

ENGINEERING EXHIBIT

Application for Construction Permit

prepared for

Gray Television Licensee, Inc.
W42DH-D Sayner/Vilas County, WI
Facility ID 167156
Ch. 42 (Digital) 15 kW

Gray Television Licensee, Inc. (“Gray”) is the licensee of Television Translator station W57AR, Channel 57, Sayner/Vilas County, WI, Facility ID 22151 (BLTT-19830929IA). A Construction Permit (“CP”) authorizes W42DH-D, a digital companion facility on Channel 42 (Facility ID 167156, BDCCDDT-20061030AFP). W42DH-D is authorized to operate with an effective radiated power (“ERP”) of 15 kW using a nondirectional antenna at the W57AR site.

Gray herein proposes a minor modification of the W42DH-D CP to employ a directional antenna and increase antenna height. No change to the authorized transmitter site is proposed. The proposed antenna is a Dielectric model TFU-DSB-M/CP and will employ circular polarization.

The proposed facility will operate on Channel 42 using a “simple” out of channel emission mask. **Figure 1** depicts the 51 dB μ coverage contours of the authorized and proposed facilities, as well as that of the licensed analog W57AR. The use of the same transmitter site and the service area overlap shown demonstrates compliance with §73.3572 for a minor change.

The antenna system for W42DH-D will be side-mounted on the existing W57AR antenna support structure, having FCC Antenna Structure Registration number 1034107. No change in overall structure height is proposed

A detailed interference study per OET Bulletin 69¹ shows that the proposal complies with the Commission’s interference protection requirements toward all NTSC, DTV, television translator,

¹FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). The implementation of OET-69 for this study followed the

LPTV, and Class A stations. The results, summarized in **Table 1**, show that any new interference does not exceed the Commission's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations).

The W42DH-D transmitter site is located 217 km from the U.S. - Canadian Border, within the international coordination zone. The proposed use of a directional antenna would reduce power levels oriented towards Canada (in the area of antenna suppression). A study using pertinent TV propagation curves (per "Step 2" of the *Letter of Understanding*² regarding full power digital television stations along the U.S. - Canadian Border) is provided in **Figure 2**. As demonstrated thereon, the worst case 12.4 dBμ F(50,10) co-channel interfering contour for the proposed W42DH-D does not reach the U.S. - Canada Border and is wholly encompassed by that of the currently authorized facility towards Canada. Based on this analysis, the instant proposal complies with the U.S. - Canadian *LOU* for coordination of full power digital television stations and no further coordination with Canada should be necessary.

The nearest FCC monitoring station is at Allegan, MI, at a distance of 476 km from the proposed site. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). There are no AM stations within 3.2 kilometers of the site, based on information contained within the Commission's database.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed transmitting antenna will be installed on an existing antenna support structure. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules. Therefore, it is

guidelines of OET-69 as specified therein. A cell size of 1 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission's implementation of OET-69 show excellent correlation.

² *Letter of Understanding Between the Federal Communications Commission of the United States of America and Industry Canada Related to the Use of the 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-806 MHz Bands for the Digital Television Broadcasting Service Along the Common Border*, September 2000.

believed that this application may be categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. Based on OET-65 equation (10), and considering 20 percent antenna relative field in downward elevations (pattern data shows less than 20 percent relative field at angles 15 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $2.3 \mu\text{W}/\text{cm}^2$, which is 0.5 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

Certification

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.

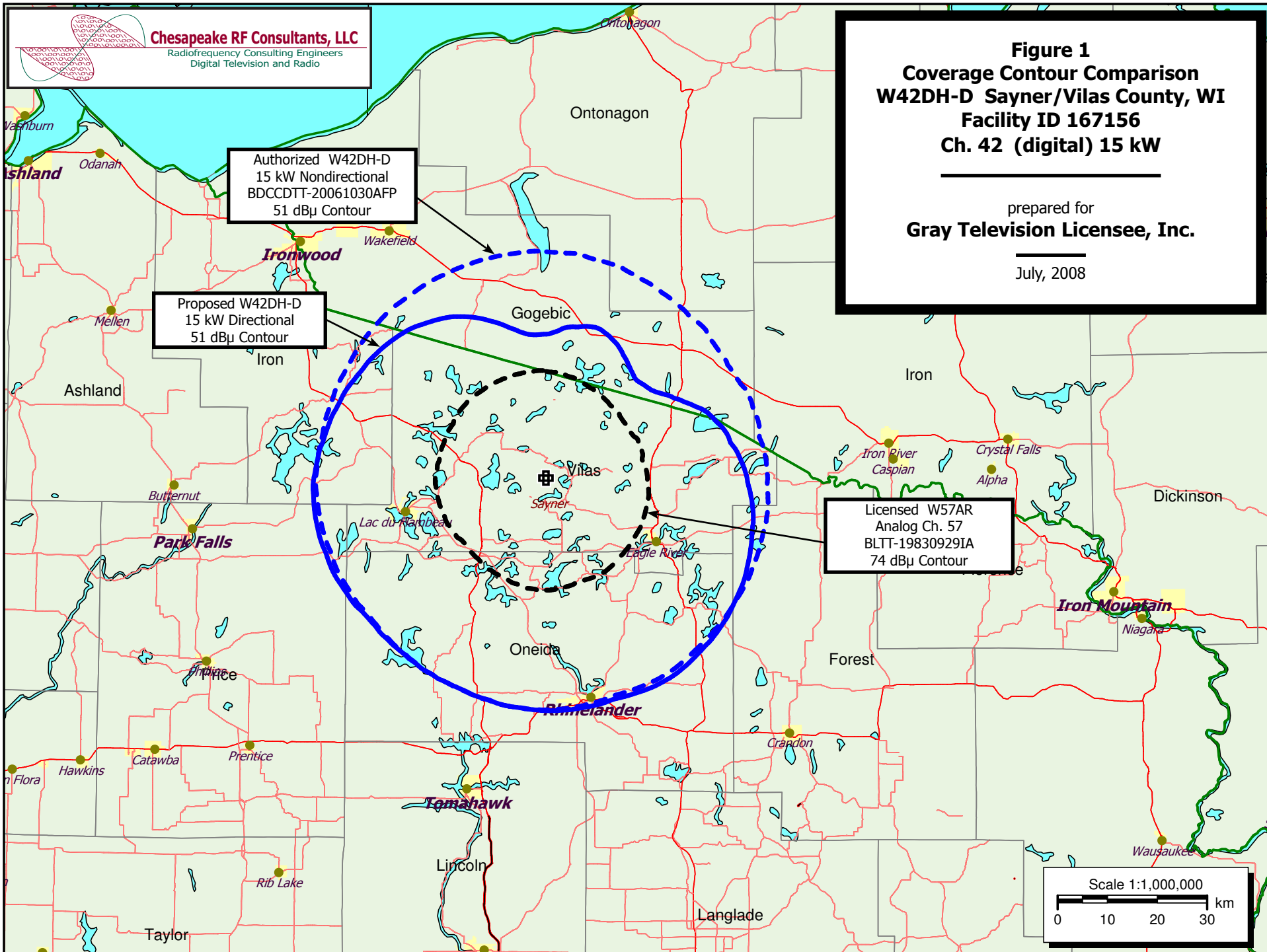
Joseph M. Davis, P.E.
July 17, 2008

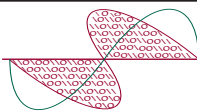
Chesapeake RF Consultants, LLC
11993 Kahns Road
Manassas, VA 20112
703-650-9600

List of Attachments

Figure 1	Coverage Contour Comparison
Figure 2	Interfering Contour Towards Canada
Table 1	Interference Analysis Results Summary
Form 346	Saved Version of Engineering Sections from FCC Form at Time of Upload

This material was entered July 17, 2008 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's name and password, and electronic data may otherwise be altered in an unauthorized fashion, we cannot be responsible for changes made subsequent to our entry of this data and related attachments.





Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 2
Interfering Contour Towards Canada
W42DH-D Sayner/Vilas County, WI
Facility ID 167156
Ch. 42 (digital) 15 kW

prepared for
Gray Television Licensee, Inc.

July, 2008

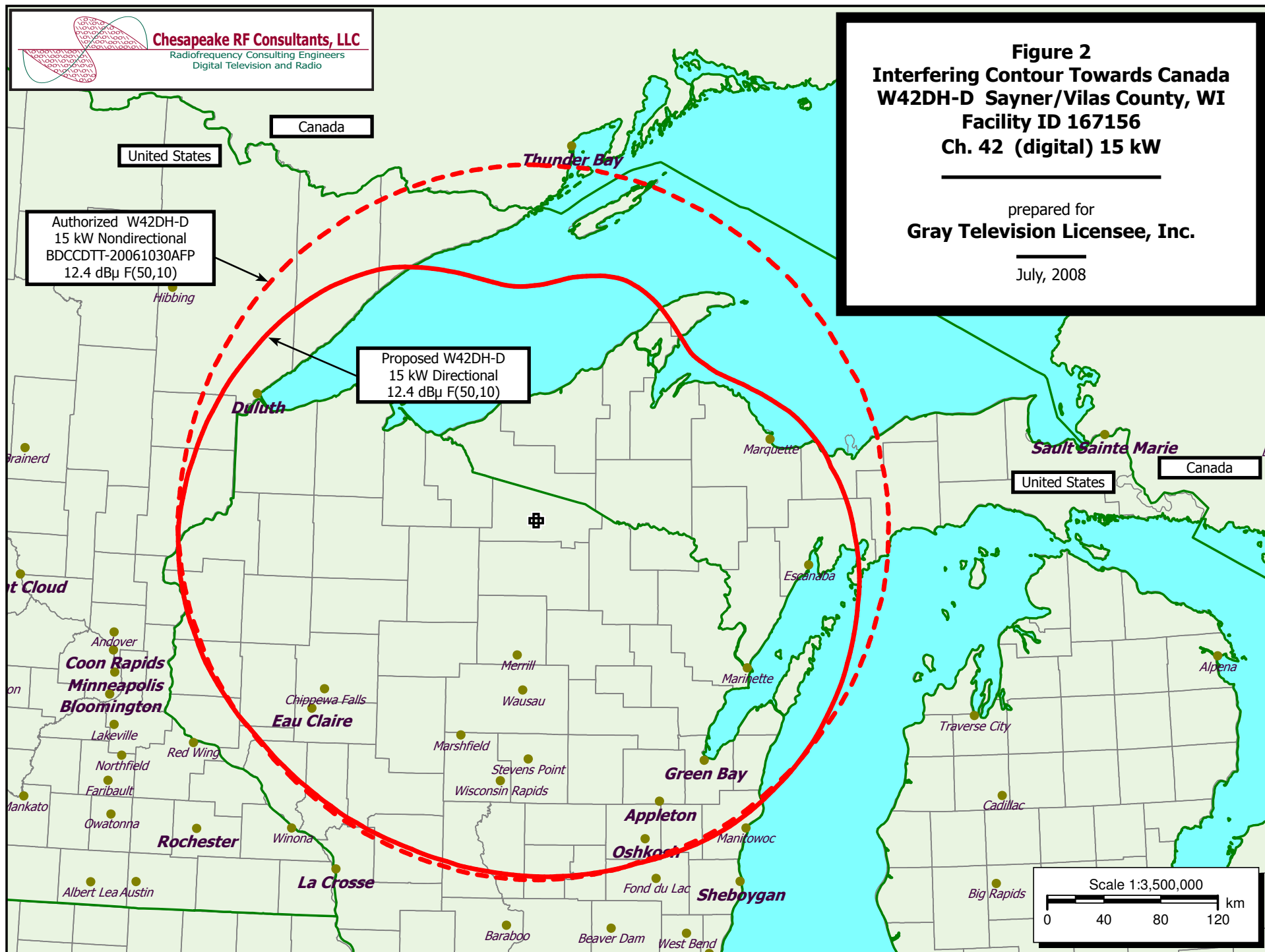


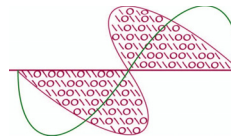
Table 1

Interference Analysis Results Summary

prepared for

Gray Television Licensee, Inc.

W42DH-D Sayner/Vilas County, WI



Chesapeake RF Consultants, LLC

Radiofrequency Consulting Engineers
Digital Television and Radio

<u>Ch.</u>	<u>Call</u>	<u>City/State</u>	<u>Dist</u> <u>(km)</u>	<u>Status</u>	<u>Application Ref. No.</u>	---Population (1990 Census)---	
						<u>Baseline</u>	<u>New Interference</u>
27	W27CQ	HOUGHTON MI	139.7	LIC	BLTT-20050420ABB	---	none
27	W27AU	WAUSAU WI	127.5	LIC	BLTT-19890519IK	---	none
34	WYOW	EAGLE RIVER WI	35.9	LIC	BLCT-20001221ABO	---	none
42	KIMT	MASON CITY IA	379.0	LIC	BLCDT-20071113AEE	---	none
42	W42CB	HESPERIA MI	389.5	LIC	BLTT-19950609IU	---	none
42	W42CB	HESPERIA MI	389.5	CP	BDFCDTT-20060124AAT	---	none
42	WPNE	GREEN BAY WI	216.4	LIC	BMLEDT-20040818AAP	---	none
43	W18CS	WHITING WI	165.8	LIC	BLTTL-20001201AAI	---	none
45	W45CI	ASHLAND WI	117.8	LIC	BLTTL-20030108ABR	---	none
45	W45CD	FENCE WI	91.4	LIC	BLTT-20050728AAM	---	none
49	DWUPT-CA	CRYSTAL FALLS MI	90.3	LIC	BLTT-19800818IC	---	none

SECTION III - ENGINEERING DATA (Digital)																																																																																																											
TECHNICAL SPECIFICATIONS																																																																																																											
Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.																																																																																																											
TECH BOX																																																																																																											
1.	Channel Number: 42																																																																																																										
2.	Translator Input Channel No. : 7																																																																																																										
3.	Primary station proposed to be rebroadcast: <table border="1"><tr><td>Facility Identifier</td><td>Call Sign</td><td>City</td><td>State</td><td>Channel</td></tr><tr><td>6867</td><td>WSAW-TV</td><td>WAUSAU</td><td>WI</td><td>7</td></tr></table>											Facility Identifier	Call Sign	City	State	Channel	6867	WSAW-TV	WAUSAU	WI	7																																																																																						
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4.	Antenna Location Coordinates: (NAD 27) Latitude: Degrees 46 Minutes 1 Seconds 55 <input checked="" type="radio"/> North <input type="radio"/> South Longitude: Degrees 89 Minutes 31 Seconds 48 <input checked="" type="radio"/> West <input type="radio"/> East																																																																																																										
5.	Antenna Structure Registration Number: 1034107 <input type="checkbox"/> Not Applicable [Exhibit 10] <input type="checkbox"/> Notification filed with FAA																																																																																																										
6.	Antenna Location Site Elevation Above Mean Sea Level: 519.7 meters																																																																																																										
7.	Overall Tower Height Above Ground Level: 150.9 meters																																																																																																										
8.	Height of Radiation Center Above Ground Level: 135 meters																																																																																																										
9.	Maximum Effective Radiated Power (ERP): 15 kW																																																																																																										
10.	Transmitter Output Power: 2.5 kW																																																																																																										
11.	<p>a. Transmitting Antenna: Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under CDBS Public Access (http://fjallfoss.fcc.gov/prod/cdbs/pubacc/prod/cdbs_pa.htm). Make sure that the Standard Pattern is marked Yes and that the relative field values shown match your values. Enter the Manufacturer (Make) and Model exactly as displayed in the Antenna Search. <input type="radio"/> Nondirectional <input type="radio"/> Directional "Off-the-shelf" <input checked="" type="radio"/> Directional composite Manufacturer DIE Model TFU-8DSB-M/CP CIRCULARLY POLARIZED</p> <p>b. Electrical Beam Tilt: 1 degrees <input type="checkbox"/> Not Applicable</p> <p>c. Directional Antenna Relative Field Values: <input type="checkbox"/> N/A (Nondirectional or Directional "Off-the-shelf") Rotation (Degrees): <input checked="" type="checkbox"/> No Rotation</p> <table border="1"><thead><tr><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th></tr></thead><tbody><tr><td>0</td><td>0.184</td><td>10</td><td>0.226</td><td>20</td><td>0.257</td><td>30</td><td>0.227</td><td>40</td><td>0.183</td><td>50</td><td>0.194</td></tr><tr><td>60</td><td>0.278</td><td>70</td><td>0.393</td><td>80</td><td>0.502</td><td>90</td><td>0.599</td><td>100</td><td>0.688</td><td>110</td><td>0.778</td></tr><tr><td>120</td><td>0.873</td><td>130</td><td>0.951</td><td>140</td><td>0.993</td><td>150</td><td>0.998</td><td>160</td><td>0.976</td><td>170</td><td>0.944</td></tr><tr><td>180</td><td>0.918</td><td>190</td><td>0.901</td><td>200</td><td>0.895</td><td>210</td><td>0.908</td><td>220</td><td>0.921</td><td>230</td><td>0.942</td></tr><tr><td>240</td><td>0.974</td><td>250</td><td>0.995</td><td>260</td><td>0.985</td><td>270</td><td>0.94</td><td>280</td><td>0.865</td><td>290</td><td>0.775</td></tr><tr><td>300</td><td>0.684</td><td>310</td><td>0.593</td><td>320</td><td>0.497</td><td>330</td><td>0.392</td><td>340</td><td>0.280</td><td>350</td><td>0.197</td></tr><tr><td>Additional Azimuths</td><td></td><td>146</td><td>1</td><td>253</td><td>0.996</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>											Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	0	0.184	10	0.226	20	0.257	30	0.227	40	0.183	50	0.194	60	0.278	70	0.393	80	0.502	90	0.599	100	0.688	110	0.778	120	0.873	130	0.951	140	0.993	150	0.998	160	0.976	170	0.944	180	0.918	190	0.901	200	0.895	210	0.908	220	0.921	230	0.942	240	0.974	250	0.995	260	0.985	270	0.94	280	0.865	290	0.775	300	0.684	310	0.593	320	0.497	330	0.392	340	0.280	350	0.197	Additional Azimuths		146	1	253	0.996						
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[Relative Field Polar Plot](#)

NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.	
12.	Out-of-channel Emission Mask: <input checked="" type="radio"/> Simple <input type="radio"/> Stringent
CERTIFICATION	
13.	<p>Interference : The proposed facility complies with all of the following applicable rule sections. 47.C.F.R Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b) and 73.1030.</p> <p style="text-align: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 11]</p>
14.	<p>Environmental Protection Act. The proposed facility is excluded from environmental processing under 47. C.F.R. Section 1.1306 (i.e., The facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine RF compliance, an Exhibit is required.</p> <p style="text-align: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 12]</p> <p>By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or</p>

	cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.
15.	Channels 52-59. If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable: <input type="checkbox"/> The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available. <input type="checkbox"/> Pursuant to Section 74.786(d), the applicant has notified, within 30 days of filing this application, all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.
16.	Channels 60-69. If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable: <input type="checkbox"/> Pursuant to Section 74.786(e), the applicant has notified, within 30 days of filing this application, all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees. <input type="checkbox"/> Pursuant to Section 74.786(e), the applicant proposing operation on channel 63, 64, 68 and 69 ("public safety channels") has secured a coordinated spectrum use agreements(s) with 700 MHz public safety regional planning committee(s) and state administrator(s) of the region(s) and state(s) within which the antenna site of the digital LPTV or TV translator station is proposed to locate, and those adjoining regions and states with boundaries within 75 miles of the proposed station location. <input type="checkbox"/> Pursuant to Section 74.786(e), the applicant for a channel adjacent to channel 63, 64, 68 or 69 has notified, within 30 days of filing this application, the 700 MHz public safety regional planning committee(s) and state administrator(s) of the region and state containing the proposed digital LPTV or TV translator antenna site and regions and states whose geographic boundaries lie within 50 miles of the proposed LPTV or TV translator antenna site.
PREPARERS CERTIFICATION ON PAGE 3 MUST BE COMPLETED AND SIGNED.	

SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name JOSEPH M. DAVIS, P.E.	Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature	Date 7/17/2008	
Mailing Address CHESAPEAKE RF CONSULTANTS, LLC 11993 KAHNS ROAD		
City MANASSAS	State or Country (if foreign address) VA	Zip Code 20112 -
Telephone Number (include area code) 7036509600	E-Mail Address (if available) JOSEPH.DAVIS@RF-CONSULTANTS.COM	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

Any specified rotation has already been applied to the plotted pattern.

Field strength values shown on a rotated pattern may differ from the listed values because intermediate azimuths are interpolated between entered azimuths.

