

## **ENGINEERING EXHIBIT**

### **Application for Construction Permit New Replacement Digital Television Translator**

prepared for

#### **Gray Television Licensee, LLC**

KAKE-TV Wichita, KS

Replacement Digital Translator

Ch. 21 15 kW

*Gray Television Licensee, LLC* (“Gray”) is the licensee of television station KAKE-TV, Facility ID 65522, Wichita, KS. KAKE-TV is operating on its post-transition digital Channel 10, its pre-transition analog channel. Pursuant to the procedures adopted in MB Docket 08-253,<sup>1</sup> *Gray* herein proposes to construct a new replacement digital television translator station on Channel 21 to aid in serving its principal community of Wichita, KS and other nearby communities.

Since ceasing analog operations on the transition date, KAKE-TV has received numerous calls regarding reception problems, including issues with indoor reception at locations within Wichita and other nearby areas. Problems with digital VHF reception by other stations have been widely publicized since the transition date. The proposed translator, to be sited on the same antenna structure as the KAKE-TV VHF digital Channel 10 facility, would provide some level of digital UHF fill-in service to aid indoor reception. The translator will employ the antenna and associated transmitting system utilized by KAKE-TV’s pre-transition digital Channel 21 (BLCDT-20050701AAA), with the effective radiated power set at 15 kW. This is a shared antenna with the KAKE-TV VHF digital Channel 10 facility, and was employed by KAKE-TV during the transition for its full-power analog Channel 10 and full-power digital Channel 21 facilities.

**Figure 1** depicts the 51 dB $\mu$  coverage contour of the proposed translator, along with the KAKE-TV digital Channel 10 noise limited contour (BLCDT-20090410ABG pending) and the pre-

---

<sup>1</sup>Report and Order, *Amendment of Parts 73 and 74 of the Commission’s Rules to Establish Rules for Replacement Digital Low Power Television Translator Stations*, MB Docket 08-253, FCC 09-36, released May 8, 2009.

transition analog Channel 10 Grade B contour (BMLCT-20050623ABM). The translator's service contour will not extend beyond KAKE-TV's former analog Grade B contour.

The proposed translator will employ the existing nondirectional antenna system top-mounted on the KAKE-TV antenna supporting structure, having FCC Antenna Structure Registration ("ASR") number 1039959. No change to the overall structure height and no tower work are required to carry out this proposal.

*Gray* specifies use of a **full service out-of-channel emission mask** as defined in §73.622(h).<sup>2</sup> Detailed interference studies per OET Bulletin 69<sup>3</sup> show that the proposal complies with the Commission's interference protection requirements toward all post-transition digital television, television translator, 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 licensee of KSNC(DT) (Ch. 22 Great Bend, KS) **has provided written consent** (attached separately) to *Gray*'s use of a full service emission mask. The full service mask provides more signal suppression on the first-adjacent channels than the standard §74.793 LPTV/translator "stringent" emission mask. **Table 2** supplies interference study results based on the "stringent" emission mask, showing that KSNC is the only station that would otherwise receive impermissible interference. In this case, there would be no predicted interference (0.00%) to KSNC for the translator's use of the full service mask as shown in **Table 1**.

---

<sup>2</sup>If needed, a waiver of §74.793(c) is requested to allow use of the full service emission mask. The proposal would allow KAKE-TV to implement a replacement digital translator to aid in restoring service to viewers who lost service at the transition date.

<sup>3</sup>FCC 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 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.

Accordingly, the instant proposal complies with §§73.6012 – 73.6020 regarding interference protection to digital television, low power television, television translator, Class A television, and land mobile facilities.

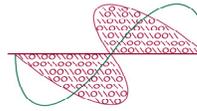
The nearest FCC monitoring station is 357 km distant at Grand Island, NE. This exceeds the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with “quiet” zones specified in §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. The site location is beyond the border areas requiring international coordination.

#### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposal will involve use of an existing transmitting antenna. 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. No tower construction or change in structure height is proposed. Therefore, it is 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 10 percent relative field at downward elevations, the calculated signal density near the antenna structure at two meters above ground level attributable to the proposed facility is  $0.05 \mu\text{W}/\text{cm}^2$ , which is 0.01 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b)(3) 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. 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, mast 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.

A handwritten signature in blue ink, appearing to read "Joseph M. Davis". The signature is fluid and cursive, with a large initial "J" and "D".

Joseph M. Davis, P.E.  
February 5, 2010

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

### List of Attachments

Figure 1	Coverage Contour Comparison
Table 1	Interference Analysis Results Summary - Full Service Emission Mask
Table 2	Interference Analysis Results Summary - LPTV Stringent Emission Mask
Form 346	Saved Version of Engineering Sections from FCC Form at Time of Upload

*This material was entered February 5, 2010 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's account number 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.*



**Figure 1**  
**Coverage Area Comparison**  
**KAKE-TV Wichita, KS**  
**Replacement Digital Translator**  
**Ch. 21 15 kW**  
prepared for  
**Gray Television Licensee, LLC**  
February, 2010

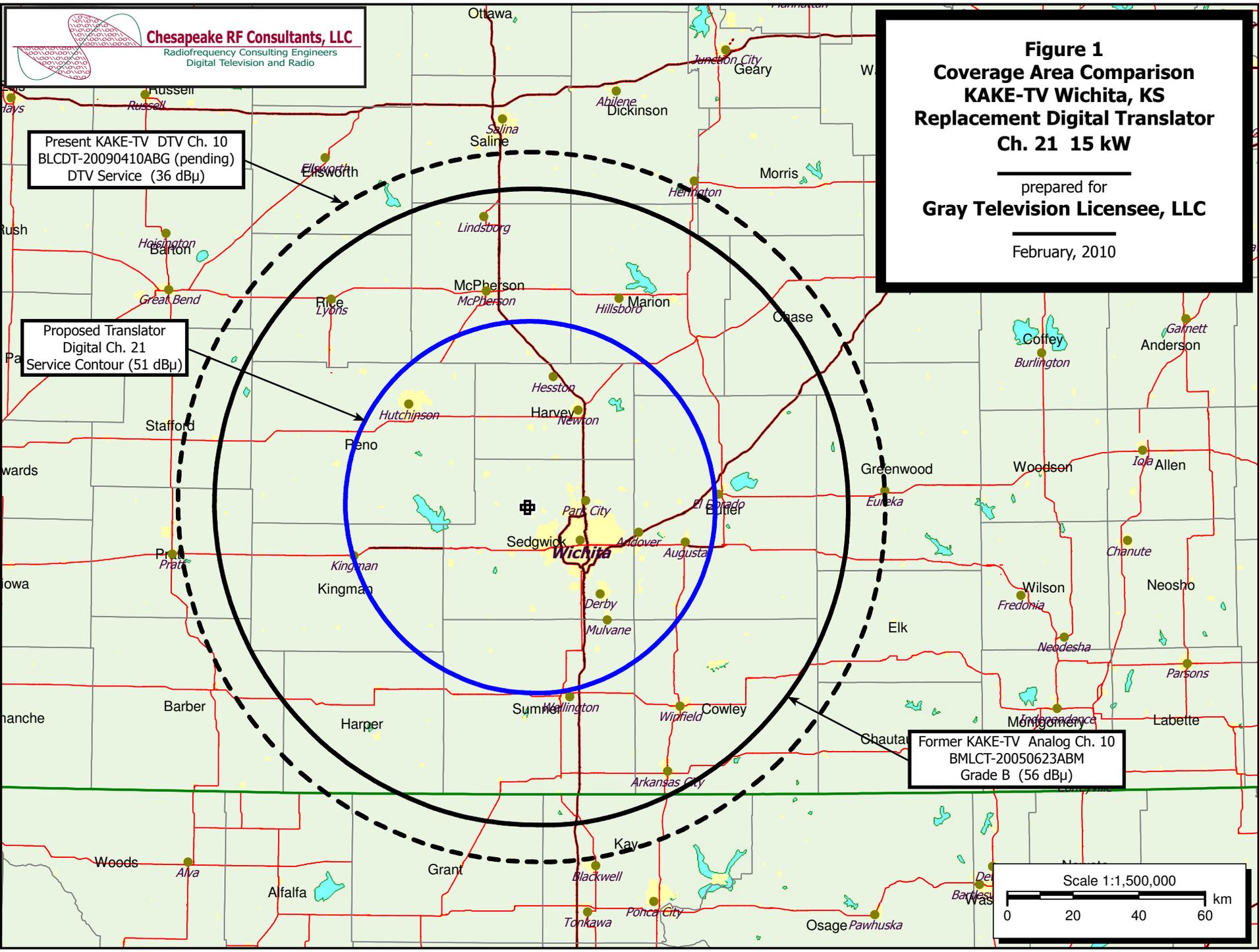


Table 1

**Interference Analysis Results Summary  
Full Service Emission Mask**

prepared for

**Gray Television Licensee, LLC**

**KAKE-TV Wichita, KS**



KAKE-TV USERRECORD-01 WICHITA KS US  
 Channel 21 ERP 15. kW HAAT 310. m RCAMSL 00733 m FULL SERVICE MASK  
 Latitude 037-46-53 Longitude 0097-31-08  
 Nondirectional Antenna

Ch.	Call	City/State	Dist (km)	Status	Application Ref. No.	---Population (2000 Census)---	
						Baseline	New Interference
17	K52FC	WICHITA KS	19.2	APP	BPTTL-20020429ACP	---	none
20	NEW	TOPEKA KS	191.3	APP	BNPDTL-20100125AIH	---	none
20	K20JD-D	CHEROKEE & ALVA OK	144.0	CP	BDCCDTT-20061024ABD	---	none
20	KTEW-CA	PONCA CITY OK	135.2	APP	BSTA-20080617ACG	---	none
21	KHBS	FORT SMITH AR	394.0	LIC	BLCDDT-20031121AMR	---	none
21	KDCK	DODGE CITY KS	233.6	LIC	BLEDT-20030423ABG	---	none
21	KKSU-LP	MANHATTAN KS	176.8	LIC	BLTTL-19950512ID	---	none
21	KTAJ-TV	ST. JOSEPH MO	295.9	LIC	BLCDDT-20060703AAK	2,119,364	23 (0.00%)
21	NEW	BEATRICE NE	281.3	APP	BNPDTL-20100201AAM	---	none
21	DK21ES	COLUMBUS, ETC NE	404.8	LIC	BLTTL-19950807JB	---	none
21	K68AU	ERICK OK	352.0	CP	BDFCDTT-20091228AFE	---	none
21	K68AU	ERICK, ETC OK	352.1	CP	BDISTT-20080610ACA	---	none
21	KTOU-LP	OKLAHOMA CITY OK	266.1	LIC	BLTTL-20011116ABI	---	none
21	K21DF	STILLWATER OK	188.1	LIC	BLTT-19940616IH	---	none
21	K21DF	STILLWATER OK	188.2	CP	BDFCDTT-20090821AAH	---	none
21	K21IT-D	WEATHERFORD OK	276.6	CP MOD	BMPDTT-20091221ADO	---	none
22	KSNC	GREAT BEND KS	131.3	LIC	BLCDDT-20081112AIQ	---	none
22	NEW	TOPEKA KS	206.5	APP	BNPDTL-20100203ABB	---	none
22	K22ID-D	ALVA - CHEROKEE OK	144.0	CP	BDCCDTT-20061024ADS	---	none
28	K28JB	WICHITA KS	19.8	LIC	BLTT-20050801AHP	---	none

Table 2

**Interference Analysis Results Summary  
LPTV Stringent Emission Mask**

prepared for

**Gray Television Licensee, LLC**

**KAKE-TV Wichita, KS**



KAKE-TV USERRECORD-01 WICHITA KS US  
 Channel 21 ERP 15. kW HAAT 310. m RCAMSL 00733 m STRINGENT MASK  
 Latitude 037-46-53 Longitude 0097-31-08  
 Nondirectional Antenna

Ch.	Call	City/State	Dist (km)	Status	Application Ref. No.	---Population (2000 Census)---	
						Baseline	New Interference
17	K52FC	WICHITA KS	19.2	APP	BPTTL-20020429ACP	---	none
20	NEW	TOPEKA KS	191.3	APP	BNPDTL-20100125AIH	---	none
20	K20JD-D	CHEROKEE & ALVA OK	144.0	CP	BDCCDTT-20061024ABD	---	none
20	KTEW-CA	PONCA CITY OK	135.2	APP	BSTA-20080617ACG	---	none
21	KHBS	FORT SMITH AR	394.0	LIC	BLCDDT-20031121AMR	---	none
21	KDCK	DODGE CITY KS	233.6	LIC	BLEDT-20030423ABG	---	none
21	KKSU-LP	MANHATTAN KS	176.8	LIC	BLTTL-19950512ID	---	none
21	KTAJ-TV	ST. JOSEPH MO	295.9	LIC	BLCDDT-20060703AAK	2,119,364	23 (0.00%)
21	NEW	BEATRICE NE	281.3	APP	BNPDTL-20100201AAM	---	none
21	DK21ES	COLUMBUS, ETC NE	404.8	LIC	BLTTL-19950807JB	---	none
21	K68AU	ERICK OK	352.0	CP	BDFCDTT-20091228AFE	---	none
21	K68AU	ERICK, ETC OK	352.1	CP	BDISTT-20080610ACA	---	none
21	KTOU-LP	OKLAHOMA CITY OK	266.1	LIC	BLTTL-20011116ABI	---	none
21	K21DF	STILLWATER OK	188.1	LIC	BLTT-19940616IH	---	none
21	K21DF	STILLWATER OK	188.2	CP	BDFCDTT-20090821AAH	---	none
21	K21IT-D	WEATHERFORD OK	276.6	CP MOD	BMPDTT-20091221ADO	---	none
22	KSNC	GREAT BEND KS	131.3	LIC	BLCDDT-20081112AIQ	173,629	8,098 (4.66%) *
22	NEW	TOPEKA KS	206.5	APP	BNPDTL-20100203ABB	---	none
22	K22ID-D	ALVA - CHEROKEE OK	144.0	CP	BDCCDTT-20061024ADS	---	none
28	K28JB	WICHITA KS	19.8	LIC	BLTT-20050801AHP	---	none

\* See Table 1 for Full Service mask results, indicating no interference to KSNC  
 Consent of KSNC has been obtained for use of a Full Service emission mask

**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:  
21

2. Translator Input Channel No. : 10

3. Primary station proposed to be rebroadcast:

Facility Identifier	Call Sign	City	State	Channel
65522	KAKE-TV	WICHITA	KS	10

4. Antenna Location Coordinates: (NAD 27)  
Latitude:  
Degrees 37 Minutes 46 Seconds 53  North  South  
Longitude:  
Degrees 97 Minutes 31 Seconds 8  West  East

5. Antenna Structure Registration Number: 1039959  
 Not Applicable [Exhibit 10]  Notification filed with FAA

6. Antenna Location Site Elevation Above Mean Sea Level: 417.6 meters

7. Overall Tower Height Above Ground Level: 325.8 meters

8. Height of Radiation Center Above Ground Level: 315.4 meters

9. Maximum Effective Radiated Power (ERP): 15 kW

10. Transmitter Output Power: 0.85 kW

11. a. Transmitting Antenna:  
Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under [CDBS Public Access](http://licensing.fcc.gov/prod/cdbs/pubacc/prod/cdbs_pa.htm) (http://licensing.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.  
 Nondirectional  Directional "Off-the-shelf"  Directional composite  
Manufacturer DIE Model TUV-28GTH/10HV-R-O6/O3  
b. Electrical Beam Tilt: 0.75 degrees  Not Applicable

c. Directional Antenna Relative Field Values:  N/A (Nondirectional or Directional "Off-the-shelf")  
Rotation (Degrees):  No Rotation

Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value
0		10		20		30		40		50	
60		70		80		90		100		110	
120		130		140		150		160		170	
180		190		200		210		220		230	
240		250		260		270		280		290	
300		310		320		330		340		350	
Additional Azimuths											

[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:  Simple  Stringent

**CERTIFICATION**

13. **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.  Yes  No  
See Explanation in [Exhibit 11]

14. **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.**  Yes  No  
See Explanation in [Exhibit 12]  
By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or 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:

The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available.

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:

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.

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.

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 2/5/2010	
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	