

FOR
FCC
USE
ONLY

FCC 302-AM
APPLICATION FOR AM
BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO. *BmmL-20120227ACC*

SECTION I - APPLICANT FEE INFORMATION

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

Citicasters Licenses, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters)

2625 S Memorial Drive

MAILING ADDRESS (Line 2) (Maximum 35 characters)

Suite A

CITY

Tulsa

STATE OR COUNTRY (if foreign address)

OK

ZIP CODE

74129

TELEPHONE NUMBER (include area code)

918-664-4581

CALL LETTERS

KKZN

OTHER FCC IDENTIFIER (If applicable)

29740

2. A. Is a fee submitted with this application?



Yes



No

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



Governmental Entity



Noncommercial educational licensee



Other (Please explain):

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		
M	O	R

(B)

FEE MULTIPLE			
0	0	0	1

(C)

FEE DUE FOR FEE TYPE CODE IN COLUMN (A)
\$ 730.00

FOR FCC USE ONLY

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)

0	0	0	1
---	---	---	---

(C)

\$

FOR FCC USE ONLY

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

\$ 730.00

FOR FCC USE ONLY

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Citicasters Licenses, Inc.		
MAILING ADDRESS 2625 S Memorial Drive, Suite A		
CITY Tulsa	STATE OK	ZIP CODE 74129

2. This application is for:

- ☒ Commercial
 ☐ Noncommercial
☒ AM Directional
 ☐ AM Non-Directional

Call letters KKZN	Community of License Thornton, CO	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
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3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620?

☐ Yes ☐ No

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

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

Exhibit No.

If No, explain in an Exhibit.

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

Exhibit 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.

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).

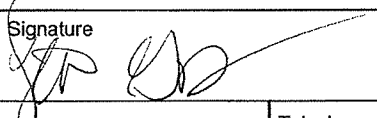
The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

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 Stephen G. Davis	Signature 	
Title Senior Vice President Engineering	Date 2/23/2012	Telephone Number 9186644581

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

Citicasters Licenses, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☐

Station License

☒

Direct Measurement of Power

1. Facilities authorized in construction permit					
Call Sign KKZN	File No. of Construction Permit (if applicable)	Frequency (kHz) 760	Hours of Operation unlimited	Power in kilowatts	
				Night 1.0	Day 50.0
2. Station location					
State CO			City or Town Thornton		
3. Transmitter location					
State CO	County Weld	City or Town Thornton	Street address (or other identification) 502 Weld County Road 13		
4. Main studio location					
State CO	County Denver	City or Town Denver	Street address (or other identification) 4695 S. Monaco Street		
5. Remote control point location (specify only if authorized directional antenna)					
State CO	County Denver	City or Town Denver	Street address (or other identification) 4695 S. Monaco Street		

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.
Engineering Exhibit

8. Operating constants:						
RF common point or antenna current (in amperes) without modulation for night system 4.65			RF common point or antenna current (in amperes) without modulation for day system 32.45			
Measured antenna or common point resistance (in ohms) at operating frequency Night 50 Day 50			Measured antenna or common point reactance (in ohms) at operating frequency Night 0 Day 0			
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
1 (ASR 1033693)	0°	0°	1.000	1.000		
2 (ASR 1033694)	+102.5°	-	1.096	-		
3 (ASR 1033695)	-88.3°	+85.5°	0.866	0.757		
4 (ASR 1033696)	+167.9°	-	0.884	-		
Manufacturer and type of antenna monitor: Potomac Instruments AM1901 (FCC ID: IJ3PI1900)						

SECTION III - Page 2

9. Description of antenna system ((f 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.
see attached	see attached	see attached	see attached	Exhibit No. NA

Excitation

☒

Series

☐

Shunt

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

North Latitude	40	°	00	'	33	"	West Longitude	104	°	56	'	21	"
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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.
NA

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system.

Exhibit No.
NA

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

none

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

NA

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) Samuel T. Cox	Signature (check appropriate box below) <i>Samuel T. Cox, P.E.</i>
Address (include ZIP Code) 2625 S. Memorial Blvd. Suite A Tulsa, OK 74129	Date 2/14/2012 Telephone No. (Include Area Code) 918-664-4581

☐

Technical Director

☒

Registered Professional Engineer

☐

Chief Operator

☐

Technical Consultant

☐

Other (specify)

Description of Radiators

	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>T4</u>
Type Radiator	uniform cross section, guyed steel tower	uniform cross section, guyed steel tower	uniform cross section, guyed steel tower	uniform cross section, guyed steel tower
Overall height in meters of radiator above base insulator, or above base, if grounded	97.6m	97.6m	97.6m	97.6m
Overall height in meters above ground (without obstruction lighting)	98.7m	98.8m	98.7m	98.9m
Overall height in meters above ground (include obstruction lighting)	100.4m	98.8m	100.5m	98.9m

ENGINEERING EXHIBIT

Application for Direct Power Measurement

KKZN (AM)

Thornton, CO

Citicasters Licenses, Inc.

FID 29740

760 kHz

DA-2

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Engineering Statement

This application is being filed to relicense the existing daytime and nighttime operation of KKZN (AM) Thornton, CO pursuant to the sections of 47 CFR 73.151 allowing performance verification by computer modeling and sampling system verification. No changes were made to the ground system or radiators and they remain as authorized in the current station license BL-931222AD. All antenna system measurements included in this application were made November 9-10, 2011 by the undersigned unless otherwise noted. Field measurements were conducted by Messrs. Bill Kleronomos and Jason Gorodetzer from January 5- February 6, 2012.

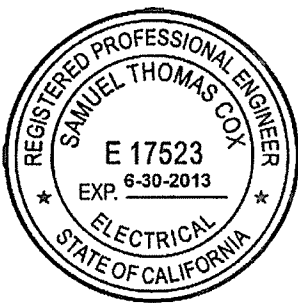
Analysis of the daytime and nighttime antenna systems was performed using the computer program Expert Mininec Broadcast Professional version 14.6 by EM Scientific Inc. The lack of any material shunting elements across the base region of the radiators allowed for an antenna model that readily converged to produce the same matrix impedances as those measured without the need for more complex circuit analysis techniques. The method of moments model was adjusted by varying the electrical height and effective radius of the radiators to produce an impedance at the base node within $\pm 2\Omega$ and $\pm 4\%$ of the measured matrix resistance and reactance at the sample point. The modeled electrical heights used fall within the range of 75-125% of the physical height. The effective radii used fall within the range of 80-150% of the radius of a circle with a circumference equal to the sum of the widths of the tower sides. Hook-up reactance was accounted for in the model by placing lumped inductive loads in series with the radiators utilizing the "lumped load" capabilities of the program.

Once the model was adjusted to match the measured matrix impedances, the array synthesis module of the computer program was used to calculate the proper base drive voltages to generate the fields necessary to form the required patterns for daytime and nighttime operation. The current distribution was calculated for each radiator and given that the sampling system utilizes base current sampling devices the operating parameters calculated from the resulting currents at each base node. The daytime antenna system only utilizes two of the four radiators. The unused radiators were detuned for daytime operation by terminating them with the appropriate reactance necessary to produce a current minima at $1/3$ the height above the base.



Samuel T. Cox, P.E.

February 14, 2012



Description of Radiators

The KKZN (AM) radiators are identical triangular, uniform cross section, guyed towers 89.0 electrical degrees in height with a face width of 61 centimeters.

Description of Sampling System

The sampling system consists of equal lengths of phase stabilized 3/8" solid outer jacket coaxial cable connected to a Delta Model TCT-1 toroidal current transformer located near the base of each radiator. The sampling lines are buried and exposed to similar environmental conditions. The antenna monitor is a Potomac Instruments AM1901 (FCC ID: IJ3PI1900) last calibrated by the manufacturer on 12/16/2011.

Daytime Operation Using Alternate Mode

The KKZN (AM) daytime antenna system is tuned to field parameters which are the inverse of the theoretical parameters specified in the license. This tuning results in exactly the same radiation pattern as the authorized theoretical parameters and provides for more favorable operating impedances and power distribution. A tabulation of the standard pattern data for the authorized theoretical parameters and those of the inverted pattern is included for comparison purposes.

KKZN (AM) Daytime Theoretical Parameter Radiation Report

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Horizontal Plane Pattern

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3101.02	5.0	3009.62	10.0	2888.02
15.0	2735.98	20.0	2554.60	25.0	2346.32
30.0	2114.90	35.0	1865.35	40.0	1603.87
45.0	1337.95	50.0	1076.96	55.0	833.93
60.0	630.39	65.0	504.34	70.0	495.60
75.0	586.72	80.0	721.26	85.0	862.14
90.0	992.54	95.0	1104.98	100.0	1195.92
105.0	1263.68	110.0	1307.49	115.0	1327.01
120.0	1322.13	125.0	1292.87	130.0	1239.42
135.0	1162.25	140.0	1062.44	145.0	942.24
150.0	806.40	155.0	665.21	160.0	542.03
165.0	484.38	170.0	542.33	175.0	705.08
180.0	927.89	185.0	1180.05	190.0	1444.31
195.0	1709.45	200.0	1966.98	205.0	2209.95
210.0	2432.65	215.0	2630.55	220.0	2800.41
225.0	2940.33	230.0	3049.75	235.0	3129.41
240.0	3181.23	245.0	3208.11	250.0	3213.71
255.0	3202.23	260.0	3178.10	265.0	3145.79
270.0	3109.61	275.0	3073.46	280.0	3040.77
285.0	3014.34	290.0	2996.29	295.0	2987.99
300.0	2990.08	305.0	3002.40	310.0	3024.01
315.0	3053.24	320.0	3087.68	325.0	3124.29
330.0	3159.41	335.0	3188.98	340.0	3208.59
345.0	3213.77	350.0	3200.13	355.0	3163.68

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 5.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3082.21	5.0	2991.16	10.0	2870.29
15.0	2719.38	20.0	2539.51	25.0	2333.10
30.0	2103.85	35.0	1856.70	40.0	1597.76
45.0	1334.41	50.0	1075.81	55.0	834.69
60.0	631.89	65.0	504.08	70.0	490.89
75.0	577.59	80.0	709.00	85.0	847.67
90.0	976.44	95.0	1087.64	100.0	1177.66
105.0	1244.79	110.0	1288.19	115.0	1307.54
120.0	1302.70	125.0	1273.71	130.0	1220.75
135.0	1144.33	140.0	1045.55	145.0	926.74
150.0	792.73	155.0	654.07	160.0	534.52
165.0	481.62	170.0	543.16	175.0	706.50
180.0	927.98	185.0	1177.98	190.0	1439.74
195.0	1702.31	200.0	1957.35	205.0	2198.00
210.0	2418.64	215.0	2614.81	220.0	2783.31
225.0	2922.26	230.0	3031.10	235.0	3110.56
240.0	3162.52	245.0	3189.82	250.0	3196.08
255.0	3185.42	260.0	3162.20	265.0	3130.85
270.0	3095.59	275.0	3060.29	280.0	3028.32
285.0	3002.45	290.0	2984.77	295.0	2976.65
300.0	2978.69	305.0	2990.75	310.0	3011.91
315.0	3040.51	320.0	3074.19	325.0	3109.91
330.0	3144.09	335.0	3172.71	340.0	3191.44
345.0	3195.85	350.0	3181.64	355.0	3144.87

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 10.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3026.37	5.0	2936.39	10.0	2817.71
15.0	2670.15	20.0	2494.76	25.0	2293.86
30.0	2071.01	35.0	1830.95	40.0	1579.51
45.0	1323.70	50.0	1072.21	55.0	836.82
60.0	636.44	65.0	504.01	70.0	478.07
75.0	551.54	80.0	673.43	85.0	805.39
90.0	929.22	95.0	1036.71	100.0	1124.00
105.0	1189.20	110.0	1231.41	115.0	1250.23
120.0	1245.52	125.0	1217.31	130.0	1165.84
135.0	1091.66	140.0	995.99	145.0	881.33
150.0	752.88	155.0	621.88	160.0	513.35
165.0	474.49	170.0	546.04	175.0	710.68
180.0	928.07	185.0	1171.63	190.0	1426.04
195.0	1681.03	200.0	1928.69	205.0	2162.50
210.0	2377.07	215.0	2568.13	220.0	2732.60
225.0	2868.67	230.0	2975.77	235.0	3054.60
240.0	3106.91	245.0	3135.42	250.0	3143.56
255.0	3135.26	260.0	3114.71	265.0	3086.13
270.0	3053.56	275.0	3020.72	280.0	2990.85
285.0	2966.62	290.0	2950.03	295.0	2942.40
300.0	2944.32	305.0	2955.65	310.0	2975.49
315.0	3002.26	320.0	3033.67	325.0	3066.82
330.0	3098.26	335.0	3124.13	340.0	3140.29
345.0	3142.50	350.0	3126.66	355.0	3089.01

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 15.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2935.23	5.0	2847.08	10.0	2732.04
15.0	2589.94	20.0	2421.81	25.0	2229.82
30.0	2017.31	35.0	1788.66	40.0	1549.30
45.0	1305.68	50.0	1065.70	55.0	839.80
60.0	644.08	65.0	505.97	70.0	461.00
75.0	512.56	80.0	618.16	85.0	738.70
90.0	854.20	95.0	955.47	100.0	1038.17
105.0	1100.16	110.0	1140.37	115.0	1158.32
120.0	1153.83	125.0	1126.94	130.0	1077.93
135.0	1007.49	140.0	917.02	145.0	809.34
150.0	690.31	155.0	572.43	160.0	482.63
165.0	466.23	170.0	551.95	175.0	717.32
180.0	927.63	185.0	1160.67	190.0	1403.17
195.0	1645.94	200.0	1881.73	205.0	2104.52
210.0	2309.29	215.0	2492.07	220.0	2649.99
225.0	2781.32	230.0	2885.52	235.0	2963.19
240.0	3015.93	245.0	3046.23	250.0	3057.25
255.0	3052.61	260.0	3036.21	265.0	3011.95
270.0	2983.60	275.0	2954.63	280.0	2928.07
285.0	2906.41	290.0	2891.54	295.0	2884.69
300.0	2886.42	305.0	2896.58	310.0	2914.35
315.0	2938.23	320.0	2966.09	325.0	2995.20
330.0	3022.35	335.0	3043.93	340.0	3056.10
345.0	3054.93	350.0	3036.61	355.0	2997.68

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 20.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2811.53	5.0	2726.08	10.0	2616.06
15.0	2481.40	20.0	2323.03	25.0	2142.97
30.0	1944.22	35.0	1730.76	40.0	1507.47
45.0	1280.10	50.0	1055.57	55.0	842.75
60.0	654.56	65.0	512.16	70.0	445.42
75.0	467.47	80.0	549.41	85.0	653.31
90.0	756.83	95.0	849.28	100.0	925.51
105.0	982.97	110.0	1020.38	115.0	1037.10
120.0	1032.92	125.0	1007.87	130.0	962.34
135.0	897.16	140.0	814.03	145.0	716.32
150.0	610.89	155.0	512.17	160.0	449.10
165.0	461.28	170.0	561.80	175.0	725.77
180.0	925.78	185.0	1144.53	190.0	1371.12
195.0	1597.62	200.0	1817.62	205.0	2025.73
210.0	2217.43	215.0	2389.12	220.0	2538.18
225.0	2663.04	230.0	2763.17	235.0	2839.04
240.0	2892.06	245.0	2924.43	250.0	2938.96
255.0	2938.90	260.0	2927.71	265.0	2908.93
270.0	2885.97	275.0	2861.95	280.0	2839.63
285.0	2821.28	290.0	2808.62	295.0	2802.77
300.0	2804.25	305.0	2812.92	310.0	2828.02
315.0	2848.20	320.0	2871.50	325.0	2895.45
330.0	2917.13	335.0	2933.29	340.0	2940.46
345.0	2935.09	350.0	2913.79	355.0	2873.47

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 25.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2658.91	5.0	2577.08	10.0	2473.43
15.0	2347.94	20.0	2201.47	25.0	2035.82
30.0	1853.65	35.0	1658.45	40.0	1454.45
45.0	1246.64	50.0	1040.88	55.0	844.38
60.0	667.03	65.0	523.98	70.0	437.56
75.0	425.64	80.0	476.25	85.0	557.43
90.0	644.82	95.0	725.56	100.0	793.32
105.0	844.90	110.0	878.66	115.0	893.80
120.0	890.01	125.0	867.36	130.0	826.34
135.0	768.02	140.0	694.56	145.0	610.14
150.0	523.16	155.0	450.52	160.0	421.42
165.0	463.76	170.0	575.80	175.0	734.87
180.0	921.32	185.0	1122.51	190.0	1329.87
195.0	1536.80	200.0	1737.84	205.0	1928.30
210.0	2104.23	215.0	2262.48	220.0	2400.72
225.0	2517.53	230.0	2612.40	235.0	2685.70
240.0	2738.60	245.0	2772.97	250.0	2791.22
255.0	2796.14	260.0	2790.75	265.0	2778.13
270.0	2761.24	275.0	2742.84	280.0	2725.35
285.0	2710.78	290.0	2700.64	295.0	2695.94
300.0	2697.13	305.0	2704.09	310.0	2716.15
315.0	2732.10	320.0	2750.22	325.0	2768.32
330.0	2783.85	335.0	2793.95	340.0	2795.58
345.0	2785.68	350.0	2761.30	355.0	2719.78

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase Spacing (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 30.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2481.67	5.0	2404.45	10.0	2308.39
15.0	2193.54	20.0	2060.67	25.0	1911.34
30.0	1747.84	35.0	1573.13	40.0	1390.79
45.0	1204.99	50.0	1020.52	55.0	843.07
60.0	679.89	65.0	541.17	70.0	441.69
75.0	397.59	80.0	410.98	85.0	462.41
90.0	528.50	95.0	594.05	100.0	650.99
105.0	695.15	110.0	724.34	115.0	737.50
120.0	734.20	125.0	714.54	130.0	679.19
135.0	629.58	140.0	568.53	145.0	501.48
150.0	438.92	155.0	399.64	160.0	407.90
165.0	475.64	170.0	592.88	175.0	742.89
180.0	912.79	185.0	1093.81	190.0	1279.43
195.0	1464.39	200.0	1644.14	205.0	1814.77
210.0	1972.92	215.0	2115.90	220.0	2241.70
225.0	2349.09	230.0	2437.58	235.0	2507.41
240.0	2559.53	245.0	2595.44	250.0	2617.15
255.0	2626.96	260.0	2627.41	265.0	2621.06
270.0	2610.44	275.0	2597.88	280.0	2585.44
285.0	2574.82	290.0	2567.34	295.0	2563.85
300.0	2564.73	305.0	2569.89	310.0	2578.76
315.0	2590.28	320.0	2603.00	325.0	2615.05
330.0	2624.25	335.0	2628.19	340.0	2624.30
345.0	2610.03	350.0	2582.90	355.0	2540.72

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 35.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2284.53	5.0	2212.93	10.0	2125.55
15.0	2022.48	20.0	1904.43	25.0	1772.70
30.0	1629.19	35.0	1476.35	40.0	1317.11
45.0	1154.83	50.0	993.33	55.0	836.93
60.0	690.80	65.0	561.51	70.0	457.93
75.0	390.90	80.0	367.81	85.0	383.46
90.0	421.87	95.0	467.59	100.0	510.61
105.0	545.35	110.0	568.81	115.0	579.50
120.0	576.81	125.0	560.90	130.0	532.68
135.0	494.15	140.0	449.18	145.0	404.88
150.0	373.47	155.0	371.76	160.0	412.66
165.0	495.60	170.0	610.70	175.0	747.64
180.0	898.57	185.0	1057.57	190.0	1219.87
195.0	1381.37	200.0	1538.43	205.0	1687.86
210.0	1826.92	215.0	1953.38	220.0	2065.56
225.0	2162.40	230.0	2243.45	235.0	2308.84
240.0	2359.29	245.0	2395.97	250.0	2420.44
255.0	2434.56	260.0	2440.36	265.0	2439.90
270.0	2435.25	275.0	2428.29	280.0	2420.72
285.0	2413.95	290.0	2409.05	295.0	2406.74
300.0	2407.33	305.0	2410.73	310.0	2416.49
315.0	2423.72	320.0	2431.23	325.0	2437.49
330.0	2440.70	335.0	2438.91	340.0	2430.03
345.0	2412.00	350.0	2382.86	355.0	2340.84

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 40.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2072.42	5.0	2007.39	10.0	1929.58
15.0	1839.10	20.0	1736.58	25.0	1623.08
30.0	1500.13	35.0	1369.68	40.0	1234.06
45.0	1095.90	50.0	958.12	55.0	823.93
60.0	696.94	65.0	581.31	70.0	482.08
75.0	405.22	80.0	356.48	85.0	337.74
90.0	343.65	95.0	363.90	100.0	388.66
105.0	411.09	110.0	427.13	115.0	434.62
120.0	432.73	125.0	421.65	130.0	402.71
135.0	378.72	140.0	354.77	145.0	338.94
150.0	341.81	155.0	372.34	160.0	432.88
165.0	519.44	170.0	625.90	175.0	746.62
180.0	876.95	185.0	1012.99	190.0	1151.29
195.0	1288.77	200.0	1422.62	205.0	1550.32
210.0	1669.71	215.0	1778.98	220.0	1876.78
225.0	1962.24	230.0	2034.93	235.0	2094.90
240.0	2142.65	245.0	2179.04	250.0	2205.25
255.0	2222.68	260.0	2232.88	265.0	2237.47
270.0	2238.02	275.0	2236.04	280.0	2232.84
285.0	2229.53	290.0	2226.98	295.0	2225.73
300.0	2226.05	305.0	2227.87	310.0	2230.81
315.0	2234.19	320.0	2237.05	325.0	2238.18
330.0	2236.20	335.0	2229.56	340.0	2216.66
345.0	2195.90	350.0	2165.78	355.0	2124.97

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 45.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1850.21	5.0	1792.61	10.0	1725.01
15.0	1647.57	20.0	1560.79	25.0	1465.53
30.0	1362.99	35.0	1254.67	40.0	1142.34
45.0	1027.99	50.0	913.80	55.0	802.08
60.0	695.31	65.0	596.14	70.0	507.44
75.0	432.24	80.0	373.56	85.0	333.47
90.0	311.76	95.0	305.07	100.0	307.89
105.0	314.60	110.0	320.91	115.0	324.20
120.0	323.35	125.0	318.64	130.0	311.76
135.0	306.00	140.0	306.27	145.0	318.38
150.0	347.22	155.0	394.88	160.0	460.50
165.0	541.47	170.0	634.72	175.0	737.26
180.0	846.31	185.0	959.31	190.0	1073.84
195.0	1187.63	200.0	1298.59	205.0	1404.79
210.0	1504.58	215.0	1596.57	220.0	1679.70
225.0	1753.25	230.0	1816.85	235.0	1870.48
240.0	1914.45	245.0	1949.36	250.0	1976.03
255.0	1995.47	260.0	2008.81	265.0	2017.23
270.0	2021.91	275.0	2023.95	280.0	2024.34
285.0	2023.91	290.0	2023.31	295.0	2022.96
300.0	2023.05	305.0	2023.54	310.0	2024.14
315.0	2024.32	320.0	2023.38	325.0	2020.42
330.0	2014.38	335.0	2004.13	340.0	1988.49
345.0	1966.29	350.0	1936.44	355.0	1897.99

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 50.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1622.56	5.0	1573.05	10.0	1516.03
15.0	1451.66	20.0	1380.37	25.0	1302.81
30.0	1219.89	35.0	1132.72	40.0	1042.60
45.0	950.98	50.0	859.41	55.0	769.54
60.0	683.04	65.0	601.62	70.0	526.97
75.0	460.70	80.0	404.29	85.0	358.82
90.0	324.67	95.0	301.23	100.0	286.80
105.0	278.99	110.0	275.39	115.0	274.16
120.0	274.44	125.0	276.46	130.0	281.48
135.0	291.63	140.0	309.41	145.0	336.98
150.0	375.65	155.0	425.59	160.0	486.10
165.0	555.91	170.0	633.47	175.0	717.13
180.0	805.18	185.0	895.93	190.0	987.71
195.0	1078.91	200.0	1168.02	205.0	1253.63
210.0	1334.53	215.0	1409.68	220.0	1478.27
225.0	1539.73	230.0	1593.76	235.0	1640.27
240.0	1679.45	245.0	1711.65	250.0	1737.41
255.0	1757.43	260.0	1772.45	265.0	1783.30
270.0	1790.80	275.0	1795.70	280.0	1798.72
285.0	1800.43	290.0	1801.31	295.0	1801.63
300.0	1801.56	305.0	1801.04	310.0	1799.87
315.0	1797.70	320.0	1794.00	325.0	1788.15
330.0	1779.41	335.0	1766.99	340.0	1750.06
345.0	1727.84	350.0	1699.57	355.0	1664.64

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 55.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1393.71	5.0	1352.69	10.0	1306.30
15.0	1254.68	20.0	1198.18	25.0	1137.28
30.0	1072.64	35.0	1005.05	40.0	935.43
45.0	864.78	50.0	794.18	55.0	724.75
60.0	657.61	65.0	593.86	70.0	534.54
75.0	480.62	80.0	432.90	85.0	391.98
90.0	358.20	95.0	331.53	100.0	311.62
105.0	297.84	110.0	289.46	115.0	285.87
120.0	286.76	125.0	292.21	130.0	302.66
135.0	318.81	140.0	341.36	145.0	370.85
150.0	407.51	155.0	451.20	160.0	501.49
165.0	557.67	170.0	618.88	175.0	684.12
180.0	752.31	185.0	822.34	190.0	893.09
195.0	963.46	200.0	1032.38	205.0	1098.90
210.0	1162.13	215.0	1221.34	220.0	1275.93
225.0	1325.49	230.0	1369.75	235.0	1408.61
240.0	1442.13	245.0	1470.51	250.0	1494.07
255.0	1513.22	260.0	1528.45	265.0	1540.26
270.0	1549.19	275.0	1555.73	280.0	1560.34
285.0	1563.40	290.0	1565.22	295.0	1565.99
300.0	1565.80	305.0	1564.63	310.0	1562.34
315.0	1558.70	320.0	1553.37	325.0	1545.93
330.0	1535.91	335.0	1522.79	340.0	1506.06
345.0	1485.20	350.0	1459.75	355.0	1429.35

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.350	91.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 60.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1167.39	5.0	1134.96	10.0	1098.89
15.0	1059.33	20.0	1016.52	25.0	970.82
30.0	922.68	35.0	872.64	40.0	821.31
45.0	769.36	50.0	717.50	55.0	666.45
60.0	616.95	65.0	569.71	70.0	525.38
75.0	484.57	80.0	447.79	85.0	415.44
90.0	387.82	95.0	365.07	100.0	347.22
105.0	334.22	110.0	325.94	115.0	322.29
120.0	323.20	125.0	328.69	130.0	338.84
135.0	353.77	140.0	373.58	145.0	398.29
150.0	427.83	155.0	461.99	160.0	500.44
165.0	542.72	170.0	588.29	175.0	636.52
180.0	686.72	185.0	738.18	190.0	790.17
195.0	841.95	200.0	892.85	205.0	942.20
210.0	989.42	215.0	1034.01	220.0	1075.56
225.0	1113.75	230.0	1148.38	235.0	1179.33
240.0	1206.61	245.0	1230.29	250.0	1250.53
255.0	1267.55	260.0	1281.63	265.0	1293.05
270.0	1302.11	275.0	1309.10	280.0	1314.30
285.0	1317.93	290.0	1320.18	295.0	1321.15
300.0	1320.91	305.0	1319.44	310.0	1316.66
315.0	1312.42	320.0	1306.53	325.0	1298.75
330.0	1288.78	335.0	1276.34	340.0	1261.11
345.0	1242.83	350.0	1221.24	355.0	1196.13

KKZN (AM) Daytime Inverted Parameter Radiation Report

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swrch	TL Swrch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Horizontal Plane Pattern

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3101.02	5.0	3009.62	10.0	2888.02
15.0	2735.98	20.0	2554.60	25.0	2346.32
30.0	2114.90	35.0	1865.35	40.0	1603.87
45.0	1337.95	50.0	1076.96	55.0	833.93
60.0	630.39	65.0	504.34	70.0	495.60
75.0	586.72	80.0	721.26	85.0	862.14
90.0	992.54	95.0	1104.98	100.0	1195.92
105.0	1263.68	110.0	1307.49	115.0	1327.01
120.0	1322.13	125.0	1292.87	130.0	1239.42
135.0	1162.25	140.0	1062.44	145.0	942.24
150.0	806.40	155.0	665.21	160.0	542.03
165.0	484.38	170.0	542.33	175.0	705.08
180.0	927.89	185.0	1180.05	190.0	1444.31
195.0	1709.45	200.0	1966.98	205.0	2209.95
210.0	2432.65	215.0	2630.55	220.0	2800.41
225.0	2940.33	230.0	3049.75	235.0	3129.41
240.0	3181.23	245.0	3208.11	250.0	3213.71
255.0	3202.23	260.0	3178.10	265.0	3145.79
270.0	3109.61	275.0	3073.46	280.0	3040.77
285.0	3014.34	290.0	2996.29	295.0	2987.99
300.0	2990.08	305.0	3002.40	310.0	3024.01
315.0	3053.24	320.0	3087.68	325.0	3124.29
330.0	3159.41	335.0	3188.98	340.0	3208.59
345.0	3213.77	350.0	3200.13	355.0	3163.68

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 5.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3082.21	5.0	2991.16	10.0	2870.29
15.0	2719.38	20.0	2539.51	25.0	2333.10
30.0	2103.85	35.0	1856.70	40.0	1597.76
45.0	1334.41	50.0	1075.81	55.0	834.69
60.0	631.89	65.0	504.08	70.0	490.89
75.0	577.59	80.0	709.00	85.0	847.67
90.0	976.44	95.0	1087.64	100.0	1177.66
105.0	1244.79	110.0	1288.19	115.0	1307.54
120.0	1302.70	125.0	1273.71	130.0	1220.75
135.0	1144.33	140.0	1045.55	145.0	926.74
150.0	792.73	155.0	654.07	160.0	534.52
165.0	481.62	170.0	543.16	175.0	706.50
180.0	927.98	185.0	1177.98	190.0	1439.74
195.0	1702.31	200.0	1957.35	205.0	2198.00
210.0	2418.64	215.0	2614.81	220.0	2783.31
225.0	2922.26	230.0	3031.10	235.0	3110.56
240.0	3162.52	245.0	3189.82	250.0	3196.08
255.0	3185.42	260.0	3162.20	265.0	3130.85
270.0	3095.59	275.0	3060.29	280.0	3028.32
285.0	3002.45	290.0	2984.77	295.0	2976.65
300.0	2978.69	305.0	2990.75	310.0	3011.91
315.0	3040.51	320.0	3074.19	325.0	3109.91
330.0	3144.09	335.0	3172.71	340.0	3191.44
345.0	3195.85	350.0	3181.64	355.0	3144.87

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 10.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	3026.37	5.0	2936.39	10.0	2817.71
15.0	2670.15	20.0	2494.76	25.0	2293.86
30.0	2071.01	35.0	1830.95	40.0	1579.51
45.0	1323.70	50.0	1072.21	55.0	836.82
60.0	636.44	65.0	504.01	70.0	478.07
75.0	551.54	80.0	673.43	85.0	805.39
90.0	929.22	95.0	1036.71	100.0	1124.00
105.0	1189.20	110.0	1231.41	115.0	1250.23
120.0	1245.52	125.0	1217.31	130.0	1165.84
135.0	1091.66	140.0	995.99	145.0	881.33
150.0	752.88	155.0	621.88	160.0	513.35
165.0	474.49	170.0	546.04	175.0	710.68
180.0	928.07	185.0	1171.63	190.0	1426.04
195.0	1681.03	200.0	1928.69	205.0	2162.50
210.0	2377.07	215.0	2568.13	220.0	2732.60
225.0	2868.67	230.0	2975.77	235.0	3054.60
240.0	3106.91	245.0	3135.42	250.0	3143.56
255.0	3135.26	260.0	3114.71	265.0	3086.13
270.0	3053.56	275.0	3020.72	280.0	2990.85
285.0	2966.62	290.0	2950.03	295.0	2942.40
300.0	2944.32	305.0	2955.65	310.0	2975.49
315.0	3002.26	320.0	3033.67	325.0	3066.82
330.0	3098.26	335.0	3124.13	340.0	3140.29
345.0	3142.50	350.0	3126.66	355.0	3089.01

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 15.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2935.23	5.0	2847.08	10.0	2732.04
15.0	2589.94	20.0	2421.81	25.0	2229.82
30.0	2017.31	35.0	1788.66	40.0	1549.30
45.0	1305.68	50.0	1065.70	55.0	839.80
60.0	644.08	65.0	505.97	70.0	461.00
75.0	512.56	80.0	618.16	85.0	738.70
90.0	854.20	95.0	955.47	100.0	1038.17
105.0	1100.16	110.0	1140.37	115.0	1158.32
120.0	1153.83	125.0	1126.94	130.0	1077.93
135.0	1007.49	140.0	917.02	145.0	809.34
150.0	690.31	155.0	572.43	160.0	482.63
165.0	466.23	170.0	551.95	175.0	717.32
180.0	927.63	185.0	1160.67	190.0	1403.17
195.0	1645.94	200.0	1881.73	205.0	2104.52
210.0	2309.29	215.0	2492.07	220.0	2649.99
225.0	2781.32	230.0	2885.52	235.0	2963.19
240.0	3015.93	245.0	3046.23	250.0	3057.25
255.0	3052.61	260.0	3036.21	265.0	3011.95
270.0	2983.60	275.0	2954.63	280.0	2928.07
285.0	2906.41	290.0	2891.54	295.0	2884.69
300.0	2886.42	305.0	2896.58	310.0	2914.35
315.0	2938.23	320.0	2966.09	325.0	2995.20
330.0	3022.35	335.0	3043.93	340.0	3056.10
345.0	3054.93	350.0	3036.61	355.0	2997.68

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 20.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2811.53	5.0	2726.08	10.0	2616.06
15.0	2481.40	20.0	2323.03	25.0	2142.97
30.0	1944.22	35.0	1730.76	40.0	1507.47
45.0	1280.10	50.0	1055.57	55.0	842.75
60.0	654.56	65.0	512.16	70.0	445.42
75.0	467.47	80.0	549.41	85.0	653.31
90.0	756.83	95.0	849.28	100.0	925.51
105.0	982.97	110.0	1020.38	115.0	1037.10
120.0	1032.92	125.0	1007.87	130.0	962.34
135.0	897.16	140.0	814.03	145.0	716.32
150.0	610.89	155.0	512.17	160.0	449.10
165.0	461.28	170.0	561.80	175.0	725.77
180.0	925.78	185.0	1144.53	190.0	1371.12
195.0	1597.62	200.0	1817.62	205.0	2025.73
210.0	2217.43	215.0	2389.12	220.0	2538.18
225.0	2663.04	230.0	2763.17	235.0	2839.04
240.0	2892.06	245.0	2924.43	250.0	2938.96
255.0	2938.90	260.0	2927.71	265.0	2908.93
270.0	2885.97	275.0	2861.95	280.0	2839.63
285.0	2821.28	290.0	2808.62	295.0	2802.77
300.0	2804.25	305.0	2812.92	310.0	2828.02
315.0	2848.20	320.0	2871.50	325.0	2895.45
330.0	2917.13	335.0	2933.29	340.0	2940.46
345.0	2935.09	350.0	2913.79	355.0	2873.47

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swrch	TL Swrch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 25.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2658.91	5.0	2577.08	10.0	2473.43
15.0	2347.94	20.0	2201.47	25.0	2035.82
30.0	1853.65	35.0	1658.45	40.0	1454.45
45.0	1246.64	50.0	1040.88	55.0	844.38
60.0	667.03	65.0	523.98	70.0	437.56
75.0	425.64	80.0	476.25	85.0	557.43
90.0	644.82	95.0	725.56	100.0	793.32
105.0	844.90	110.0	878.66	115.0	893.80
120.0	890.01	125.0	867.36	130.0	826.34
135.0	768.02	140.0	694.56	145.0	610.14
150.0	523.16	155.0	450.52	160.0	421.42
165.0	463.76	170.0	575.80	175.0	734.87
180.0	921.32	185.0	1122.51	190.0	1329.87
195.0	1536.80	200.0	1737.84	205.0	1928.30
210.0	2104.23	215.0	2262.48	220.0	2400.72
225.0	2517.53	230.0	2612.40	235.0	2685.70
240.0	2738.60	245.0	2772.97	250.0	2791.22
255.0	2796.14	260.0	2790.75	265.0	2778.13
270.0	2761.24	275.0	2742.84	280.0	2725.35
285.0	2710.78	290.0	2700.64	295.0	2695.94
300.0	2697.13	305.0	2704.09	310.0	2716.15
315.0	2732.10	320.0	2750.22	325.0	2768.32
330.0	2783.85	335.0	2793.95	340.0	2795.58
345.0	2785.68	350.0	2761.30	355.0	2719.78

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 30.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2481.67	5.0	2404.45	10.0	2308.39
15.0	2193.54	20.0	2060.67	25.0	1911.34
30.0	1747.84	35.0	1573.13	40.0	1390.79
45.0	1204.99	50.0	1020.52	55.0	843.07
60.0	679.89	65.0	541.17	70.0	441.69
75.0	397.59	80.0	410.98	85.0	462.41
90.0	528.50	95.0	594.05	100.0	650.99
105.0	695.15	110.0	724.34	115.0	737.50
120.0	734.20	125.0	714.54	130.0	679.19
135.0	629.58	140.0	568.53	145.0	501.48
150.0	438.92	155.0	399.64	160.0	407.90
165.0	475.64	170.0	592.88	175.0	742.89
180.0	912.79	185.0	1093.81	190.0	1279.43
195.0	1464.39	200.0	1644.14	205.0	1814.77
210.0	1972.92	215.0	2115.90	220.0	2241.70
225.0	2349.09	230.0	2437.58	235.0	2507.41
240.0	2559.53	245.0	2595.44	250.0	2617.15
255.0	2626.96	260.0	2627.41	265.0	2621.06
270.0	2610.44	275.0	2597.88	280.0	2585.44
285.0	2574.82	290.0	2567.34	295.0	2563.85
300.0	2564.73	305.0	2569.89	310.0	2578.76
315.0	2590.28	320.0	2603.00	325.0	2615.05
330.0	2624.25	335.0	2628.19	340.0	2624.30
345.0	2610.03	350.0	2582.90	355.0	2540.72

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase Spacing (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swth	TL Swth	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern Calculated at 35.0 Degrees Elevation					
Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2284.53	5.0	2212.93	10.0	2125.55
15.0	2022.48	20.0	1904.43	25.0	1772.70
30.0	1629.19	35.0	1476.35	40.0	1317.11
45.0	1154.83	50.0	993.33	55.0	836.93
60.0	690.80	65.0	561.51	70.0	457.93
75.0	390.90	80.0	367.81	85.0	383.46
90.0	421.87	95.0	467.59	100.0	510.61
105.0	545.35	110.0	568.81	115.0	579.50
120.0	576.81	125.0	560.90	130.0	532.68
135.0	494.15	140.0	449.18	145.0	404.88
150.0	373.47	155.0	371.76	160.0	412.66
165.0	495.60	170.0	610.70	175.0	747.64
180.0	898.57	185.0	1057.57	190.0	1219.87
195.0	1381.37	200.0	1538.43	205.0	1687.86
210.0	1826.92	215.0	1953.38	220.0	2065.56
225.0	2162.40	230.0	2243.45	235.0	2308.84
240.0	2359.29	245.0	2395.97	250.0	2420.44
255.0	2434.56	260.0	2440.36	265.0	2439.90
270.0	2435.25	275.0	2428.29	280.0	2420.72
285.0	2413.95	290.0	2409.05	295.0	2406.74
300.0	2407.33	305.0	2410.73	310.0	2416.49
315.0	2423.72	320.0	2431.23	325.0	2437.49
330.0	2440.70	335.0	2438.91	340.0	2430.03
345.0	2412.00	350.0	2382.86	355.0	2340.84

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 40.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	2072.42	5.0	2007.39	10.0	1929.58
15.0	1839.10	20.0	1736.58	25.0	1623.08
30.0	1500.13	35.0	1369.68	40.0	1234.06
45.0	1095.90	50.0	958.12	55.0	823.93
60.0	696.94	65.0	581.31	70.0	482.08
75.0	405.22	80.0	356.48	85.0	337.74
90.0	343.65	95.0	363.90	100.0	388.66
105.0	411.09	110.0	427.13	115.0	434.62
120.0	432.73	125.0	421.65	130.0	402.71
135.0	378.72	140.0	354.77	145.0	338.94
150.0	341.81	155.0	372.34	160.0	432.88
165.0	519.44	170.0	625.90	175.0	746.62
180.0	876.95	185.0	1012.99	190.0	1151.29
195.0	1288.77	200.0	1422.62	205.0	1550.32
210.0	1669.71	215.0	1778.98	220.0	1876.78
225.0	1962.24	230.0	2034.93	235.0	2094.90
240.0	2142.65	245.0	2179.04	250.0	2205.25
255.0	2222.68	260.0	2232.88	265.0	2237.47
270.0	2238.02	275.0	2236.04	280.0	2232.84
285.0	2229.53	290.0	2226.98	295.0	2225.73
300.0	2226.05	305.0	2227.87	310.0	2230.81
315.0	2234.19	320.0	2237.05	325.0	2238.18
330.0	2236.20	335.0	2229.56	340.0	2216.66
345.0	2195.90	350.0	2165.78	355.0	2124.97

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Switch	TL Switch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 45.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1850.21	5.0	1792.61	10.0	1725.01
15.0	1647.57	20.0	1560.79	25.0	1465.53
30.0	1362.99	35.0	1254.67	40.0	1142.34
45.0	1027.99	50.0	913.80	55.0	802.08
60.0	695.31	65.0	596.14	70.0	507.44
75.0	432.24	80.0	373.56	85.0	333.47
90.0	311.76	95.0	305.07	100.0	307.89
105.0	314.60	110.0	320.91	115.0	324.20
120.0	323.35	125.0	318.64	130.0	311.76
135.0	306.00	140.0	306.27	145.0	318.38
150.0	347.22	155.0	394.88	160.0	460.50
165.0	541.47	170.0	634.72	175.0	737.26
180.0	846.31	185.0	959.31	190.0	1073.84
195.0	1187.63	200.0	1298.59	205.0	1404.79
210.0	1504.58	215.0	1596.57	220.0	1679.70
225.0	1753.25	230.0	1816.85	235.0	1870.48
240.0	1914.45	245.0	1949.36	250.0	1976.03
255.0	1995.47	260.0	2008.81	265.0	2017.23
270.0	2021.91	275.0	2023.95	280.0	2024.34
285.0	2023.91	290.0	2023.31	295.0	2022.96
300.0	2023.05	305.0	2023.54	310.0	2024.14
315.0	2024.32	320.0	2023.38	325.0	2020.42
330.0	2014.38	335.0	2004.13	340.0	1988.49
345.0	1966.29	350.0	1936.44	355.0	1897.99

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 50.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1622.56	5.0	1573.05	10.0	1516.03
15.0	1451.66	20.0	1380.37	25.0	1302.81
30.0	1219.89	35.0	1132.72	40.0	1042.60
45.0	950.98	50.0	859.41	55.0	769.54
60.0	683.04	65.0	601.62	70.0	526.97
75.0	460.70	80.0	404.29	85.0	358.82
90.0	324.67	95.0	301.23	100.0	286.80
105.0	278.99	110.0	275.39	115.0	274.16
120.0	274.44	125.0	276.46	130.0	281.48
135.0	291.63	140.0	309.41	145.0	336.98
150.0	375.65	155.0	425.59	160.0	486.10
165.0	555.91	170.0	633.47	175.0	717.13
180.0	805.18	185.0	895.93	190.0	987.71
195.0	1078.91	200.0	1168.02	205.0	1253.63
210.0	1334.53	215.0	1409.68	220.0	1478.27
225.0	1539.73	230.0	1593.76	235.0	1640.27
240.0	1679.45	245.0	1711.65	250.0	1737.41
255.0	1757.43	260.0	1772.45	265.0	1783.30
270.0	1790.80	275.0	1795.70	280.0	1798.72
285.0	1800.43	290.0	1801.31	295.0	1801.63
300.0	1801.56	305.0	1801.04	310.0	1799.87
315.0	1797.70	320.0	1794.00	325.0	1788.15
330.0	1779.41	335.0	1766.99	340.0	1750.06
345.0	1727.84	350.0	1699.57	355.0	1664.64

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 55.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1393.71	5.0	1352.69	10.0	1306.30
15.0	1254.68	20.0	1198.18	25.0	1137.28
30.0	1072.64	35.0	1005.05	40.0	935.43
45.0	864.78	50.0	794.18	55.0	724.75
60.0	657.61	65.0	593.86	70.0	534.54
75.0	480.62	80.0	432.90	85.0	391.98
90.0	358.20	95.0	331.53	100.0	311.62
105.0	297.84	110.0	289.46	115.0	285.87
120.0	286.76	125.0	292.21	130.0	302.66
135.0	318.81	140.0	341.36	145.0	370.85
150.0	407.51	155.0	451.20	160.0	501.49
165.0	557.67	170.0	618.88	175.0	684.12
180.0	752.31	185.0	822.34	190.0	893.09
195.0	963.46	200.0	1032.38	205.0	1098.90
210.0	1162.13	215.0	1221.34	220.0	1275.93
225.0	1325.49	230.0	1369.75	235.0	1408.61
240.0	1442.13	245.0	1470.51	250.0	1494.07
255.0	1513.22	260.0	1528.45	265.0	1540.26
270.0	1549.19	275.0	1555.73	280.0	1560.34
285.0	1563.40	290.0	1565.22	295.0	1565.99
300.0	1565.80	305.0	1564.63	310.0	1562.34
315.0	1558.70	320.0	1553.37	325.0	1545.93
330.0	1535.91	335.0	1522.79	340.0	1506.06
345.0	1485.20	350.0	1459.75	355.0	1429.35

Call: KKZN
 Freq: 760 kHz
 THORNTON, CO, US
 Hours: D
 Lat: 40-00-33 N
 Lng: 104-56-21 W
 Power: 50.0 kW
 Theo RMS: 2187.28 mV/m @ 1km @ 50.0 kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.350	-91.0	0.0	0.0	89.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	134.8	116.5	89.0	0	0	0.0	0.0	0.0	0.0

Standard Pattern
Calculated at 60.0 Degrees Elevation

Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)	Azimuth (Deg)	Field (mV/m @1km)
0.0	1167.39	5.0	1134.96	10.0	1098.89
15.0	1059.33	20.0	1016.52	25.0	970.82
30.0	922.68	35.0	872.64	40.0	821.31
45.0	769.36	50.0	717.50	55.0	666.45
60.0	616.95	65.0	569.71	70.0	525.38
75.0	484.57	80.0	447.79	85.0	415.44
90.0	387.82	95.0	365.07	100.0	347.22
105.0	334.22	110.0	325.94	115.0	322.29
120.0	323.20	125.0	328.69	130.0	338.84
135.0	353.77	140.0	373.58	145.0	398.29
150.0	427.83	155.0	461.99	160.0	500.44
165.0	542.72	170.0	588.29	175.0	636.52
180.0	686.72	185.0	738.18	190.0	790.17
195.0	841.95	200.0	892.85	205.0	942.20
210.0	989.42	215.0	1034.01	220.0	1075.56
225.0	1113.75	230.0	1148.38	235.0	1179.33
240.0	1206.61	245.0	1230.29	250.0	1250.53
255.0	1267.55	260.0	1281.63	265.0	1293.05
270.0	1302.11	275.0	1309.10	280.0	1314.30
285.0	1317.93	290.0	1320.18	295.0	1321.15
300.0	1320.91	305.0	1319.44	310.0	1316.66
315.0	1312.42	320.0	1306.53	325.0	1298.75
330.0	1288.78	335.0	1276.34	340.0	1261.11
345.0	1242.83	350.0	1221.24	355.0	1196.13

Matrix Impedance Measurements

Tower 1 driven with all others floated	$49.0 + j76.0 \Omega$
Tower 2 driven with all others floated	$44.6 + j67.2 \Omega$
Tower 3 driven with all others floated	$49.8 + j70.5 \Omega$
Tower 4 driven with all others floated	$45.1 + j65.9 \Omega$

All measurements above made with a Hewlett Packard 8753D vector network analyzer and directional coupler in a calibrated measurement system.

Comparison of Modeled and Measured Matrix Impedances

T	Z_{modeled}	Z_{measured}
1	$48.7 + j76.2 \Omega$	$49.0 + j76.0 \Omega$
2	$45.4 + j66.9 \Omega$	$44.6 + j67.2 \Omega$
3	$48.7 + j70.2 \Omega$	$49.8 + j70.5 \Omega$
4	$45.4 + j65.9 \Omega$	$45.1 + j65.9 \Omega$

MoM Calculated Impedance Tower 1 Driven with Other Towers Floated

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT1DAO 12-14-2011 10:55:45

IMPEDANCE

normalization = 50.
freq resist react impd phase VSWR S11 S12
(MHz) (ohms) (ohms) (ohms) (deg) dB dB
source = 1; node 1, sector 1
.76 48.741 76.202 90.457 57.4 4.1419 -4.2786 -2.0299

INPUT FILE

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT1DAO 12-14-2011 10:57:48

KKZN

GEOMETRY

Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

		minimum		maximum
Individual wires	wire	value	wire	value
segment length	2	6.93333	1	7.03333
segment/radius ratio	2	23.8177	1	24.1612
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)
frequency no. of segment length (wavelengths)
no. lowest step steps minimum maximum
1 .76 0 1 .0175762 .0178297

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	1	0	19.	0	0	0
2	16	0	-10,000.	0	0	0
3	31	0	-10,000.	0	0	0
4	46	0	-10,000.	0	0	0

MoM Calculated Impedance Tower 2 Driven with Other Towers Floated

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT2DAO 12-14-2011 11:24:54

IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 16, sector 1							
.76	45.402	66.944	80.887	55.9	3.7142	-4.7953	-1.7489

INPUT FILE

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT2DAO 12-14-2011 11:25:50

KKZN

GEOMETRY

Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

	minimum	maximum
Individual wires	wire value	wire value
segment length	2 6.93333	1 7.03333
segment/radius ratio	2 23.8177	1 24.1612
radius	1 .2911	1 .2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)

no.	frequency	step	no. of steps	segment length (wavelengths)
lowest			minimum	maximum
1	.76	0	1	.0175762 .0178297

Sources

source	node	sector	magnitude	phase	type
1	16	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-10,000.	0	0	0
2	16	0	18.	0	0	0
3	31	0	-10,000.	0	0	0
4	46	0	-10,000.	0	0	0

MoM Calculated Impedance Tower 3 Driven with Other Towers Floated

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast Professional\Work\KKZN\KKZNT3DAOF 12-14-2011 11:27:23

IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 31, sector 1							
.76	48.741	70.201	85.462	55.2	3.7566	-4.7384	-1.7774

INPUT FILE

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast Professional\Work\KKZN\KKZNT3DAOF 12-14-2011 11:28:33

KKZN

GEOMETRY

Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

	minimum	maximum
Individual wires	wire value	wire value
segment length	2 6.93333	1 7.03333
segment/radius ratio	2 23.8177	1 24.1612
radius	1 .2911	1 .2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency	no. of	segment length (wavelengths)
no. lowest	steps	minimum maximum
1 .76	0	1 .0175762 .0178297

Sources

source	node	sector	magnitude	phase	type
1	31	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-10,000.	0	0	0
2	16	0	-10,000.	0	0	0
3	31	0	13.	0	0	0
4	46	0	-10,000.	0	0	0

MoM Calculated Impedance Tower 4 Driven with Other Towers Floated

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT4DAOF 12-14-2011 11:29:53

IMPEDANCE

normalization = 50.

freq	resist	react	imped	phase	VSWR	S11	S12
(MHz)	(ohms)	(ohms)	(ohms)	(deg)		dB	dB
source = 1; node 46, sector 1							
.76	45.402	65.944	80.062	55.5	3.651	-4.8828	-1.7062

INPUT FILE

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNT4DAOF 12-14-2011 11:31:03

KKZN

GEOMETRY

Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

	minimum	maximum
Individual wires	wire value	wire value
segment length	2 6.93333	1 7.03333
segment/radius ratio	2 23.8177	1 24.1612
radius	1 .2911	1 .2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)

no.	lowest	step	no. of steps	segment length (wavelengths)
			minimum	maximum
1	.76	0	1	.0175762 .0178297

Sources

source	node	sector	magnitude	phase	type
1	46	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-10,000.	0	0	0
2	16	0	-10,000.	0	0	0
3	31	0	-10,000.	0	0	0
4	46	0	17.	0	0	0

Calculated Operating Parameters from Modeled Base Currents

	<u>Base Current</u>	<u>Base Current Phase</u>	<u>Ratio</u>	<u>Phase</u>
<u>Day</u>				
Tower 1	25.5262 A	+276.2°	1.000	0.0°
Tower 2	-	-	-	-
Tower 3	18.5740 A	+1.7°	0.757	+85.5°
Tower 4	-	-	-	-
<u>Night</u>				
Tower 1	3.47384 A	+2.5°	1.000	0.0°
Tower 2	3.80699 A	+105.0°	1.096	+102.5°
Tower 3	3.00734 A	+274.2°	0.866	-88.3°
Tower 4	3.06903 A	+170.4°	0.884	+167.9°

MoM Calculated Base Drive Voltages and Currents for Day Pattern

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNDAYINVERTED 12-14-2011 11:41:37

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .76 MHz

tower	field ratio magnitude	phase (deg)
1	1.35	-91.
2	1.	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	2,629.7	322.5	24.5262	276.2
31	1,201.87	77.5	18.5741	1.7

Sum of square of source currents = 1,893.06

Total power = 50,000. Watts

INPUT FILE

C:\Documents and Settings\stcox\My Documents\Expert MININEC Broadcast
Professional\Work\KKZN\KKZNDAYINVERTED 12-14-2011 11:42:19

KKZN

GEOMETRY

Dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

	minimum	maximum
Individual wires	wire value	wire value
segment length	2 6.93333	1 7.03333
segment/radius ratio	2 23.8177	1 24.1612
radius	1 .2911	1 .2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)

no.	frequency	step	no. of steps	segment length (wavelengths)
	lowest			minimum maximum
1	.76	0	1	.0175762 .0178297

Sources - Peak Voltage

source node	sector	magnitude	phase	type
1	1	3,718.96	322.5	voltage
2	31	1,699.7	77.5	voltage

Lumped loads

load node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1 0	19.	0	0	0
2	16 0	521.2	0	0	0
3	31 0	13.	0	0	0
4	46 0	531.7	0	0	0

MOM Calculated Current Distribution for Day Pattern

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Professional\Work\KKZN\KKZNDAYINVERTED 12-14-2011 11:44:29

CURRENT rms									
Frequency = .76 MHz									
Input power = 50,000. watts									
Efficiency = 100. %									
coordinates in meters									
current	no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)	
GND	0	0	0	0	24.5262	276.2	2.64173	-24.3835	
2	0	0	0	7.03333	25.3056	273.7	1.61392	-25.2541	
3	0	0	0	14.0667	25.5259	272.1	.928785	-25.509	
4	0	0	0	21.1	25.3724	270.8	.365349	-25.3697	
5	0	0	0	28.1333	24.8707	269.8	-1.03846	-24.8705	
6	0	0	0	35.1667	24.0359	268.8	-1.48852	-24.0309	
7	0	0	0	42.2	22.8808	268.	-1.792539	-22.8671	
8	0	0	0	49.2333	21.4195	267.3	-1.01765	-21.3953	
9	0	0	0	56.2667	19.6676	266.6	-1.16487	-19.6331	
10	0	0	0	63.3	17.6425	266.	-1.23505	-17.5992	
11	0	0	0	70.3333	15.3619	265.4	-1.22907	-15.3127	
12	0	0	0	77.3667	12.8431	264.9	-1.14785	-12.7917	
13	0	0	0	84.4	10.0993	264.4	-1.091986	-10.0505	
14	0	0	0	91.4333	7.13148	263.9	-1.760663	-7.0908	
15	0	0	0	98.4667	3.90398	263.4	-1.44838	-3.87815	
END	0	0	0	105.5	0	0	0	0	
GND	25.5414	-95.3216	0	1.84666	2.2	1.84536	.0694308		
17	25.5414	-95.3216	6.93333	1.2521	2.1	1.25123	.046476		
18	25.5414	-95.3216	13.8667	.854272	2.	.853754	.0297523		
19	25.5414	-95.3216	20.8	.524692	1.6	.524491	.0145312		
20	25.5414	-95.3216	27.7333	.247366	.1	.247366	3.81E-04		
21	25.5414	-95.3216	34.6667	.0208174	322.5	.0165117	-.0126779		
22	25.5414	-95.3216	41.6	.172312	188.2	-.170571	-.0244288		
23	25.5414	-95.3216	48.5333	.317056	186.3	-.315168	-.0345485		
24	25.5414	-95.3216	55.4667	.420316	185.8	-.418147	-.0426426		
25	25.5414	-95.3216	62.4	.482703	185.7	-.480283	-.0482713		
26	25.5414	-95.3216	69.3333	.504961	185.8	-.502382	-.0509683		
27	25.5414	-95.3216	76.2667	.487858	185.9	-.485263	-.0502573		
28	25.5414	-95.3216	83.2	.432017	186.1	-.429598	-.0456565		
29	25.5414	-95.3216	90.1333	.337408	186.2	-.335412	-.0366494		
30	25.5414	-95.3216	97.0667	.201805	186.4	-.200543	-.0225308		
END	25.5414	-95.3216	104.	0	0	0	0		
GND	-65.9512	-132.278	0	18.574	1.7	18.5659	.550748		
32	-65.9512	-132.278	7.03333	19.0466	1.2	19.0427	.383811		
33	-65.9512	-132.278	14.0667	19.1218	.8	19.1199	.27034		
34	-65.9512	-132.278	21.1	18.926	.5	18.9252	.174731		
35	-65.9512	-132.278	28.1333	18.4797	.3	18.4795	.0926854		
36	-65.9512	-132.278	35.1667	17.7953	.1	17.7953	.0228159		
37	-65.9512	-132.278	42.2	16.8837	359.9	16.8837	-.0352785		
38	-65.9512	-132.278	49.2333	15.7564	359.7	15.7562	-.0816228		
39	-65.9512	-132.278	56.2667	14.4258	359.5	14.4253	-.116099		
40	-65.9512	-132.278	63.3	12.9052	359.4	12.9044	-.138547		
41	-65.9512	-132.278	70.3333	11.2082	359.2	11.2072	-.148814		
42	-65.9512	-132.278	77.3667	9.34769	359.1	9.34654	-.146754		
43	-65.9512	-132.278	84.4	7.33368	359.	7.33249	-.132194		
44	-65.9512	-132.278	91.4333	5.16717	358.8	5.16611	-.104781		
45	-65.9512	-132.278	98.4667	2.82263	358.7	2.82191	-.063492		
END	-65.9512	-132.278	105.5	0	0	0	0		
GND	-91.4984	-36.9678	0	1.8149	2.1	1.81369	.0662238		
47	-91.4984	-36.9678	6.93333	1.21897	2.1	1.21818	.0438801		
48	-91.4984	-36.9678	13.8667	.820679	1.9	.820216	.0275839		
49	-91.4984	-36.9678	20.8	.491174	1.5	.491009	.0127367		
50	-91.4984	-36.9678	27.7333	.214439	359.7	.214437	-1.08E-03		
51	-91.4984	-36.9678	34.6667	.0206994	221.9	-.015398	-.0138336		
52	-91.4984	-36.9678	41.6	.202603	187.2	-.201015	-.0253135		
53	-91.4984	-36.9678	48.5333	.34552	185.8	-.343723	-.035194		
54	-91.4984	-36.9678	55.4667	.446495	185.5	-.444412	-.0430816		
55	-91.4984	-36.9678	62.4	.506213	185.5	-.503881	-.0485373		
56	-91.4984	-36.9678	69.3333	.525449	185.6	-.522959	-.0510959		

MoM Calculated Current Distribution for Day Pattern (cont.)

57	-91.4984	-36.9678	76.2667	.505	185.7	-.502491	-.0502817
58	-91.4984	-36.9678	83.2	.445506	185.9	-.443164	-.0456143
59	-91.4984	-36.9678	90.1333	.346939	186.1	-.345005	-.0365778
60	-91.4984	-36.9678	97.0667	.207027	186.2	-.205804	-.0224691
END	-91.4984	-36.9678	104.	0	0	0	0

MoM Calculated Current Moments for Day Pattern

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CURRENT MOMENTS(amp-meters) rms

Frequency = .76 MHz
Input power = 50,000. watts

wire	magnitude	phase (deg)	vertical current moment	
			magnitude	phase (deg)
1	2,664.64	268.9	2,664.64	268.9
2	5.2626	333.1	5.2626	333.1
3	1,974.3	.1	1,974.3	.1
4	2.78205	295.7	2.78205	295.7

Medium wave array vertical current moment (amps-meters) rms
(Calculation assumes tower wires are grouped together.
The first wire of each group must contain the source.)

tower	magnitude	phase (deg)
1	2,666.94	269.
2	1,975.51	0.0

Normalized to Tower 2 (ALTERNATE MODE)

tower	magnitude	phase (deg)
1	1.350	-91.0
2	1.000	0.0

MoM Calculated Base Drive Voltages and Currents for Night Pattern

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .76 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.98	102.
3	.8	-88.
4	.82	170.

VOLTAGES AND CURRENTS - rms

source	voltage node	magnitude	phase (deg)	current magnitude	phase (deg)
1	454.839	80.3	3.47384	2.5	
16	282.849	171.4	3.80699	105.	
31	234.342	348.4	3.00733	274.2	
46	275.547	257.6	3.06903	170.4	

Sum of square of source currents = 90.0474

Total power = 1,000. Watts

INPUT FILE

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GEOMETRY

Dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	15
		0	0	105.5		
2	none	98.6842	75.	0	.2911	15
		98.6842	75.	104.		
3	none	147.807	116.5	0	.2911	15
		147.807	116.5	105.5		
4	none	98.6842	158.	0	.2911	15
		98.6842	158.	104.		

Number of wires = 4
current nodes = 60

		minimum		maximum
Individual wires	wire	value	wire	value
segment length	2	6.93333	1	7.03333
segment/radius ratio	2	23.8177	1	24.1612
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION

Frequencies (MHz)

frequency	no. of	segment length (wavelengths)		
no. lowest	steps	minimum	maximum	
1 .76	0	1	.0175762	.0178297

Sources - Peak Voltage

source	node	sector	magnitude	phase	type
1	1	1	643.239	80.3	voltage
2	16	1	400.009	171.4	voltage
3	31	1	331.409	348.4	voltage
4	46	1	389.682	257.6	voltage

MoM Calculated Base Drive Voltages and Currents for Night Pattern(cont.)

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	19.	0	0	0
2	16	0	18.	0	0	0
3	31	0	13.	0	0	0
4	46	0	17.	0	0	0

Mom Calculated Current Distribution for Night Pattern

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CURRENT rms
Frequency = .76 MHz
Input power = 1,000, watts
Efficiency = 100. %
coordinates in meters

current	no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	0	3.47384	2.5	3.47058	.150456
2	0	0	0	7.03333	3.68876	1.6	3.68739	.100713
3	0	0	0	14.0667	3.78312	1.	3.78252	.0674218
4	0	0	0	21.1	3.80803	.6	3.80782	.0398929
5	0	0	0	28.1333	3.77081	.3	3.77078	.0167891
6	0	0	0	35.1667	3.67514	360.	3.67514	-2.37E-03
7	0	0	0	42.2	3.52377	359.7	3.52373	-.0178067
8	0	0	0	49.2333	3.31934	359.5	3.3192	-.0296178
9	0	0	0	56.2667	3.06457	359.3	3.06433	-.037889
10	0	0	0	63.3	2.76239	359.1	2.76206	-.0426979
11	0	0	0	70.3333	2.41581	359.	2.41541	-.0441278
12	0	0	0	77.3667	2.0277	358.8	2.02726	-.0422644
13	0	0	0	84.4	1.60028	358.7	1.59985	-.0371795
14	0	0	0	91.4333	1.13383	358.5	1.13346	-.0288857
15	0	0	0	98.4667	.622667	358.4	.62243	-.0172023
END	0	0	0	105.5	0	0	0	0
GND	25.5414	-95.3216	0	3.80699	105.	-.985325	3.67727	-2.99332
17	25.5414	-95.3216	6.93333	3.90389	104.	-.943585	3.78814	-3.10068
18	25.5414	-95.3216	13.8667	3.91947	103.3	-.904934	3.81357	-3.12809
19	25.5414	-95.3216	20.8	3.87956	102.8	-.861518	3.7827	-3.10762
20	25.5414	-95.3216	27.7333	3.78829	102.4	-.812593	3.70011	-2.59987
21	25.5414	-95.3216	34.6667	3.64817	102.	-.758153	3.56852	-2.26013
22	25.5414	-95.3216	41.6	3.46146	101.6	-.698495	3.39025	-1.8867
23	25.5414	-95.3216	48.5333	3.2305	101.3	-.634076	3.16766	-1.48157
24	25.5414	-95.3216	55.4667	2.95785	101.	-.565447	2.9033	-1.0449
25	25.5414	-95.3216	62.4	2.64624	100.7	-.49321	2.59987	.571466
26	25.5414	-95.3216	69.3333	2.29846	100.5	-.417988	2.26013	-2.99332
27	25.5414	-95.3216	76.2667	1.91716	100.2	-.340372	1.8867	-3.10068
28	25.5414	-95.3216	83.2	1.50435	100.	-.260838	1.48157	-3.12809
29	25.5414	-95.3216	90.1333	1.06022	99.8	-.17956	1.0449	-3.10762
30	25.5414	-95.3216	97.0667	.579446	99.5	-.0958349	.571466	-2.93769
END	25.5414	-95.3216	104.	0	0	0	0	-2.93769
GND	-65.9512	-132.278	0	3.00734	274.2	.219393	-2.99332	-3.10068
32	-65.9512	-132.278	7.03333	3.10633	273.5	.187352	-3.10068	-3.12809
33	-65.9512	-132.278	14.0667	3.13238	273.	.164006	-3.12809	-3.10762
34	-65.9512	-132.278	21.1	3.11089	272.6	.142702	-3.10762	-2.93769
35	-65.9512	-132.278	28.1333	3.04583	272.3	.122684	-3.04335	-2.79266
36	-65.9512	-132.278	35.1667	2.93952	272.	.103764	-2.93769	-2.61032
37	-65.9512	-132.278	42.2	2.79398	271.8	.0859595	-2.79266	-2.14281
38	-65.9512	-132.278	49.2333	2.61124	271.5	.0693763	-2.61032	-1.86246
39	-65.9512	-132.278	56.2667	2.39353	271.3	.0541604	-2.39291	-1.55417
40	-65.9512	-132.278	63.3	2.14319	271.1	.0404779	-2.14281	-1.21977
41	-65.9512	-132.278	70.3333	1.86267	270.9	.0284993	-1.86246	-1.008152
42	-65.9512	-132.278	77.3667	1.55427	270.7	.0183922	-1.55417	-0.859616
43	-65.9512	-132.278	84.4	1.21982	270.5	.0103152	-1.21977	-0.69615
44	-65.9512	-132.278	91.4333	.859627	270.3	4.42E-03	-.859616	0
45	-65.9512	-132.278	98.4667	.469616	270.1	8.62E-04	-.469615	.51032
END	-65.9512	-132.278	105.5	0	0	0	0	.538497
GND	-91.4984	-36.9678	0	3.06903	170.4	-3.02631	.51032	.550138
47	-91.4984	-36.9678	6.93333	3.18887	170.3	-3.14307	.538497	.552096
48	-91.4984	-36.9678	13.8667	3.22741	170.2	-3.18018	.550138	.507718
49	-91.4984	-36.9678	20.8	3.21496	170.1	-3.1672	.552096	.477564
50	-91.4984	-36.9678	27.7333	3.15609	170.	-3.10862	.54536	.440362
51	-91.4984	-36.9678	34.6667	3.05338	170.	-3.00695	.530439	.396524
52	-91.4984	-36.9678	41.6	2.90888	169.9	-2.86423	.507718	
53	-91.4984	-36.9678	48.5333	2.72467	169.9	-2.6825	.477564	
54	-91.4984	-36.9678	55.4667	2.50295	169.9	-2.46391	.440362	
55	-91.4984	-36.9678	62.4	2.24603	169.8	-2.21075	.396524	

MoM Calculated Current Distribution for Night Pattern (cont.)

56	-91.4984	-36.9678	69.3333	1.95631	169.8	-1.92538	.34647
57	-91.4984	-36.9678	76.2667	1.63604	169.8	-1.61003	.290601
58	-91.4984	-36.9678	83.2	1.28693	169.7	-1.26635	.229221
59	-91.4984	-36.9678	90.1333	.909118	169.7	-.894505	.16235
60	-91.4984	-36.9678	97.0667	.498002	169.7	-.489956	.0891591
END	-91.4984	-36.9678	104.	0	0	0	0

MoM Calculated Current Moments for Night Pattern

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Professional\Work\KKZN\KKZNNITE 02-13-2012 12:42:22

CURRENT MOMENTS (amp-meters) rms

Frequency = .76 MHz

Input power = 1,000. watts

wire	magnitude	phase (deg)	magnitude	phase (deg)
1	407.083	360.	407.083	360.
2	398.941	102.	398.941	102.
3	325.666	272.	325.666	272.
4	333.808	170.	333.808	170.

Medium wave array vertical current moment (amps-meters) rms

(Calculation assumes tower wires are grouped together.

The first wire of each group must contain the source.)

tower	magnitude	phase (deg)
1	407.083	360.
2	398.941	102.
3	325.666	272.
4	333.808	170.

Normalized to Tower 1

tower	magnitude	phase (deg)
1	1.000	0.0
2	0.980	+102.0
3	0.800	-88.0
4	0.820	+170.0

Measured and Calculated Sampling Line Characteristics

Measured open circuit resonant frequency at odd multiple of $\frac{1}{4}$ wavelength nearest to carrier frequency:

Tower 1	732.3 kHz	$\frac{3}{4} \lambda$ (270°)
Tower 2	732.4 kHz	$\frac{3}{4} \lambda$ (270°)
Tower 3	732.4 kHz	$\frac{3}{4} \lambda$ (270°)
Tower 4	732.95 kHz	$\frac{3}{4} \lambda$ (270°)

Measured impedance $1/8$ wavelength above and below open circuit resonant frequency:

Tower 1	610.25 kHz	$6.45 - j48.4 \Omega$	$-1/8 \lambda$
	854.35 kHz	$9.48 + j48.4 \Omega$	$+1/8 \lambda$
Tower 2	610.33 kHz	$6.62 - j49.2 \Omega$	$-1/8 \lambda$
	854.47 kHz	$9.53 + j48.7 \Omega$	$+1/8 \lambda$
Tower 3	610.33 kHz	$6.59 - j49.2 \Omega$	$-1/8 \lambda$
	854.47 kHz	$9.55 + j48.8 \Omega$	$+1/8 \lambda$
Tower 4	610.79 kHz	$6.63 - j49.2 \Omega$	$-1/8 \lambda$
	855.11 kHz	$9.63 + j48.9 \Omega$	$+1/8 \lambda$

Calculated characteristic impedance using the formula $Z_o = ((R_1^2 + X_1^2)^{1/2} * (R_2^2 + X_2^2)^{1/2})^{1/2}$:

Tower 1	49.1 Ω
Tower 2	49.7 Ω
Tower 3	49.7 Ω
Tower 4	49.7 Ω

Calculated electrical length at f_{carrier} :

Tower 1	$L = (f_{\text{carrier}} / f_{\text{resonant}}) * 270^\circ = (760 \text{ kHz} / 732.3 \text{ kHz}) * 270^\circ = 280.21^\circ$
Tower 2	$L = (f_{\text{carrier}} / f_{\text{resonant}}) * 270^\circ = (760 \text{ kHz} / 732.4 \text{ kHz}) * 270^\circ = 280.17^\circ$
Tower 3	$L = (f_{\text{carrier}} / f_{\text{resonant}}) * 270^\circ = (760 \text{ kHz} / 732.4 \text{ kHz}) * 270^\circ = 280.17^\circ$
Tower 4	$L = (f_{\text{carrier}} / f_{\text{resonant}}) * 270^\circ = (760 \text{ kHz} / 732.95 \text{ kHz}) * 270^\circ = 279.97^\circ$

Measured and Calculated Sampling Line Characteristics (cont.)

Measured impedance at f_{carrier} at the input of the sampling line with the sampling device connected:

Tower 1 $49.6 - j2.7 \, \Omega$

Tower 2 $50.1 - j2.3 \, \Omega$

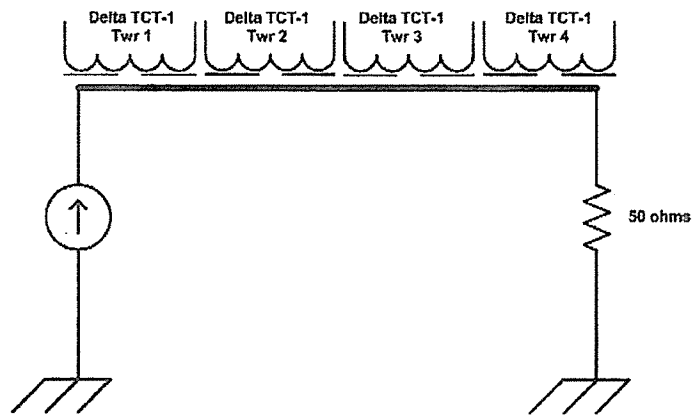
Tower 3 $49.9 - j2.1 \, \Omega$

Tower 4 $50.0 - j2.8 \, \Omega$

All measurements above made with a Hewlett Packard 8753D vector network analyzer and directional coupler in a calibrated measurement system.

Sampling Transformer Calibration

The toroidal current transformers were set up adjacent to each other on a common conductor as shown below. The Hewlett Packard 8753D vector network analyzer system was properly calibrated for an A/B response measurement. The common conductor was driven by the swept RF output of the vector network analyzer system. The sampled output from the tower 1 toroid was fed to the A receiver of the vector network analyzer system and the sampled outputs of the tower 2, 3 and 4 toroids were alternately fed to the B receiver. The relative phase and magnitude of the outputs of the tower 2, 3 and 4 toroids as compared to the output of the tower 1 toroid at the carrier frequency were noted and the results shown below.



	<u>Indicated Ratio</u>	<u>Indicated Phase</u>
Tower 1 (SN 1979)	1.0000	+0.0°
Tower 2 (SN 4367)	0.9963	+0.05°
Tower 3 (SN 4598)	0.9967	+0.21°
Tower 4 (SN 2243)	0.9975	-0.07°

The manufacturer specifies these devices to be accurate to within +/- 2% absolute magnitude and +/- 2° absolute phase.

Environmental Statement

The KKZN (AM) radiators are surrounded by a secured fence restricting access by unauthorized personnel. Based on the charts and graphs supplied in Supplement A, Edition 97-01 to OET Bulletin 65, Edition 97-01 the applicant certifies that the distance to the fences from the radiators complies with FCC OET65 regarding human exposure to non-ionizing electromagnetic radiation.

Questions concerning this exhibit should be directed to:

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tomcox@clearchannel.com

KKZN (AM) Reference Points

Engineer:

Bill Kleronomos /Jason Gorodetzer

Model: Potomac FIM-21

FIM S/N: 454

FIM Cal Date: 22AUG2009

DAY FIELD MEASUREMENTS							
<u>Azimuth</u>	<u>Description</u>	<u>Distance (km)</u>	<u>Latitude (NAD27)</u>	<u>Longitude (NAD27)</u>	<u>Date</u>	<u>Time</u>	<u>Field (mV/m)</u>
68.0°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 to Weld County Road 15. Take measurement on road side 100 feet past Weld County Road 15 intersection.	1.5	40 00 33.2N	104 55 20.5W	1/6/2012	8:45	170
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 and proceed 3.5 miles. Take measurement on roadside.	5.9	40 01 45.9N	104 52 19.9W	1/6/2012	10:20	55
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 to US Highway 85. Turn north on US Highway 85 to Weld County Road 8. Turn west on Weld County Road 8 and proceed .25 miles west of Platte River. Take measurement on roadside in front of No Trespassing sign.	9.7	40 02 38.0N	104 49 41.8W	1/6/2012	11:30	35
116.5°T	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue to Weld County Road 15. Turn north on Weld County Road 15 and proceed .2 miles. Take measurement on roadside.	1.6	40 00 12.9N	104 55 23.2W	1/5/2012	8:45	750
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn east on 160th Avenue to Yosemite Street. Turn north on Yosemite Street and proceed .1 miles. Take measurement at first driveway on right.	5.6	39 59 11.9N	104 52 44.5W	1/5/2012	10:45	190
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn east on 160th Avenue to Riverdale Road. Turn south on Riverdale Road and proceed 1 mile. Make measurement at bridge crossing irrigation ditch.	8.45	39 58 37.8N	104 50 56.1W	1/5/2012	11:50	130
165°T	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue and proceed .2 miles. Take measurement on roadside 100 yards west of farm driveway.	1	40 00 01.2N	104 56 08.7W	1/9/2012	9:45	375
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn east on 160th Avenue to Weld County Road 17. Turn south on Weld County Road 17 to 152nd Avenue. Turn West and proceed .2 miles. Take measurement on roadside.	4.36	39 58 19.0N	104 55 34.7W	1/9/2012	10:35	100
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn east on 160th Avenue to Quebec Street. Turn south on Quebec Street to 120th Avenue. Turn west on 120th Avenue and proceed .15 miles. Take measurement on roadside.	10	39 55 41.4N	105 55 59.8W	1/9/2012	11:20	68

296.5°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn west on Weld County Road 6 to Weld County Road 11. Turn south on Weld County Road 11 and proceed .8 miles. Take measurement on roadside.	2.1	40 01 01.8N	104 57 39.1W	1/31/2012	9:30	1100
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn west on Weld County Road 6 to Interstate 25. Continue on Weld County Road 6 .7 miles past Interstate 25. Take measurement on roadside adjacent to unmarked farm mailbox.	5	40 01 45.7N	104 59 33.9W	1/31/2012	11:00	360
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn west on Weld County Road 6 to Weld County Road 5. Turn south on Weld County Road 5 and proceed .4 miles. Take measurement on roadside in front of Blake's Small Car Salvage.	7.48	40 02 14.4N	105 01 03.9W	2/1/2012	15:00	350
344°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 and proceed 300 feet. Take measurement on roadside.	0.6	40 00 53.5N	104 56 25.1W	2/2/2012	10:30	4500
	From tower gate proceed north on Weld County Road 13 to Weld County Road 8. Turn West on Weld County Road 8 and proceed .5 miles to rural mailbox 5487. Take measurement on roadside next to mailbox.	4	40 02 38.8N	104 57 08.6W	2/2/2012	11:20	750
	From tower gate proceed north on Weld County Road 13 to Weld County Road 12. Turn west on Weld County Road 12 to Weld County Road 11. Turn south on Weld County Road 11 and proceed .3 miles to rural mailbox 4700. Take measurement on dirt driveway on east side of road.	6.8	40 04 07.0N	104 57 37.7W	2/2/2012	12:00	290

NIGHT FIELD MEASUREMENTS							
<u>Azimuth</u>	<u>Description</u>	<u>Distance (km)</u>	<u>Latitude (NAD27)</u>	<u>Longitude (NAD27)</u>	<u>Date</u>	<u>Time</u>	<u>Field (mV/m)</u>
45.5°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 and proceed .4 miles. Take measurement on roadside.	0.9	40 00 53.6N	104 55 57.4W	1/20/2012	9:10	24
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 to Weld County Road 17. Turn north on Weld County Road 17 to Weld County Road 8. Turn east on Weld County Road 8 and proceed for .5 miles. Take measurement on roadside approximately 250 feet west of where road curves around small lake.	5.4	40 02 37.7N	104 53 40.8W	1/20/2012	11:15	2.5
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 and proceed to Weld County Road 21. Turn north on Weld County Road 21 and proceed for 2.3 miles. Take measurement on roadside parallel to irrigation ditch.	8.65	40 03 49.3N	104 52 00.4W	1/20/2012	11:55	3.5

59°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 and proceed .8 miles. Take measurement on roadside at Weld County Road sign.	1.25	40 00 53.4N	104 55 35.4W	1/23/2012	13:30	12
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 and proceed 2.5 miles. Take measurement on dirt road to right leading to oil well.	2.8	40 01 45.5N	104 53 41.9W	1/23/2012	14:35	4.5
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 to Weld County Road 19. Turn north on Weld County Road 19 and proceed .25 miles. Take measurement on roadside next to irrigation ditch.	3.8	40 02 00.0N	104 53 08.4W	1/23/2012	15:00	2.5
73.5°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 to Weld County Road 15. Turn north on Weld County Road 15 and proceed .15 miles to curve in road. Take measurement on roadside as road begins to curve.	1.5	40 00 43.1N	104 55 24.2W	1/23/2012	12:00	7
	From tower gate proceed north on Weld County Road 13 for .3 miles. Turn east on Weld County Road 4 to Weld County Road 17. Turn north on Weld County Road 17 and proceed .15 miles to abandoned railroad crossing. Take measurement at railroad crossing.	3.1	40 01 01.2N	104 54 15.4W	1/23/2012	13:00	2.4
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn east on Weld County Road 6 to Weld County Road 21. Turn south on Weld County Road 21 and proceed .2 miles. Take measurement on roadside approximately 100 yards north of power lines.	6.5	40 01 37.5N	104 52 00.4W	1/23/2012	13:30	1.4
90.5°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 to Weld County Road 15. Turn south on Weld County Road 15 and proceed .4 miles to bridge over small creek. Take measurement in middle of bridge.	1.35	40 00 31.6N	104 55 24.2W	2/2/2012	14:00	9
	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 to Weld County Road 17. Turn south on Weld County Road 17 and proceed .5 miles to rural mailbox 526. Take measurement on roadside just before mailbox.	3	40 00 28.5N	104 54 15.6W	2/2/2012	14:25	6.5
	From tower gate proceed north on Weld County Road 13 to Weld County Road 4. Turn east on Weld County Road 4 to Weld County Road 21. Turn south on Weld County Road 21 and proceed .5 miles to oil well dirt road on west side labeled "Encana Well, Seltzer 43-34".	6.25	40 00 19.1N	104 52 00.1W	2/2/2012	15:05	2

105°T	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue to Weld County Road 15. Turn north on Weld County Road 15 and proceed .3 miles. Take measurement on roadside.	1.4	40 00 23.1N	104 55 23.3W	1/23/2012	15:25	7.2
	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue to Weld County Road 17. Turn north on Weld County Road 17 and proceed 100 yards. Take measurement on roadside just past ranch house on west.	3.1	40 00 04.9N	104 52 15.2W	1/23/2012	15:45	3.5
	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue to Weld County Road 19. Turn south on Weld County Road 19 and proceed .1 miles to junction with first dirt road. Take measurement on roadside.	5	39 59 55.2N	104 53 01.6W	1/23/2012	16:30	0.7
186°T	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn east on 168th Avenue and proceed 150 feet. Take measurement on roadside.	1	40 00 01.1N	104 56 21.0W	2/6/2012	10:00	350
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn west on 160th Avenue and proceed .1 miles to Jackson Street. Take measurement at the southwest corner of Jackson street and 160th Avenue.	2.57	39 59 11.2N	104 56 32.4W	2/6/2012	10:30	140
	From tower gate proceed south on Weld County Road 13 to 136th Avenue. Turn west on 136th Avenue to Milwaukee Street. Turn north on Milwaukee Street to 136th Place. Turn east on 136th Place to dead end. Take measurement in front of residence at 3326 East 136th Place.	7.3	39 56 36.4N	104 56 53.1W	2/6/2012	11:30	52
241.5°T	From tower gate proceed south on Weld County Road 13 to 168th Avenue. Turn west on 168th Avenue to York Street. Take measurement on the southwest corner of the intersection of 168th Avenue and York Street.	2	40 00 00.6N	104 57 31.5W	1/20/2012	13:00	35
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn west on 160th Avenue to Huron Street. Turn south on Huron Street and proceed .1 miles to bridge over Interstate E-470. Take measurement on roadside on the north side of the bridge.	5.6	39 59 03.9N	104 59 48.2W	1/20/2012	14:30	12
	From tower gate proceed south on Weld County Road 13 to 160th Avenue. Turn west on 160th Avenue to Interstate 25. Turn south onto Interstate 25 to 144th Avenue exit. Take 144th Avenue exit west to Zuni Street. Turn north on Zuni Street to 155th Avenue. Take measurement on the southeast corner of the intersection of Zune Street and 144th Avenue.	7.4	39 58 40.5N	105 00 54.8W	1/20/2012	15:15	10
312°T	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn West on Weld County Road 6 to Weld County Road 11. Turn south on Weld County Road 11 and proceed .3 miles to bridge over small creek. Take measurement on roadside just before bridge.	2.55	40 01 24.8N	104 57 39.1W	2/2/2012	16:15	160

	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn west on Weld County Road 6 to Interstate 25 frontage road. Turn north on Interstate 25 frontage road and proceed .5 miles to highway marker D17-EF. Take measurement just past highway marker.	4.8	40 02 15.4N	104 58 45.4W	2/2/2012	17:00	100
	From tower gate proceed north on Weld County Road 13 to Weld County Road 6. Turn west on Weld County Road 6 to Interstate 25 frontage road. Turn north on Interstate 25 frontage road to Weld County Road 8. Turn west on Weld County Road 8 .3 miles to sign designating Town of Erie. Take measurement on roadside just past sign.	5.7	40 02 38.4N	104 59 04.5W	2/2/2012	17:20	80