Federal Communications Commission
Washington, D. C. 20554

Approved by OMB
3060-0627
Expires 01/31/98

FOR FCC USE ONLY

Accepted/Filed
APR - 4 2014
FCC Office of the Secretary

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.

FOR COMMISSION USE ONLY
FILE NO. BAML-20140404ABR

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)

New Life Evangelistic Center, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters)
1411 Locust Street

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
St. Louis	Missouri	63103

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
3148813200	KKLO	10345

2. A. Is a fee submitted with this application? KKLO 10345 ☐ Yes ☑ No

B. If No, indicate reason for fee exemption (see 47 C.F.R. Section

☐ Governmental Entity ☐ Noncommercial educational licensee ☑ Other (Please explain): MEASUREMENT

C. If Yes, provide the following information:

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in the "Mass Media Services Fee Filing Guide." Column (B) lists the Fee Multiple applicable for this application. Enter fee amount due in Column (C).

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
	0001	$	

To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)	(B)	(C)	FOR FCC USE ONLY
	0001	$	

ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.	TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
	$	

0006473107
BP-20040813AAG

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT NEW LIFE EVANGELISTIC CENTER, INC		
MAILING ADDRESS 1411 LOCUST STREET		
CITY ST. LOUIS	STATE MO	ZIP CODE 63103

2. This application is for:

☒ Commercial ☐ Noncommercial

☒ AM Directional ☐ AM Non-Directional

Call letters	Community of License	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
KKLO	LEAVENSWORTH KS	N/A	N/A	N/A

3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620?

☐ Yes ☐ No

DNA

Exhibit No.

If No, explain in an Exhibit.

4. Have all the terms, conditions, and obligations set forth in the above described construction permit been fully met?

☐ Yes ☐ No

DNA

Exhibit No.

If No, state exceptions in an Exhibit.

5. Apart from the changes already reported, has any cause or circumstance arisen since the grant of the underlying construction permit which would result in any statement or representation contained in the construction permit application to be now incorrect?

☐ Yes ☒ No

Exhibit No.

If Yes, explain in an Exhibit.

6. Has the permittee filed its Ownership Report (FCC Form 323) or ownership certification in accordance with 47 C.F.R. Section 73.3615(b)?

☐ Yes ☐ No

☒ Does not apply

If No, explain in an Exhibit.

Exhibit No.

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination?

☐ Yes ☒ No

If the answer is Yes, attach as an Exhibit a full disclosure of the persons and matters involved, including an identification of the court or administrative body and the proceeding (by dates and file numbers), and the disposition of the litigation. Where the requisite information has been earlier disclosed in connection with another application or as required by 47 U.S.C. Section 1.65(c), the applicant need only provide: (i) an identification of that previous submission by reference to the file number in the case of an application, the call letters of the station regarding which the application or Section 1.65 information was filed, and the date of filing; and (ii) the disposition of the previously reported matter.

Exhibit No.

8. Does the applicant, or any party to the application, have a petition on file to migrate to the expanded band (1605-1705 kHz) or a permit or license either in the existing band or expanded band that is held in combination (pursuant to the 5 year holding period allowed) with the AM facility proposed to be modified herein?

☐ Yes ☒ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

The APPLICANT hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because use of the same, whether by license or otherwise, and requests and authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended).

The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

CERTIFICATION

1. By checking Yes, the applicant certifies, that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. Section 1.2002(b).

☒ Yes ☐ No

2. I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Name	Signature	
CHARLES HALE	Charles W Hale	
Title	Date	Telephone Number
SECRETARY	4/4/2014	314 881 3200

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

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
New Life Evangelistic Center, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License ☐ Direct Measurement of Power **Moment Method Proof**

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
KKLO		1410 kHz	Unlimited	0.5 kW	5.0 kW

2. Station location

State	City or Town
Kansas	Leavenworth

3. Transmitter location

State	County	City or Town	Street address (or other identification)
Kansas	Leavenworth	Leavenworth	481 Muncie Road

4. Main studio location

State	County	City or Town	Street address (or other identification)
Kansas	Leavenworth	Leavenworth	481 Muncie Road

5. Remote control point location (specify only if authorized directional antenna)

State	County	City or Town	Street address (or other identification)

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☑ No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? ☑ Yes ☐ No ☐ Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. See Report

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for Night System	RF common point or antenna current (in amperes) without modulation for day system
3.29 amperes	10.39 amperes
Measured antenna or common point resistance (in ohms) at operating frequency	**Measured antenna or common point reactance (in ohms) at operating frequency**
Night: 50 ohms Day: 50 ohms	Night: +j 0 ohms Day: +j 0 ohms

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
T1 (W)	0.0°	-57.8°	1.000	0.477	N/A	N/A
T2 (C)		0.0°		1.000	N/A	N/A
T3 (SE)		- 130.9°		0.417	N/A	N/A
T4 (E)	-54.3°		0.782			

Manufacturer and type of antenna monitor: Potomac Instruments Model 1900

9. Description of antenna system (if directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
Guyed, uniform cross-section steel towers mounted on concrete base piers and insulators	T1 = 133.5 m T2-4 = 45.7 m	T1 = 135.0 m T2-4 = 47.2 m	T1 = 135.9 m T2-4 = 47.2 m	Exhibit No.

Excitation ☑ Series ☐ Shunt

ASR T1(W) = 1048270
ASR T2-T4 = ASR Not Required

Geographic coordinates to nearest second. For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North Latitude	West Longitude
39 ° 16 ' 24 "	94 ° 54 ' 27 "

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits. Exhibit No. See Report

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system. Exhibit No.

10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

11. Give reasons for the change in antenna or common point resistance.

See Report. There is no change in common point resistance. The instant application is being filed to relicense KKLO under the Moment Method proof rules and procedures.

I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

Name (Please Print or Type)	Signature (check appropriate box below)
Donald J. Baad	Donald J Baad
Address (include ZIP Code) P.O. Box 220 385 Airport Drive Coldwater, MI 49036	Date February 19, 2014 Telephone No. (Include Area Code) (517) 278-7339

☐ Technical Director
☐ Registered Professional Engineer
☐ Chief Operator
☑ Technical Consultant
☐ Other (specify)

MOMENT METHOD ANTENNA PROOF OF PERFORMANCE

KKLO – Leavenworth, KS

Facility ID # 10345

February 2014

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036

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CERTIFICATION OF ENGINEERS

The firm of Munn-Reese, Inc., Broadcast Engineering Consultants, with offices at 385 Airport Drive, Coldwater, Michigan, has been retained for the purpose of preparing the technical data forming this report.

Some of the data utilized in this report was taken from the FCC Secondary Database and data on file. While this information is believed accurate, errors or omissions in the database and file data are possible. This firm may not be held liable for damages as a result of such data errors or omissions. Other data utilized in this report is based on field measurements and/or observations made by the undersigned, or others under the supervision of the undersigned.

The report has been prepared by properly trained electronics specialists under the direction of the undersigned whose qualifications are a matter of record before the Federal Communications Commission.

I declare under penalty of the laws of perjury that the contents of this report are true and accurate to the best of my knowledge and belief.

February 18, 2014

MUNN-REESE, INC.
385 Airport Drive, PO Box 220
Coldwater, Michigan 49036
Telephone: 517-278-7339

By _____
Wayne S. Reese, President

By _____
Edmond R. Trombley, Staff Engineer

By _____
Donald J. Baad, Staff Engineer

By _____
Richard Grzebik, Staff Engineer

Discussion of Report

The firm of Munn-Reese, Inc. was retained to prepare an Antenna Proof of Performance under the Moment Method rules found in §73.151(c). This report supplies technical support for an application to relicense the existing KKLO, Leavenworth, KS (Facility ID # 10345) day and night directional arrays under the new Moment Method rules. The station will continue to operate during daytime hours with a power of 5.0 kW, and at night with a power of 500 Watts. The daytime array uses three towers and the night time array uses two towers. One tower is common to both arrays. The common tower is 226° tall while each of the other towers is 77.4° tall. Thus, all of the towers qualify for base current sampling under the provisions of §73.151(c)(2)(i).

The existing phasing and coupling equipment has been retained with no changes requested in either the theoretical pattern or the theoretical parameters. However, the sample system has been modified by removing the existing loops and installing current sampling transformers at the base of each tower. The sample lines have also been modified to conform to the requirements of Moment Method proofs. Details of the modified sampling system are found in ***Exhibit 2.10***.

Self-impedance measurements were made at each tower with the other towers "floating" in an open circuit configuration as set forth in §73.151(c)(1). Measurements were made using an Array Solutions Power Aim 120 configured as a network analyzer. The measurements were made at the output of each ATU. This output point was opened to "float" the unused towers. The results of these measurements are shown in ***Exhibit 1.10***, along with the dimensions of the individual towers.

A capacitance of approximately 50 pf was used to represent the base insulator and any stray capacitance near each tower base. At 1410 kHz, this can be modeled by a shunt reactance of –j 2258 ohms.

Individual printouts from Mininec Broadcast Professional, Version 14.5, are shown for the modeling of each tower in ***Exhibits 1.11 - 1.14***. The base impedance predicted by the Mininec software was adjusted by first combining the predicted base impedance with the assumed parallel shunt reactance and then adding the assumed series reactance to represent the series path between the base of the tower and the ATU output. The results of these calculations are shown in the "Adjusted Model" columns of ***Exhibit 1.10***. The circuit diagram and formulas used to calculate these adjusted values are shown at the end of the exhibit.

The predicted self impedance values were calibrated by altering the tower dimensions of the model within the limitations described in §73.151(c)(1)(i)-(ix). The "Model Check" portion of ***Exhibit 1.10*** confirms that each adjusted model is within the dimensional limitations. These cells are conditionally formatted to show green when the dimensions are within the limits and red when the limits are exceeded. The model for each tower was adjusted until the base resistance and reactance predicted by the moment method software adjusted for the assumed shunt and series reactance matched the measured

Discussion of Report

data within the ±2 ohms and ±4 percent specified in §73.151(c)(2)(ii). The resulting values are shown in the "Adjusted Model" columns of ***Exhibit 1.10***. These cells have also been conditionally formatted to indicate the acceptability of the predicted values.

The modeled tower parameters were used, along with the theoretical field parameters, to generate predicted drive points and base parameters using the moment method software as specified in §73.151(c)(2)(i). The computed data is shown in ***Exhibit 1.20*** for the day pattern and ***Exhibit 1.30*** for the night pattern. The predicted base current and phases were adjusted to reflect the presence of the assumed shunt reactance at each tower. These adjusted values are shown in the "ATU Output" column of ***Exhibit 1.20*** and ***1.30***. The "ATU Output" magnitudes and phases were normalized to produce the "Mininec Model" "Ratio" and "Phase" parameters shown in the upper middle portion of each exhibit. These are the operating parameters used on Form 302-AM. Supporting exhibits consisting of the array synthesis for each pattern are shown in ***Exhibit 1.21*** and ***1.31***, respectively. An array summary for each pattern has also been included in ***Exhibit 1.22*** and ***Exhibit 1.32***.

Since this Moment Method proof is being filed to relicense an existing array, and no changes are requested in the theoretical pattern, KKLO qualifies for the exemption from a post construction survey as clarified in Public Notice DA 09-2340 (released October 29, 2009).

Exhibit 3.10 shows the details of the sample system verification. The sample lines are Cablewave FCC38-50J cable. This cable is listed with a velocity factor of 0.81. When the field engineers measured the open circuit phase delay of these lines in accordance with §73.151(c)(2)(i), they found the "Maximum Deviation" between the longest and shortest lines was 0.2°. This is indicated by the conditional formatting of the "Maximum Deviation" cell.

The open circuit impedance of each line was also measured using the procedure described in §73.151(c)(2)(i). Good agreement was found, and the measured values, shown in ***Exhibit 3.10***, are within the two ohm tolerance.

The newly purchased Delta TCT-3 current sensing transformers were compared using the network analyzer. The results of these measurements are also shown in ***Exhibit 3.10***. The magnitudes and phases were within the tolerances specified by the manufacturer. These cells have also been conditionally formatted to indicate the acceptability of the measured values.

As a final step, the impedance of each sample line was again measured from the antenna monitor end with the sample transformer attached at the ATU end. The results are also shown in ***Exhibit 3.10***.

KKLO purchased a new Potomac Instruments Model AM-1900 digital antenna monitor. The calibration was checked using a "T" connector with equal length cables to confirm

Discussion of Report

the other tower inputs had a Ratio of 1.000 and a Phase of 0° when fed the same signal as the reference tower.

Bob Moore, Contract Engineer for KKLO, tuned the array to the parameters generated by the moment method modeling software. The final tuning parameters, as read from the antenna monitor, were adjusted to those shown in ***Exhibit 1.20*** and ***Exhibit 1.30***. The common point impedance for each array was maintained at 50 ohms resistance and ±j 0 ohms reactance.

§73.151(c)(3) calls for the establishment of field strength measurement reference points along each pattern maxima and minima. These are shown for the day pattern in ***Exhibit 4.10*** and the night pattern in ***Exhibit 4.11***. Each point includes the measured field strength value, the distance (in km) from the array, the NAD27 geographic coordinates and a brief description of the location.

The modeling of the arrays was performed by Donald J. Baad, Staff Engineer with this office. Field work was performed by and under the direction Bob Moore, Contract Engineer for KKLO in consultation with the Munn-Reese office. Assistance was provided by Shawn Baker who also works as a contract engineer the licensee of KKLO.

Exhibit 1.10 - Moment Method Open Circuit Modeling Data

Modeling Software: Mininec Broadcast Professional - Version 14.5

Station: KKLO - Leavenworth, KS

Freq (kHz) **1410**

Self-Impedances:
Measured

Twr	Open R	Open X	Electrical Ht (°)	Number of Faces	Face Width (in)	Equiv Radius (m)
1C	39.85	-117.11	226°	3	24	0.291
2D	29.52	-11.71	77.4°	3	15	0.182
3D	25.13	-11.29	77.4°	3	15	0.182
4N	35.70	4.53	77.4°	3	12	0.146

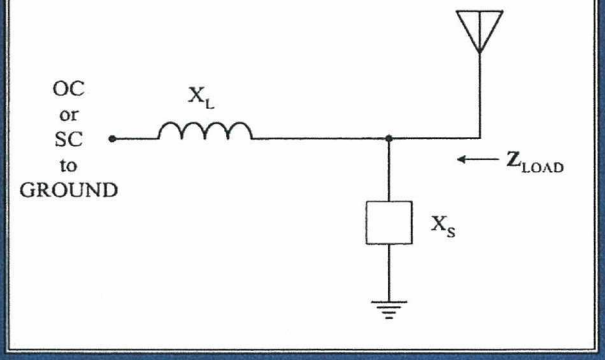
Model Check

Twr	Adjusted Ht(°)	Adjusted Radius(m)	Number Segments
1	232°	0.291	29
2	81°	0.182	10
3	80.4°	0.182	10
4	86.2°	0.124	10

Twr	Mininec R	Mininec X	Assumed Shunt X	Assumed Series X	Adjusted Model R	Adjusted Model X
1	45.16	-163.18	-2258	35	39.27	-117.91
2	30.35	-26.90	-2258	15	29.63	-11.98
3	25.44	-30.00	-2258	18.5	24.78	-11.39
4	34.92	-5.02	-2258	10	34.76	4.46

Exhibit 1.10 - Moment Method Open Circuit Modeling Data

Added Series Inductance and Shunt Reactance Bases Open and Shorted



Added Series Inductance and Shunt Reactance Base Impedance Formulas

$Z_{BASE} = R_B + jX_B$

$Z_{ATU} = R_A + jX_A$

X_S = Shunt Reactance

X_L = Inductive Series Reactance

$$R_A = R_B X_S^2 / (R_B^2 + (X_B + X_S)^2)$$

$$X_A = + jX_S (R_B^2 + X_B^2 + X_B X_S)) / (R_B^2 + (X_B + X_S)^2) + jX_L$$

Munn-Reese, Inc.
Broadcast Engineering Consultants
Coldwater, MI 49036

Exhibit 1.11 – Tower 1 Model

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KKLO - Tower 1 (Common) Driven - Other Towers Open

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	1	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	30	0	-2,258.	0	0	0
2	40	0	-2,258.	0	0	0
3	50	0	-2,258.	0	0	0

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1,410.	45.162	-163.18	169.31	285.5	13.729	-1.2676	-5.9665

Exhibit 1.12 – Tower 2 Model

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KKLO - Tower 2 (Day) Driven - Other Towers Open

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	30	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-2,258.	0	0	0
2	40	0	-2,258.	0	0	0
3	50	0	-2,258.	0	0	0

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 30, sector 1							
1,410.	30.345	-26.9	40.551	318.4	2.296	-8.1078	-.7294

Exhibit 1.13 – Tower 3 Model

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KKLO - Tower 3 (Day) Driven - Other Towers Open

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	40	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-2,258.	0	0	0
2	30	0	-2,258.	0	0	0
3	50	0	-2,258.	0	0	0

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 40, sector 1							
1,410.	25.441	-30.004	39.338	310.3	2.8283	-6.4191	-1.1243

Exhibit 1.14 – Tower 4 Model

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KKLO - Tower 4 (Night) Driven - Other Towers Open

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	50	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-2,258.	0	0	0
2	30	0	-2,258.	0	0	0
3	40	0	-2,258.	0	0	0

C:\Expert MININEC Broadcast Professional\Jobs\KKLO Twr 4 12-05-2013 10:51:48

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 50, sector 1							
1,410.	34.919	-5.0162	35.277	351.8	1.4595	-14.571	-.15432

Exhibit 1.20 - Moment Method Day Pattern Parameters

Modeling Software: Mininec Broadcast Professional - Version 14.5

Open Circuit Model

Station: KKLO - Leavenworth, KS

Freq (kHz) **1410**

Day Pattern

	Field Parameters		Normalized Base	
Twr	**Ratio**	**Phase**	**Ratio**	**Phase**
1	1.000	132.0°	0.477	-57.8°
2	1.070	0.0°	1.000	0.0°
3	0.490	-132.0°	0.417	-130.9°
4	Floated			

Mininec Model Data

	Drive Point		Current		Shunt	ATU Output	
Twr	**R**	**X**	**Mag**	**Phase**	**X**	**Mag**	**Phase**
1	40.37	-184.07	5.3530	303.9°	-2258	5.7902	304.847°
2	20.77	-22.30	12.0177	2.1°	-2258	12.1369	2.622°
3	32.44	25.83	5.1153	230.9°	-2258	5.0573	231.733°
4							

Exhibit 1.21 – Day Pattern Synthesis

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1410 KHz

tower	field ratio magnitude	phase (deg)
1	1.	132.
2	1.07	0
3	.49	-132.
4	0	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	1,008.76	226.3	5.353	303.9
30	366.2	315.1	12.0177	2.1
40	212.13	269.4	5.11524	230.9
50	204.38	337.7	.327952	71.7

Sum of square of source currents = 398.707
Total power = 5,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00155234	.0054904
Y(1, 2)	-.00255806	.00196878
Y(1, 3)	.00155273	-.000627198
Y(1, 4)	.0022227	-.000815234
Y(2, 1)	-.00255788	.00196833
Y(2, 2)	.0369071	.0265081
Y(2, 3)	-.00859668	-.0142885
Y(2, 4)	-.022342	-.00512596
Y(3, 1)	.00155263	-.000627389
Y(3, 2)	-.00859716	-.0142891
Y(3, 3)	.0205284	.0196575
Y(3, 4)	-.00434178	.0119947
Y(4, 1)	.00222234	-.000814578
Y(4, 2)	-.0223417	-.00512272
Y(4, 3)	-.00434114	.0119944
Y(4, 4)	.0382283	-.00533505

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	45.1565	-163.159
Z(1, 2)	-8.65467	.393717
Z(1, 3)	6.40512	5.10302
Z(1, 4)	-3.001	7.66858
Z(2, 1)	-8.65439	.394161
Z(2, 2)	30.7819	-26.8463
Z(2, 3)	12.0677	-16.6079
Z(2, 4)	20.281	-14.6141
Z(3, 1)	6.40509	5.10296
Z(3, 2)	12.0675	-16.6081
Z(3, 3)	25.6641	-30.2083
Z(3, 4)	4.8918	-19.0493
Z(4, 1)	-2.99881	7.6708

Exhibit 1.21 – Day Pattern Synthesis

Z(4, 2)	20.2833	-14.6118
Z(4, 3)	4.89335	-19.0487
Z(4, 4)	35.2734	-5.10715

Exhibit 1.22 – Day Pattern Summary

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KKLO Day Array

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	1	1	1,426.6	226.3	voltage
2	30	1	517.885	315.1	voltage
3	40	1	299.997	269.4	voltage
4	50	1	289.037	337.7	voltage

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1,410.	40.367	-184.07	188.45	282.4	18.78	-.92589	-7.167
source = 2; node 30, sector 1							
1,410.	20.766	-22.3	30.472	313.	2.9647	-6.0983	-1.2238
source = 3; node 40, sector 1							
1,410.	32.441	25.833	41.47	38.5	2.1326	-8.8368	-.60837
source = 4; node 50, sector 1							
1,410.	-44.028	-621.63	623.19	265.9	****	****	****

Exhibit 1.22 – Day Pattern Summary

C:\Expert MININEC Broadcast Professional\Jobs\KKLO Day 12-05-2013 11:47:37

CURRENT rms
Frequency = 1410 KHz
Input power = 5,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	5.353	303.9	2.98637	-4.44255
2	0	0	8.	4.40986	301.4	2.29668	-3.76459
3	0	0	16.	3.6778	299.	1.7817	-3.21742
4	0	0	24.	2.94285	295.8	1.28131	-2.64927
5	0	0	32.	2.19428	290.9	.782583	-2.04999
6	0	0	40.	1.4496	281.3	.284292	-1.42145
7	0	0	48.	.798751	254.7	-.210249	-.770584
8	0	0	56.	.703925	188.7	-.695783	-.106751
9	0	0	64.	1.29334	154.4	-1.16615	.559311
10	0	0	72.	2.02153	143.	-1.6148	1.21615
11	0	0	80.	2.75167	137.7	-2.03512	1.85203
12	0	0	88.	3.44787	134.6	-2.42065	2.45525
13	0	0	96.	4.0907	132.5	-2.76525	3.01451
14	0	0	104.	4.6656	131.	-3.06329	3.5191
15	0	0	112.	5.16037	129.9	-3.30974	3.95917
16	0	0	120.	5.56471	129.	-3.50033	4.32593
17	0	0	128.	5.87008	128.2	-3.63164	4.61183
18	0	0	136.	6.06973	127.6	-3.70119	4.8107
19	0	0	144.	6.15882	127.	-3.70748	4.91789
20	0	0	152.	6.13442	126.5	-3.65008	4.93032
21	0	0	160.	5.99557	126.1	-3.52962	4.84651
22	0	0	168.	5.74323	125.7	-3.34774	4.66662
23	0	0	176.	5.3802	125.3	-3.10706	4.39235
24	0	0	184.	4.9109	124.9	-2.81104	4.02678
25	0	0	192.	4.34109	124.6	-2.46384	3.57415
26	0	0	200.	3.6773	124.3	-2.06994	3.03938
27	0	0	208.	2.92572	123.9	-1.63361	2.42717
28	0	0	216.	2.08951	123.6	-1.15737	1.7397
29	0	0	224.	1.16169	123.3	-.638226	.970659
END	0	0	232.	0	0	0	0
GND	-50.	-86.6026	0	12.0177	2.1	12.0094	.448193
31	-50.	-86.6026	8.1	11.6913	1.2	11.6886	.251782
32	-50.	-86.6026	16.2	11.189	.6	11.1883	.12407
33	-50.	-86.6026	24.3	10.4739	.1	10.4739	.024775
34	-50.	-86.6026	32.4	9.55024	359.7	9.55011	-.0505122
35	-50.	-86.6026	40.5	8.42856	359.3	8.42793	-.102894
36	-50.	-86.6026	48.6	7.12236	358.9	7.12113	-.132438
37	-50.	-86.6026	56.7	5.6455	358.6	5.64379	-.138834
38	-50.	-86.6026	64.8	4.00703	358.3	4.00519	-.121459
39	-50.	-86.6026	72.9	2.19706	357.9	2.19564	-.0788353
END	-50.	-86.6026	81.	0	0	0	0
GND	-100.	-173.205	0	5.11525	230.9	-3.22603	-3.9697
41	-100.	-173.205	8.04	5.15771	229.6	-3.34594	-3.92514
42	-100.	-173.205	16.08	5.05	228.7	-3.33076	-3.79585
43	-100.	-173.205	24.12	4.81476	228.1	-3.21563	-3.58352
44	-100.	-173.205	32.16	4.45859	227.6	-3.00771	-3.29131

Exhibit 1.22 – Day Pattern Summary

45	-100.	-173.205	40.2	3.98806	227.1	-2.71259	-2.92343
46	-100.	-173.205	48.24	3.41025	226.8	-2.33577	-2.48475
47	-100.	-173.205	56.28	2.73215	226.4	-1.88252	-1.98009
48	-100.	-173.205	64.32	1.95828	226.2	-1.35634	-1.41252
49	-100.	-173.205	72.36	1.08369	225.9	-.754066	-.778305
END	-100.	-173.205	80.4	0	0	0	0
GND	17.0617	-138.957	0	.327957	71.7	.102923	.311388
51	17.0617	-138.957	8.62	.185324	74.4	.0498905	.178482
52	17.0617	-138.957	17.24	.09007	78.8	.0174278	.0883678
53	17.0617	-138.957	25.86	.0184119	104.4	-4.57E-03	.0178356
54	17.0617	-138.957	34.48	.0400842	243.2	-.0180997	-.0357651
55	17.0617	-138.957	43.1	.0770165	251.4	-.0245775	-.0729897
56	17.0617	-138.957	51.72	.0971819	254.9	-.0253889	-.0938069
57	17.0617	-138.957	60.34	.100442	257.4	-.0219767	-.0980085
58	17.0617	-138.957	68.96	.0867045	259.5	-.0157984	-.085253
59	17.0617	-138.957	77.58	.0553102	261.5	-8.22E-03	-.054696
END	17.0617	-138.957	86.2	0	0	0	0

Exhibit 1.30 - Moment Method Night Pattern Parameters

Modeling Software: Mininec Broadcast Professional - Version 14.5

Open Circuit Model

Station: KKLO - Leavenworth, KS

Freq (kHz) **1410**

Night Pattern

	Field Parameters		Normalized Base	
Twr	**Ratio**	**Phase**	**Ratio**	**Phase**
1	1.000	0.0°	1.000	0.0°
2				
3				
4	0.600	95.0°	0.782	-54.3°

Mininec Model Data

	Drive Point		Current		Shunt	ATU Output	
Twr	**R**	**X**	**Mag**	**Phase**	**X**	**Mag**	**Phase**
1	48.67	-157.19	2.7186	151.2°	-2258	2.9084	152.354°
2							
3							
4	27.14	-2.89	2.2724	97.4°	-2255	2.2755	98.089°

Exhibit 1.31 – Night Pattern Synthesis

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1410 KHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	0	0
3	0	0
4	.6	95.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	447.343	78.5	2.71857	151.2
30	63.7876	42.1	.102768	130.7
40	26.2072	39.1	.0416021	128.4
50	62.0109	91.4	2.27242	97.4

Sum of square of source currents = 25.1337
Total power = 500. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00155234	.0054904
Y(1, 2)	-.00255806	.00196878
Y(1, 3)	.00155273	-.000627198
Y(1, 4)	.0022227	-.000815234
Y(2, 1)	-.00255788	.00196833
Y(2, 2)	.0369071	.0265081
Y(2, 3)	-.00859668	-.0142885
Y(2, 4)	-.022342	-.00512596
Y(3, 1)	.00155263	-.000627389
Y(3, 2)	-.00859716	-.0142891
Y(3, 3)	.0205284	.0196575
Y(3, 4)	-.00434178	.0119947
Y(4, 1)	.00222234	-.000814578
Y(4, 2)	-.0223417	-.00512272
Y(4, 3)	-.00434114	.0119944
Y(4, 4)	.0382283	-.00533505

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	45.1565	-163.159
Z(1, 2)	-8.65467	.393717
Z(1, 3)	6.40512	5.10302
Z(1, 4)	-3.001	7.66858
Z(2, 1)	-8.65439	.394161
Z(2, 2)	30.7819	-26.8463
Z(2, 3)	12.0677	-16.6079
Z(2, 4)	20.281	-14.6141
Z(3, 1)	6.40509	5.10296
Z(3, 2)	12.0675	-16.6081
Z(3, 3)	25.6641	-30.2083
Z(3, 4)	4.8918	-19.0493
Z(4, 1)	-2.99881	7.6708

Exhibit 1.31 – Night Pattern Synthesis

Z(4, 2)	20.2833	-14.6118
Z(4, 3)	4.89335	-19.0487
Z(4, 4)	35.2734	-5.10715

Exhibit 1.32 – Night Pattern Summary

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KKLO Night Array

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.291	29
		0	0	232.		
2	none	100.	120.	0	.182	10
		100.	120.	81.		
3	none	200.	120.	0	.182	10
		200.	120.	80.4		
4	none	140.	83.	0	.124	10
		140.	83.	86.2		

Number of wires = 4
current nodes = 59

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	8.	4	8.62
radius	4	.124	1	.291

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,410.	0	1	.0222222	.0239444

Sources

source	node	sector	magnitude	phase	type
1	1	1	632.638	78.5	voltage
2	30	1	90.2092	42.1	voltage
3	40	1	37.0625	39.1	voltage
4	50	1	87.6966	91.4	voltage

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1,410.	48.671	-157.19	164.55	287.2	12.071	-1.4424	-5.4881
source = 2; node 30, sector 1							
1,410.	14.798	-620.53	620.7	271.4	524.08	-3.3E-02	-21.19
source = 3; node 40, sector 1							
1,410.	7.265	-629.93	629.98	270.7	1,099.4	-1.6E-02	-24.399
source = 4; node 50, sector 1							
1,410.	27.135	-2.8897	27.288	353.9	1.8513	-10.499	-.40552

Exhibit 1.32 – Night Pattern Summary

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CURRENT rms
Frequency = 1410 KHz
Input power = 500. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	2.71858	151.2	-2.38343	1.30764
2	0	0	8.	2.31031	148.2	-1.9639	1.21682
3	0	0	16.	1.99445	145.3	-1.63973	1.13539
4	0	0	24.	1.67911	141.6	-1.31508	1.04402
5	0	0	32.	1.36117	136.2	-.982808	.941732
6	0	0	40.	1.04933	127.8	-.643058	.829203
7	0	0	48.	.768392	112.9	-.298907	.70787
8	0	0	56.	.581353	85.5	.0452619	.579588
9	0	0	64.	.589161	49.3	.384404	.446479
10	0	0	72.	.777979	23.6	.713181	.310846
11	0	0	80.	1.04103	9.7	1.0262	.175096
12	0	0	88.	1.31883	1.8	1.31817	.04168
13	0	0	96.	1.58647	356.9	1.58408	-.0869593
14	0	0	104.	1.83121	353.5	1.81931	-.208442
15	0	0	112.	2.04499	351.	2.01972	-.320495
16	0	0	120.	2.22201	349.1	2.18176	-.421004
17	0	0	128.	2.35791	347.6	2.30252	-.508048
18	0	0	136.	2.44946	346.3	2.37982	-.579942
19	0	0	144.	2.49446	345.2	2.41221	-.635265
20	0	0	152.	2.49161	344.3	2.39903	-.672884
21	0	0	160.	2.44052	343.5	2.34037	-.691978
22	0	0	168.	2.34169	342.8	2.23709	-.692039
23	0	0	176.	2.19637	342.2	2.09076	-.672873
24	0	0	184.	2.00654	341.6	1.90355	-.634589
25	0	0	192.	1.77475	341.	1.67815	-.577546
26	0	0	200.	1.50386	340.5	1.4175	-.502291
27	0	0	208.	1.19663	340.	1.12442	-.409383
28	0	0	216.	.85455	339.5	.800537	-.298994
29	0	0	224.	.474968	339.1	.443579	-.1698
END	0	0	232.	0	0	0	0
GND	-50.	-86.6026	0	.102767	130.7	-.0670644	.0778673
31	-50.	-86.6026	8.1	.0549522	129.7	-.0351024	.0422797
32	-50.	-86.6026	16.2	.0249173	127.8	-.0152638	.0196948
33	-50.	-86.6026	24.3	2.78E-03	105.9	-7.62E-04	2.67E-03
34	-50.	-86.6026	32.4	.0135062	313.9	9.36E-03	-9.73E-03
35	-50.	-86.6026	40.5	.023753	311.	.0155962	-.0179154
36	-50.	-86.6026	48.6	.0287048	309.7	.0183168	-.0221012
37	-50.	-86.6026	56.7	.0287203	308.5	.0178843	-.0224724
38	-50.	-86.6026	64.8	.0241206	307.4	.0146515	-.0191609
39	-50.	-86.6026	72.9	.0150664	306.2	8.9E-03	-.0121544
END	-50.	-86.6026	81.	0	0	0	0
GND	-100.	-173.205	0	.0416003	128.4	-.0258394	.0326023
41	-100.	-173.205	8.04	.0220675	127.9	-.013551	.0174168
42	-100.	-173.205	16.08	9.85E-03	126.9	-5.91E-03	7.88E-03
43	-100.	-173.205	24.12	8.45E-04	111.8	-3.14E-04	7.85E-04
44	-100.	-173.205	32.16	5.61E-03	310.	3.61E-03	-4.29E-03

Exhibit 1.32 – Night Pattern Summary

45	-100.	-173.205	40.2	9.66E-03	308.6	6.03E-03	-7.55E-03
46	-100.	-173.205	48.24	.011536	307.9	7.08E-03	-9.1E-03
47	-100.	-173.205	56.28	.0114208	307.3	6.91E-03	-9.09E-03
48	-100.	-173.205	64.32	9.48E-03	306.6	5.65E-03	-7.61E-03
49	-100.	-173.205	72.36	5.84E-03	305.9	3.42E-03	-4.73E-03
END	-100.	-173.205	80.4	0	0	0	0
GND	17.0617	-138.957	0	2.27242	97.4	-.2942	2.25329
51	17.0617	-138.957	8.62	2.24286	96.4	-.248723	2.22903
52	17.0617	-138.957	17.24	2.16485	95.7	-.213501	2.1543
53	17.0617	-138.957	25.86	2.03874	95.1	-.180941	2.0307
54	17.0617	-138.957	34.48	1.86658	94.6	-.150201	1.86053
55	17.0617	-138.957	43.1	1.65127	94.2	-.121133	1.64682
56	17.0617	-138.957	51.72	1.39629	93.9	-.0937779	1.39314
57	17.0617	-138.957	60.34	1.10536	93.5	-.0682073	1.10325
58	17.0617	-138.957	68.96	.781457	93.3	-.044432	.780193
59	17.0617	-138.957	77.58	.424225	93.	-.0222711	.42364
END	17.0617	-138.957	86.2	0	0	0	0

Exhibit 2.10 – Description of Modified Sampling System

This application seeks to relicense the existing KKLO facility under the Moment Method rules set forth in §73.151(c) without modifying either the theoretical pattern or parameters. KKLO is licensed to operate with a three tower directional antenna at 5 kW of daytime power and a two tower directional antenna at 0.5 kW during nighttime hours. One tower is common to both arrays. The common tower is a 226° radiator, while the other towers are 77.4° radiators.

No changes were made in the existing phasing and coupling equipment. However, changes were made in the existing sampling system. In addition an unused FM antenna and feedline were removed from the tall, common tower.

Because of the unequal height towers the licensed KKLO arrays had been monitored using sampling loops mounted on each tower. The sampling lines were brought across the base insulators by means of traditional isolation coils at the base of each tower. As part of the relicensing process, the unused FM antenna and the sample loops, along with the isolation coils, have all been removed.

Since the tower heights conform to the requirements of §73.151(c)(2)(i) for base current sampling, new Delta TCT-3 current sampling transformers were purchased and installed at each tower base. The existing FCC38-50J Cablewave sample lines have been redirected to the new transformers by means of short super-flex jumper cables between the transformers and what was formerly the connection to the bottom of the isolation coils. Because much of the sample line for the tall tower was previously installed on the tower, it was necessary to add some additional sample line of the same type at this tower to achieve the necessary equal length lines. Details of the sample system verification are found in ***Exhibit 3.10***.

The existing KKLO facility was licensed using a Potomac Instruments AM-19(204) antenna monitor. As part of the sample system modification this unit was replaced with a new Potomac Instruments Model 1900 digital antenna monitor.

Exhibit 3.10 - Sample System Verification

KKLO - LEAVENWORTH, KS

Carrier Freq (kHz) 1410

Sample Line

Manufacturer	Model	Velocity Factor (0.xx)	Design Length (feet)	Full Wave Freq (kHz)
Cablewave	FLC-38-50J	0.81	390	2042.8

Theoretical Calculations

	90°	270°	450°	630°
Resonant Frequency (kHz)	510.7	1532.1	2553.5	3574.9
Distance from Carrier (kHz)	-899.3	122.1	1143.5	2164.9

Final Measurements (After Trimming Line Lengths)

Measurement Date: 11/5/2013

Sample Lines	Selected Resonance (Electrical °)	2013 Measured Freq at Resonance (MHz)	2013 Line Length at Carrier Freq (Electrical °)	Maximum Deviation
Twr 1	270°	1.424208	267.3°	*0.22*
Twr 2	270°	1.424763	267.2°	
Twr 3	270°	1.424339	267.3°	
Twr 4	270°	1.423569	267.4°	

Sample Line Impedance Measurements

Measurement Date: 11/5/2013

Sample Lines	2013 '+45° Frequency (MHz)	2013 Measured Resistance	2013 Measured Reactance	2013 Line Impedance	2013 Geometric Mean Impedance	2013 Maximum Deviation
Twr 1	1.66158	6.85	50.58	51.04	50.41	*1.47*
Twr 2	1.66222	6.84	50.94	51.40	50.77	
Twr 3	1.66173	6.43	48.86	49.28	49.30	
Twr 4	1.66083	6.66	49.61	50.05	49.87	

Exhibit 3.10 - Sample System Verification

Sample Lines	2013 '-45° Frequency (MHz)	2013 Measured Resistance	2013 Measured Reactance	2013 Line Impedance
Twr 1	1.18684	4.40	-49.59	49.78
Twr 2	1.18730	4.35	-49.95	50.14
Twr 3	1.18695	4.31	-49.13	49.32
Twr 4	1.18631	4.40	-49.50	49.69

Sampling Devices

Measurement Date: 7/29/2013

Location	Manufacturer	Model	Serial Number	Magnitude 2013	Phase 2013
Twr 1	Delta	TCT-3	18159	***1.000***	***0.00°***
Twr 2	Delta	TCT-3	18160	***0.999***	***0.26°***
Twr 3	Delta	TCT-3	18161	***0.999***	***0.07°***
Twr 4	Delta	TCT-3	18162	***0.999***	***0.13°***

Sample Line Measurements with Sampling Devices Attached

Measurement Date: 11/5/2013

Sample Line	Frequency (MHz)	2013 Measured Resistance	2013 Measured Reactance	2013 Impedance Magnitude
Twr 1	1410	51.77	-3.180	51.87
Twr 2	1410	52.11	-2.849	52.18
Twr 3	1410	50.42	-2.198	50.47
Twr 4	1410	50.95	-2.517	51.01

Exhibit 4.10 - Field Strength Reference Points - Day Pattern

STATION: KKLO-Day FREQUENCY 1410 khz. RADIAL BEARING 20, 120, 241 °T
300, 332

METER NDA TYPE N/A S/N N/A CAL. DATE N/A

METER DA TYPE FIM-41 S/N 1773 CAL. DATE 4/15/2013 ENGINEER Bob Moore, Shawn Baker

POINT	NON DA POWER			DA POWER			DISTANCE	
NUMBER	mV/m	TIME	DATE	mV/m	TIME	DATE	KM	REMARKS
20-1				101	12:01	12/30/2013	1.27	Corner of Pking lot @ strip mall, Ash St. & Frontage Rd
								39°-17'-2.61" 94°-54-9.0
20-2				63	12:25	12/30/2013	2.04	Jct Home Pl & Wilson Ave
								39°-17'-26.0" 94°-53'-57.9"
20-3				56	12:29	12/30/2013	2.26	Santa Fe Street between house 30 & 35 middle street
								39°-17'-32.6" 94°-53'-54.9"
332-1				99	12:45	12/30/2013	1.8	Buffalo Bill Cody Park parking lot @ light pole
								39°-17'-15.6" 94°-55'-2.4"
332-2				85	13:00	12/30/2013	2.27	In front of 2509 Old Creek Court
								39°-17'-29.2" 94°-55'-11.4"
332-3				56	13:10	12/30/2013	3.63	15222 10th Ave, in front of Korean Meth. Ch. of Leavenworth
								39°-18'-7.75" 94°55'-38.3"
300-1				102	14:36	12/30/2013	2.56	New Lawrence just before Richard W Lawrence Mid School
								39°-17'-5.44 94°-55'-59.5"
300-2				59	14:21	12/30/2013	3.37	Limit St & 16th Street just south of intersection
								39°-17'-18.6" 94°-56'-28.9"
300-3				78	14:28	12/30/2013	4.15	By mailbox 2500 on 19th St
								39°-17'-31.3" 94°-56'-57.4"
241-1				110	14:49	12/30/2013	1.99	Cemetery road off of Mt Calvary Rd.
								39°-15'-53.0" 94°-55'-40.1"
241-2				49	14:54	12/30/2013	2.92	155th Street close to mail box 26989
								39°-15'-38.1" 94°-56'-13.9"
241-3				30	15:02	12/30/2013	4.78	New Lawrence Dr by cattle gates on both sides of road
								39°-15'-10.2" 94°-57'-19.6"
120-1				580	15:13	12/30/2013	1.7	8th Street
								39°-15'-56.6" 94°-53'-25.3"
120-2				350	15:18	12/30/2013	2.13	Wolcott Rd, Leavenworth water plant #2 entrance
								39°-15'-49.5" 94°-53'-9.9"
120-3				280	15:24	12/30/2013	2.62	Wolcott Rd @ water treatment pools
								39°-15'-41.3" 94°-52'-51.7

Exhibit 4.11 - Field Strength Reference Points - Night Pattern

PAGE No. _____

STATION: KKLO-Night FREQUENCY 1410 khz. RADIAL BEARING 30.5, 135.6, 263 °T NAD 27

METER NDA TYPE _____ S/N _____ CAL. DATE _____ ENGINEER _____

METER DA TYPE FIM-41 S/N 1773 CAL. DATE 4/15/2013 ENGINEER Bob Moore, Shawn Baker

POINT	NON DA POWER			DA POWER			DISTANCE	
NUMBER	mV/m	TIME	DATE	mV/m	TIME	DATE	KM	REMARKS
30.5 - 1				75	16:23	12/30/2013	1.1	Frontage Rd just north of St. Mary's St.
								39°-16'-53.9" 94°-54'-4.04"
30.5 - 2				95	16:27	12/30/2013	1.38	St. Mary's St at VA Medical Center entrance
								39°-17'-2.19" 94°-53'-57.9"
30.5 - 3				62	16:31	12/30/2013	1.99	Limit Street & Home Place intersection
								39°-17'-19.3" 94°-53'-44.9"
135.6 - 1				48	15:47	12/30/2013	1.26	North end of 3rd St at dead end
								39°-15'-54.8" 94°-53'-50.6"
135.6 - 2				37	15:42	12/30/2013	1.56	Vacant lot in trailer park across from #39 lot
								39°-15'-48.6" 94°-53'-41.9"
135.6 - 3				32	15:38	12/30/2013	1.39	4th & Connie intersection
								39°-15'-51.9" 94°-53'-46.8"
263 - 1				125	15:56	12/30/2013	2.33	13th Street in front of 4751-6
								39°-16'-14.7" 94°-56'-3.7"
263 - 2				78	16:00	12/30/2013	3.38	New Lawrence Rd by Wagga Wagga Sign
								39°-16'-10.5" 94°-56'-47.4"
263 - 3				52	16:06	12/30/2013	5.2	CR5 north of Eisenhower Road
								39°-16'-3.5" 94°-58'-2.7"