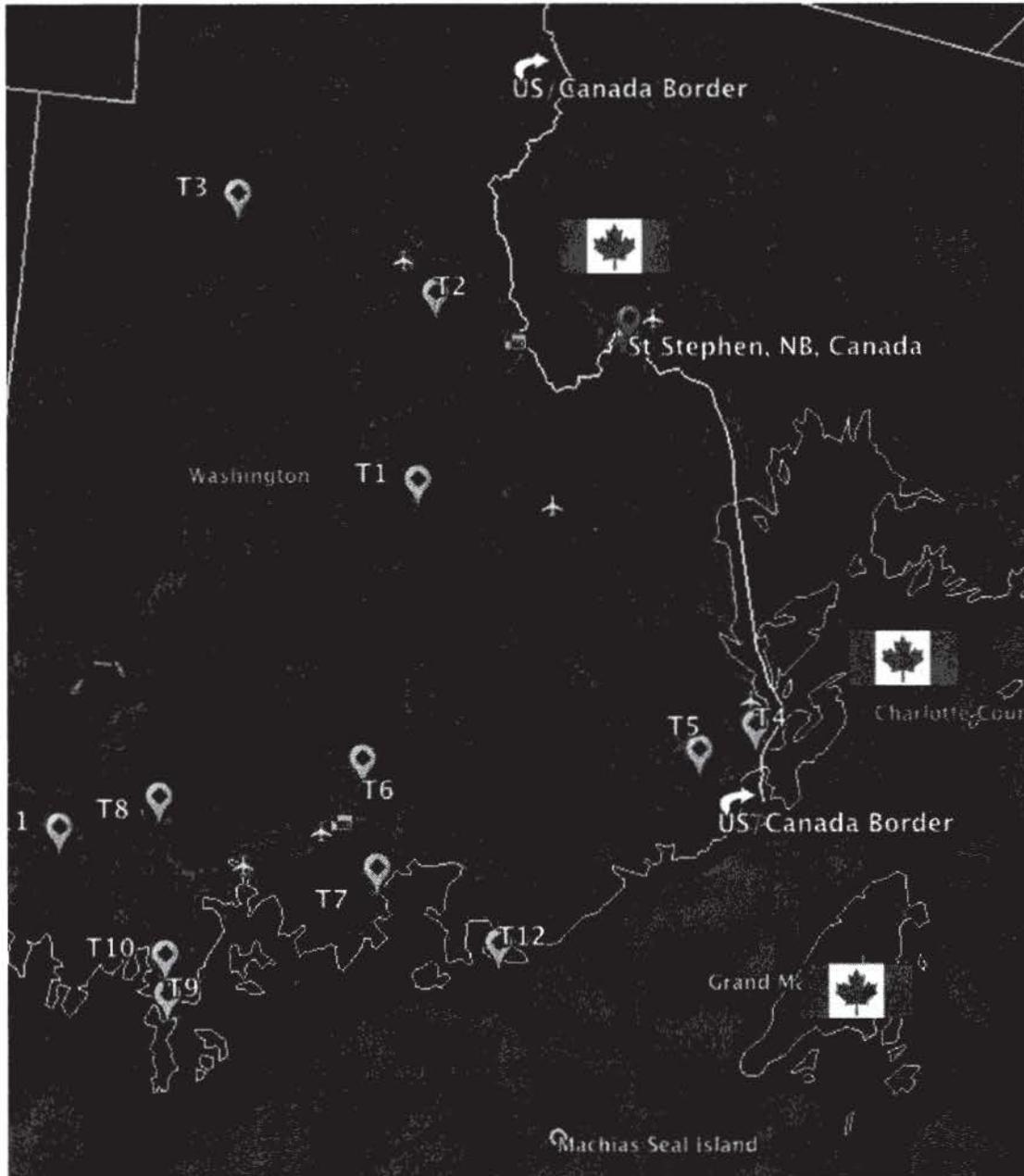


Figure 1: Site locations

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Firm leases on all these towers have not yet been obtained. We seek under this waiver authorization to use up to 15 towers in Washington County. Since these locations are close to the US/Canadian border, in order to facilitate any necessary consideration by FCC's Canadian counterpart, Industry Canada, we are willing to stipulate the following:

1. All antennas on sites within 10 km of the US/Canada border will point away from Canada
2. Downtilt will be used on all sites within 20 km of the US/Canada border to minimize radiation towards the border
3. Any spectrum use under this waiver will be secondary with respect to any Canadian licensed spectrum use
4. Sites within 5 km of the US/Canada border will only use channels 43-51
5. Adaptrum pledges to assist and cooperate with any Canadian entity operating under IC policies and authorization that seeks to build a comparable TV white space network on the Canadian side of Washington Country's border including developing a mutually agreeable spectrum plan.

We recognize the importance of protecting both US and Canadian primary licensees as well as the possible need for FCC coordination with its Canadian counterpart, Industry Canada for such a location.

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Below are the Canadian UHF TV stations in this general area followed by Canadian non-TV licenses in the UKF band that are nearby:

Canadian TV Call	Channel	City	Distance to Machias ME (km)
CBHFT-6	17	Digby NS	101
CBAFT-10	19	Fredericton NB	125
CIHF-TV-12	21	St-Stephen NB	35
CHCT-TV	26	St. Andrews NB	39
CBAT-TV	31	Fredericton NB	125
CJCH-TV7	40	Yarmouth NS	165
CBAT-TV	42	Saint John NB	91
CIHF-TV-1	44	Fredericton NB	137
CIHF-TV-10	45	Yarmouth NS	127
CBHFT-1	50	Yarmouth NS	125

Table 2: Canadian UHF TV Licenses Within 150 km of Machias ME

Source: <http://www.fcc.gov/encyclopedia/tv-query-broadcast-station-search>

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Canadian Non-TV Licenses Within 50 km of Machias ME

Frequency (MHz)	TV Channel	IC Status Code Number	City	Distance from Nearest Proposed Site (km)
513.24	21	6	St Stephen NB	35
513.25	21	0	St Stephen NB	35
513.25	21	1	St Stephen NB	35
543.25	26	0	St Andrews NB	39
543.25	26	6	St. Andrews NB	39
579.25	32	0	Milltown NB	19
597.25	35	0	St Andrews NB	39
627.25	40	0	St-Stephen NB	35
657.25	45	0	Milltown NB	19

IC Status Codes:

Code 0: Available channel, channel either unused, proposed, subjected to an application gazetted by the CRTC or to a tentative deletion.

Code 1: Approved station by CRTC but either not yet authorized for construction by Industry Canada, authorized for construction by Industry Canada and currently being built or under on-air testing.

Code 6: Operational station, temporary, short duration or normal operation.

Source: http://sd.ic.gc.ca/pls/engdoc_anon/web_search_geographical_input

Table 3: Canadian UHF licenses in Machias ME vicinity

Proposed Use

Specifics of Washington County Installation

On all the towers, we propose to use a Kathrein Model CL-1469B antenna described in Attachment 1. This antenna has a maximum gain of 8 dB and will be down-tilted.

We would limit our use of spectrum in this operation to the following TV channels:

14-15, 19, 23-24, 28-31, 33-34, 39, 43-51

We are planning to use ten or fewer channels from this list. The reason for selecting these channels is shown in Attachment 2. These channels use only channels listed in the US TV whitespace database that have no Canadian TV station within 150 km and no non-TV Canadian licenses within 50 km. (As shown in Table 1, in an abundance of caution we are avoiding all Canadian non-TV licensed spectrum regardless of whether they are IC codes 0,1, or 6.)

Legal Issues

§1.925(b)(3) provides

The Commission may grant a request for waiver if it is shown that:

(i) The underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a grant of the requested waiver would be in the public interest; or

(ii) In view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative.

In this case, both circumstances apply to this request. For the case of §1.925(b)(3)(i) we have shown that the underlying purpose of §15.709(b)(2) was to protect television broadcast licensees and other authorized users of TV spectrum from harmful interference. However, in rural Maine there is not much TV reception to protect at present as is shown in the following data from the Commission's own website:

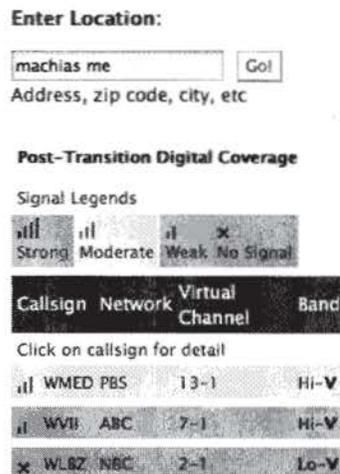


Figure 2: FCC data on readily receivable US TV stations in Machias ME¹

Under present FCC rules, this is an abundance of TV white space in this rural area:

¹ <http://transition.fcc.gov/mb/engineering/dtvmaps/>

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Adaptrum, Inc.
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San Jose, CA 95131
Phone: 408-850-0545
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Available Spectrum: 40 Channels (240 MHz)

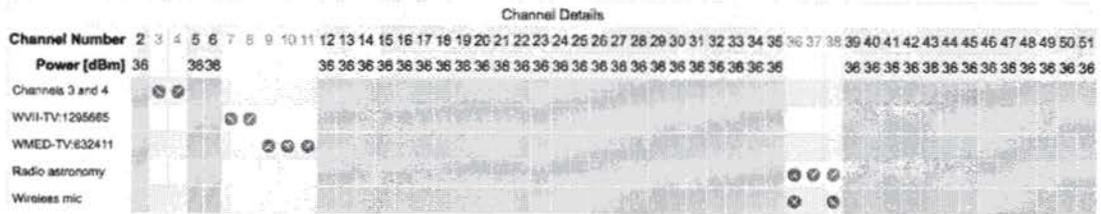


Figure 2: Spectrum availability in Machias ME from Google Spectrum Database

However in the low population density of this area² it is very expensive to serve this area under the general rules for TV band devices.

In this specific environment the underlying purpose of §15.709(b)(2) would not be served as it is an overly burdensome approach to protecting actual TV coverage in such a remote area. In view of the unusual factual circumstances of the instant case, application of the rule would be inequitable, unduly burdensome and contrary to the public interest.

For the above reasons we respectfully request a waiver of the rules described above.

Please refer technical questions to Dr. Michael Marcus, consultant to Adaptrum, 301-229-7714, marcus@marcus-spectrum.com.

Sincerely

/S/

Haiyun Tang
CEO
Adaptrum, Inc

² The population density of the Town of Machias is 160.1/sq mi but the surrounding Washington County is only 13/sq mi. (2010 Census data) (Nearly 85% of the world's supply of wild blueberries comes from Washington County!)

Attachment 1: Antenna data



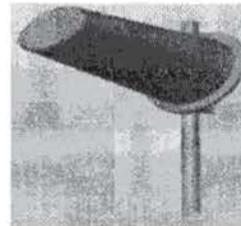
CL-1469B UHF-TV LOG-PERIODIC ANTENNA 8 dBd gain 470-862 MHz (Channels 14-69*)

The Kathrein Scala Division CL-1469B is a ruggedly built, linearly polarized log-periodic antenna designed for professional UHF-TV transmit and receive applications.

Like all Kathrein Scala Division antennas, the CL-1469B is made of the finest materials using state of the art electrical and mechanical designs resulting in superior performance and long service life. The rugged fiberglass radome protects the antenna from icing and assures stable pattern and gain performance under adverse environmental conditions.

The CL-1469B may be used stand alone or in arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.

*The CL-1469B covers all 6, 7, and 8 MHz UHF-TV channels worldwide (bands IV/V).



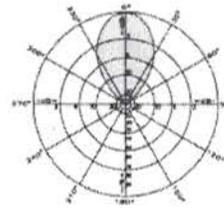
(Shown horizontally polarized)

Specifications:

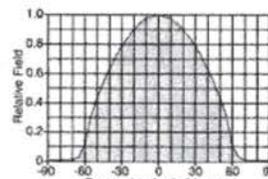
Frequency range	470-862 MHz (broadband)*
Gain	8 dBd
Power gain	6.31
Impedance	50 or 75 ohms
VSWR	< 1.5:1
Polarization	Horizontal or vertical
Front-to-back ratio	>35 dB
Maximum input power	100 watts, type "N" 75 ohm connector 250 watts, type "N" 50 ohm connector
Azimuth pattern	52 degrees (half-power)
Elevation pattern	72 degrees (half-power)
Connector	N female (50 or 75 ohms)
Weight	22 lb (10 kg)
Dimensions	28 x 17 x 12 inches (737 x 432 x 305 mm)
Equivalent flat plate area	2.76 ft ² (256 m ²)
Wind survival rating*	100 mph (160 kph)
Shipping dimensions	31 x 20 x 14.5 inches (787 x 508 x 368 mm)
Shipping weight	26.0 lb (12.7 kg)
Mounting	Mounting kits available for masts of 2.375 to 4.5 inch (60 to 114 mm) OD.

See reverse for order information.

*Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1995) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.



Azimuth pattern (E-plane)



Elevation pattern (H-plane)



10275-C

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 770-6500 Fax: (541) 779-6575
 Email: broadcast@kathrein.com Internet: www.kathrein-scala.com

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Attachment 2

Channels selected for proposed use and US and Canadian Uses in Area

TV Channel	FCC WS DB	Canadian TV	Canadian NonTV	Proposed
14				
15				
16				
17				
18				
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