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Engineering Report:

Application for License
and
Direct Power Measurement

Radio Station KMXA
1090 kHz, 50 kW Day, 500 W Night
Aurora, CO
Facility ID # 10057

Prepared for
Entravision Holdings, LLC

6/2011
Rev. 12/11

APPLICATION FOR LICENSE
and Direct Power Measurement

RADIO STATION KMXA-AM Aurora, CO
1090 kHz, 50.0 kW-D, 0.5 kW-N, DA-2
Facility ID #10057

	Purpose of Application
Item 1	Tower Impedance Measurements and Verification of Method of Moments Model
Item 2	Derivation of Operating Parameters for Directional Antenna
Item 3	Method of Moments Model Details for Towers Driven Individually
Item 4	Method of Moments Model Details for Directional Antenna
Item 5	Certified Array Geometry
Item 6	Sampling System Measurements, Sample Device Description, Antenna Monitor Data
Item 7	Reference Field Strength Measurements
Item 8	Direct Measurement of Power
Appendix A	License BL-850710AD (Most Recent Complete License Document)
Appendix B	FCC Form 302-AM

Purpose of Application

This engineering exhibit supports an application for a "moment method license" license for the presently authorized and unmodified antenna radiation patterns of radio station KMXA, Aurora, CO. KMXA is authorized per license to operate on 1090 kHz with a power of 50.0 kW day and 500 watts night using different directional antenna patterns for the daytime and nighttime operation.

The antenna towers and ground system are unmodified from their long-established conditions and adjustments of the antenna parameters were made in accordance with the terms of the license and specifications provided for the previous licensing of the station. Information is provided herein demonstrating that the directional antenna parameters for the patterns authorized by the station license have been determined in accordance with the requirements of section 73.151(c) of the FCC Rules. The system has been adjusted to produce antenna monitor parameters within +/- 5 percent in ratio and +/- 3 degrees in phase of the modeled values, as required by the Rules.

Benjamin F. Dawson III P.E.

June 15, 2011
December 16, 2011

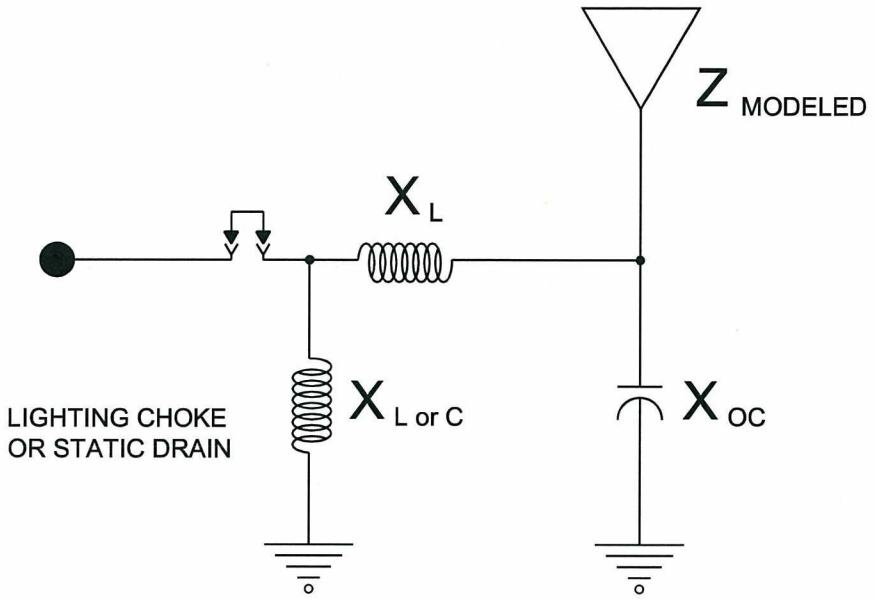
Item 1

Analysis of Tower Impedance Measurements to Verify Method of Moments Model - KMXA

Tower impedance measurements were made at the locations of the sample system current transformers using an HP-8753C network analyzer in a calibrated measurement system. The other towers were open circuited at the same point where impedance measurements were made (the "reference points") for each of the measurements.

Circuit calculations were performed to relate the method of moments modeled impedances at the tower feed points to those at the current sample device locations as shown in the table. The base conditions shown for each tower, which includes the stray capacitances, were used in the moment method model as a load at ground level for the open circuited case. Two of the towers have static drain chokes and the remainder have lighting transformers, and the manufacturer's values of impedance for each were used in the models.

In addition to the page showing the schematic of the assumed circuit and tabulation of calculated values, a page showing the result of calculations using the NETBW circuit analysis program are shown. These calculations show the impedance transformations and phase shifts between the tower base values produced by the MININEC moment method model and the location of the current sample devices used to produce the antenna monitor input signals.



TOWER	X_{LC} (Ω)	X_L (Ω)	X_{OC} (Ω)	$Z_{MODELED}$ (Ω)	$Z_{ATU\ MODELED}$ (Ω)	$Z_{ATU\ MEASURED}$ (Ω)	
NW TWR #1	+j3550	+j20.0	-j9000	89.828 +j140.830	84.7239+j157.1634	85.4 +j158.02	✓
NC TWR #2	-j22.5k	+j22.0	-j9000	82.824 +j139.180	86.6857+j163.4191	85.8 +j163.95	✓
NE TWR #3	+j3550	+j24.0	-j9000	79.411 +j126.580	75.0935+j147.0986	75.75 +j148.9	✓
SW TWR #4	+j3550	+j35.0	-j9000	82.297 +j133.150	77.1946 +j163.4102	79.2 +j156.9	✓
SC TWR #5	-j22.5k	+j30.0	-j9000	85.618 +j138.050	89.6409 +j170.2773	93.2 +j167.7	✓
SE TWR #6	+j3550	+j16.0	-j9000	87.268 +j136.440	82.6078 +j149.2864	85.7 +j155.4	✓
S TWR #7	+j3550	+j26.0	-j9000	85.670 +j132.900	80.7540 +j155.0566	78.4 +j154.9	✓

Bob Allen, H&D | 12/16/2011 12:54 PM | KMXA CIRCUIT MOM TABLE.dwg | PDF FILE: KMXA MOM TABLE.pdf

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ANALYSIS OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL

RADIO STATION KMXA AURORA, CO 12/2011

Item 2

Derivation of Operating Parameters for Directional Antenna - KMXA

The method of moments model of the array, following verification with the measured individual open circuited base impedances, was used for directional antenna calculations. Calculations were made to determine the complex voltage values for sources located at ground level at the base of each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna patterns. With these voltage sources, the tower currents and phases were calculated. Twenty segments were used for towers in the moment method model. The currents and voltages at the tower bases (segments 1, 21, 41, 61, 81, 101 and 121) were used to calculate the currents at the sample device locations by Kirchoff's law, using the analysis program NETBW.

Tower	Modeled Current Pulse	Tower Base Current Magnitude	Tower Base Current Phase	Antenna Monitor Sample Ratio	Antenna Monitor Sample Phase
1 W Day	1	11.0956	15.10	0.608	-72.1
6 SE Day	101	18.0938	86.70	1.0	0
7 S Day	121	10.8704	159.4	0.600	73.2
1 NW Night	1	0.8456	269.5	0.392	-93.8
2 NC Night	21	2.0766	42.2	0.880	39.9
3 NE Night	41	1.2598	170.1	0.561	167.1
4 SW Night	61	1.1100	234.2	0.506	-129.2
5 SC Night	81	2.3526	2.6	1.0	0
6 SE Night	101	1.2896	129.1	0.578	126.1

Item 3

Method of Moments Model Details for Towers Driven Individually - KMXA

The array of towers was modeled using MININEC One wire was used to represent each tower. The top and bottom wire end points were specified using the theoretical directional antenna specifications in electrical degrees. The towers were modeled using 20 wire segments per tower. As the towers are physically 103.6 degrees in electrical height, the segment lengths are 5.18 electrical degrees.

Each tower's modeled height relative to its physical height falls within the required range of 75 to 125 percent and each modeled radius falls within the required range of 80 percent to 150 percent of the radius of a circle having a circumference equal to the sum of the widths of the tower sides. The array consists of identical, triangular, uniform cross section towers having a face width of 18 inches.

Tower	Physical Height (degrees)	Modeled Height (degrees)	Modeled Percentage of Height	Modeled Radius (meters)	Percent of Equivalent Radius
1 NW	103.6	109.5	105.7	0.22	100.8
2 NC	103.6	110.0	10.2	0.22	100.8
3 NE	103.6	107.5	103.8	0.22	100.8
4 SW	103.6	108.7	105.0	0.22	100.8
5 SC	103.6	106.2	102.5	0.22	100.8
6 SE	103.6	108.5	104.7	0.22	100.8
7 S	103.6	108.0	104.2	0.22	100.8

The following pages show the details of the method of moments models for the individually driven towers.

MOMENT METHOD MODEL FOR TOWERS DRIVEN INDIVIDUALLY
OTHER TOWERS 'OPEN' CIRCUITED
(BASE REGION IMPEDANCE VALUES USED AS SHOWN,TOWER #1 LOAD +J5917)
DETAILED OUTPUT FOR TOWER #1
IMPEDANCE DATA FOR TOWERS # 2 THROUGH # 7

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KMXA 1090 Aurora

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.22	20
		0	0	109.5		
2	none	80.	79.	0	.22	20
		80.	79.	110.		
3	none	160.	79.	0	.22	20
		160.	79.	107.5		
4	none	228.	214.	0	.22	20
		228.	214.	108.75		
5	none	180.52	195.74	0	.22	20
		180.52	195.74	110.		
6	none	161.2	169.4	0	.22	20
		161.2	169.4	108.5		
7	none	300.	159.4	0	.22	20
		300.	159.4	108.		

Number of wires = 7
current nodes = 140

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.375	2	5.5
radius	1	.22	1	.22

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,090.	0	1	.0149306	.0152778

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	121	0	5,934.	0	0	0
2	41	0	5,928.	0	0	0

3	21	0	-6,426.	0	0	0
4	81	0	-6,426.	0	0	0
5	61	0	5,958.	0	0	0
6	101	0	5,906.	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							
1,090.	89.828	140.83	167.04	57.5	6.6178	-2.6453	-3.4088

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CURRENT rms
Frequency = 1090 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	2.35928	302.5	1.26875	-1.9891
2	0	0	5.475	2.54673	299.8	1.26481	-2.21045
3	0	0	10.95	2.65265	298.2	1.25302	-2.33805
4	0	0	16.425	2.72179	296.9	1.23347	-2.42625
5	0	0	21.9	2.75944	295.9	1.2063	-2.4818
6	0	0	27.375	2.76782	295.	1.17172	-2.50757
7	0	0	32.85	2.74815	294.3	1.12997	-2.50509
8	0	0	38.325	2.70131	293.6	1.08137	-2.47542
9	0	0	43.8	2.62814	293.	1.02628	-2.41948
10	0	0	49.275	2.52952	292.4	.965082	-2.33818
11	0	0	54.75	2.4064	291.9	.898236	-2.23247
12	0	0	60.225	2.25985	291.4	.826209	-2.1034
13	0	0	65.7	2.09102	291.	.749499	-1.95208
14	0	0	71.175	1.90113	290.6	.668628	-1.77967
15	0	0	76.65	1.69144	290.2	.584096	-1.58739
16	0	0	82.125	1.46316	289.8	.496383	-1.37639
17	0	0	87.6	1.21728	289.5	.405896	-1.14761
18	0	0	93.075	.954283	289.1	.312865	-.901539
19	0	0	98.55	.673378	288.8	.217115	-.637416
20	0	0	104.025	.370149	288.5	.117364	-.351049
END	0	0	109.5	0	0	0	0
GND	15.2647	-78.5302	0	.0232436	172.3	-.0230365	3.1E-03
22	15.2647	-78.5302	5.5	.109612	172.4	-.108637	.0145895
23	15.2647	-78.5302	11.	.164838	172.4	-.163374	.0219188
24	15.2647	-78.5302	16.5	.209486	172.4	-.207631	.0278194
25	15.2647	-78.5302	22.	.246047	172.4	-.243875	.0326187
26	15.2647	-78.5302	27.5	.275494	172.4	-.273073	.0364423
27	15.2647	-78.5302	33.	.298273	172.4	-.295667	.0393457
28	15.2647	-78.5302	38.5	.314624	172.4	-.311894	.0413589
29	15.2647	-78.5302	44.	.324704	172.5	-.32191	.0425045
30	15.2647	-78.5302	49.5	.328648	172.5	-.325848	.0428052
31	15.2647	-78.5302	55.	.326588	172.6	-.323839	.042287

32	15.2647	-78.5302	60.5	.318672	172.6	-.316026	.0409837
33	15.2647	-78.5302	66.	.305067	172.7	-.302572	.0389349
34	15.2647	-78.5302	71.5	.285958	172.7	-.283659	.0361873
35	15.2647	-78.5302	77.	.261542	172.8	-.259478	.0327918
36	15.2647	-78.5302	82.5	.232017	172.9	-.230223	.0288013
37	15.2647	-78.5302	88.	.197554	172.9	-.196058	.0242659
38	15.2647	-78.5302	93.5	.158236	173.	-.157064	.0192246
39	15.2647	-78.5302	99.	.113923	173.1	-.113098	.0136867
40	15.2647	-78.5302	104.5	.0638298	173.2	-.0633779	7.58E-03
END	15.2647	-78.5302	110.	0	0	0	0
GND	30.5294	-157.06	0	.0182875	275.	1.59E-03	-.0182184
42	30.5294	-157.06	5.375	.0436262	94.9	-3.74E-03	.0434657
43	30.5294	-157.06	10.75	.0833738	94.8	-7.04E-03	.083076
44	30.5294	-157.06	16.125	.115815	94.8	-9.61E-03	.115415
45	30.5294	-157.06	21.5	.142736	94.7	-.0116249	.142262
46	30.5294	-157.06	26.875	.164836	94.6	-.0131514	.164311
47	30.5294	-157.06	32.25	.182427	94.5	-.0142377	.18187
48	30.5294	-157.06	37.625	.195669	94.4	-.0149186	.1951
49	30.5294	-157.06	43.	.20466	94.3	-.0152246	.204093
50	30.5294	-157.06	48.375	.209472	94.2	-.0151853	.208921
51	30.5294	-157.06	53.75	.210173	94.	-.0148304	.209649
52	30.5294	-157.06	59.125	.206836	93.9	-.0141894	.206348
53	30.5294	-157.06	64.5	.199543	93.8	-.0132926	.1991
54	30.5294	-157.06	69.875	.188386	93.7	-.0121699	.187993
55	30.5294	-157.06	75.25	.173465	93.6	-.0108515	.173125
56	30.5294	-157.06	80.625	.154874	93.5	-9.37E-03	.154591
57	30.5294	-157.06	86.	.13269	93.3	-7.74E-03	.132464
58	30.5294	-157.06	91.375	.106932	93.2	-6.01E-03	.106763
59	30.5294	-157.06	96.75	.0774576	93.1	-4.18E-03	.0773448
60	30.5294	-157.06	102.125	.0436807	93.	-2.25E-03	.0436226
END	30.5294	-157.06	107.5	0	0	0	0
GND	-189.021	127.496	0	.0122948	208.8	-.0107689	-5.93E-03
62	-189.021	127.496	5.4375	.0298645	28.8	.0261758	.0143775
63	-189.021	127.496	10.875	.0570225	28.7	.0500159	.0273858
64	-189.021	127.496	16.3125	.0792399	28.6	.0695607	.0379509
65	-189.021	127.496	21.75	.0977261	28.5	.0858662	.0466626
66	-189.021	127.496	27.1875	.11295	28.4	.0993381	.0537554
67	-189.021	127.496	32.625	.125117	28.3	.11015	.0593396
68	-189.021	127.496	38.0625	.13433	28.2	.118386	.0634768
69	-189.021	127.496	43.5	.140646	28.1	.124088	.0662086
70	-189.021	127.496	48.9375	.144108	28.	.127285	.0675694
71	-189.021	127.496	54.375	.144752	27.8	.128001	.0675931
72	-189.021	127.496	59.8125	.14262	27.7	.126265	.0663146
73	-189.021	127.496	65.25	.137758	27.6	.122108	.0637728
74	-189.021	127.496	70.6875	.13022	27.4	.115569	.0600092
75	-189.021	127.496	76.125	.120061	27.3	.106687	.0550681
76	-189.021	127.496	81.5625	.107336	27.2	.0955029	.0489924
77	-189.021	127.496	87.	.0920867	27.	.0820431	.0418196
78	-189.021	127.496	92.4375	.074312	26.9	.0662973	.0335701
79	-189.021	127.496	97.875	.0539023	26.7	.0481566	.0242157
80	-189.021	127.496	103.313	.0304343	26.5	.0272304	.0135923
END	-189.021	127.496	108.75	0	0	0	0
GND	-173.751	48.9701	0	.0132692	75.3	3.36E-03	.0128375
82	-173.751	48.9701	5.5	.0625953	75.3	.0158694	.0605503
83	-173.751	48.9701	11.	.0941842	75.3	.0239574	.0910863
84	-173.751	48.9701	16.5	.119776	75.2	.0305888	.115804

85	-173.751	48.9701	22.	.140791	75.1	.0361179	.13608
86	-173.751	48.9701	27.5	.157785	75.1	.0406783	.152452
87	-173.751	48.9701	33.	.171009	75.	.0443248	.165165
88	-173.751	48.9701	38.5	.180596	74.9	.0470799	.174352
89	-173.751	48.9701	44.	.186629	74.8	.0489522	.180095
90	-173.751	48.9701	49.5	.189175	74.7	.0499438	.182463
91	-173.751	48.9701	55.	.188297	74.6	.0500545	.181522
92	-173.751	48.9701	60.5	.184064	74.5	.0492837	.177343
93	-173.751	48.9701	66.	.176552	74.3	.0476316	.170005
94	-173.751	48.9701	71.5	.165844	74.2	.0450992	.159594
95	-173.751	48.9701	77.	.15203	74.1	.0416864	.146203
96	-173.751	48.9701	82.5	.135196	73.9	.0373919	.129922
97	-173.751	48.9701	88.	.11541	73.8	.032208	.110824
98	-173.751	48.9701	93.5	.0926907	73.6	.0261112	.0889369
99	-173.751	48.9701	99.	.0669231	73.5	.0190375	.0641582
100	-173.751	48.9701	104.5	.037608	73.3	.0108093	.0360211
END	-173.751	48.9701	110.	0	0	0	0
GND	-158.449	-29.653	0	.0142275	279.5	2.35E-03	-.0140313
102	-158.449	-29.653	5.425	.034037	99.5	-5.61E-03	.0335723
103	-158.449	-29.653	10.85	.0650553	99.4	-.0106558	.0641767
104	-158.449	-29.653	16.275	.090366	99.4	-.0147094	.0891608
105	-158.449	-29.653	21.7	.11136	99.3	-.0179998	.109895
106	-158.449	-29.653	27.125	.128581	99.2	-.0206227	.126917
107	-158.449	-29.653	32.55	.142274	99.2	-.0226256	.140463
108	-158.449	-29.653	37.975	.152565	99.1	-.0240385	.150659
109	-158.449	-29.653	43.4	.159533	99.	-.0248848	.15758
110	-158.449	-29.653	48.825	.163237	98.9	-.0251869	.161282
111	-158.449	-29.653	54.25	.163734	98.8	-.0249684	.161819
112	-158.449	-29.653	59.675	.161083	98.7	-.024255	.159246
113	-158.449	-29.653	65.1	.155353	98.5	-.0230753	.15363
114	-158.449	-29.653	70.525	.146618	98.4	-.0214609	.145038
115	-158.449	-29.653	75.95	.134958	98.3	-.0194455	.133549
116	-158.449	-29.653	81.375	.120451	98.1	-.017064	.119236
117	-158.449	-29.653	86.8	.103159	98.	-.0143511	.102156
118	-158.449	-29.653	92.225	.0830995	97.8	-.0113366	.0823225
119	-158.449	-29.653	97.65	.0601665	97.7	-8.04E-03	.0596273
120	-158.449	-29.653	103.075	.0339078	97.5	-4.43E-03	.0336178
END	-158.449	-29.653	108.5	0	0	0	0
GND	-280.818	-105.553	0	9.08E-03	137.7	-6.72E-03	6.11E-03
122	-280.818	-105.553	5.4	.0218127	317.7	.0161311	-.0146828
123	-280.818	-105.553	10.8	.0417177	317.6	.0308226	-.028113
124	-280.818	-105.553	16.2	.0580235	317.6	.0428237	-.0391517
125	-280.818	-105.553	21.6	.071615	317.5	.0527918	-.0483914
126	-280.818	-105.553	27.	.0828332	317.4	.0609822	-.056058
127	-280.818	-105.553	32.4	.0918264	317.3	.0675087	-.0622468
128	-280.818	-105.553	37.8	.0986652	317.2	.0724281	-.0669999
129	-280.818	-105.553	43.2	.103387	317.1	.0757743	-.0703363
130	-280.818	-105.553	48.6	.106018	317.	.0775718	-.0722669
131	-280.818	-105.553	54.	.106581	316.9	.0778449	-.0727994
132	-280.818	-105.553	59.4	.105101	316.8	.0766193	-.0719418
133	-280.818	-105.553	64.8	.101605	316.7	.0739241	-.069705
134	-280.818	-105.553	70.2	.0961283	316.6	.0697936	-.0661022
135	-280.818	-105.553	75.6	.0887075	316.4	.0642642	-.0611485
136	-280.818	-105.553	81.	.079378	316.3	.0573723	-.0548569
137	-280.818	-105.553	86.4	.0681645	316.1	.0491469	-.0472332
138	-280.818	-105.553	91.8	.0550612	316.	.0395969	-.0382599

```
 139    -280.818   -105.553   97.2        .0399806 315.8   .028673    -.0278623
 140    -280.818   -105.553   102.6       .0226015 315.6   .0161613   -.0158
END     -280.818   -105.553   108.        0         0       0          0
```

TOWER # 2

```
C:\Expert MBPro V.14\kmxa2-2  12-15-2011   14:53:48

IMPEDANCE
   normalization = 50.
freq      resist    react     imped     phase     VSWR      S11       S12
(KHz)     (ohms)    (ohms)    (ohms)    (deg)               dB        dB
source =  1; node 21, sector 1
1,090.    82.824    139.18    161.96    59.2      6.7905    -2.577    -3.4917
```

TOWER # 3

```
C:\Expert MBPro V.14\kmxa2-3  12-15-2011   14:54:43

IMPEDANCE
   normalization = 50.
freq      resist    react     imped     phase     VSWR      S11       S12
(KHz)     (ohms)    (ohms)    (ohms)    (deg)               dB        dB
source =  1; node 41, sector 1
1,090.    79.411    126.58    149.43    57.9      6.0888    -2.8792   -3.1455
```

TOWER # 4

```
C:\Expert MBPro V.14\kmxa2-4  12-15-2011   14:57:14

IMPEDANCE
   normalization = 50.
freq      resist    react     imped     phase     VSWR      S11       S12
(KHz)     (ohms)    (ohms)    (ohms)    (deg)               dB        dB
source =  1; node 61, sector 1
1,090.    82.297    133.15    156.53    58.3      6.4061    -2.7341   -3.3052
```

TOWER # 5

```
C:\Expert MBPro V.14\kmxa2-5  12-15-2011   14:58:10

IMPEDANCE
   normalization = 50.
freq      resist    react     imped     phase     VSWR      S11       S12
(KHz)     (ohms)    (ohms)    (ohms)    (deg)               dB        dB
source =  1; node 81, sector 1
1,090.    85.618    138.05    162.44    58.2      6.5963    -2.654    -3.3985
```

TOWER # 6

```
C:\Expert MBPro V.14\kmxa2-6  12-15-2011   14:58:40

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR     S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)             dB       dB
source =  1; node 101, sector 1
1,090.   87.268   136.44   161.96   57.4     6.4292   -2.7241  -3.3167
```

TOWER # 7

```
C:\Expert MBPro V.14\kmxa2-7  12-15-2011   14:59:14

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR     S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)             dB       dB
source =  1; node 121, sector 1
1,090.   85.67    132.9    158.12   57.2     6.2607   -2.7987  -3.2327
```

NETBW CALCULATION OF IMPEDANCE AT ATU OUTPUT (SAMPLE DEVICE LOCATION) AS MODIFIED BY BASE CAPACITANCE, FEED PIPE/SERIES CIRCUIT INDUCTANCE, AND STRAYS FOR ONE TOWER WITH THE OTHER TOWERS OPEN CIRCUITED. OPEN CIRCUITED TOWERS LOADED WITH BASE CAPACITANCE IN PARALLEL WITH STATIC DRAIN OR LIGHTING CHOKE AND LEAD INDUCTANCE.

TOWER #1 NW

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	89.828	140.830	84.7239	157.1634	+0.8495

TOWER # 2 NC

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	82.824	139.180	86.6857	163.4191	-0.7547

TOWER # 3 NE

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	79.411	126.580	75.0935	147.0986	+0.7514

TOWER # 4 SW

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	82.297	133.150	77.1946	163.4102	+0.7740

TOWER # 5 SC

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	85.618	138.050	89.6409	170.2773	-0.7801

TOWER # 6 SE

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	87.268	136.440	82.6078	149.2864	+0.8274

TOWER # 7 S

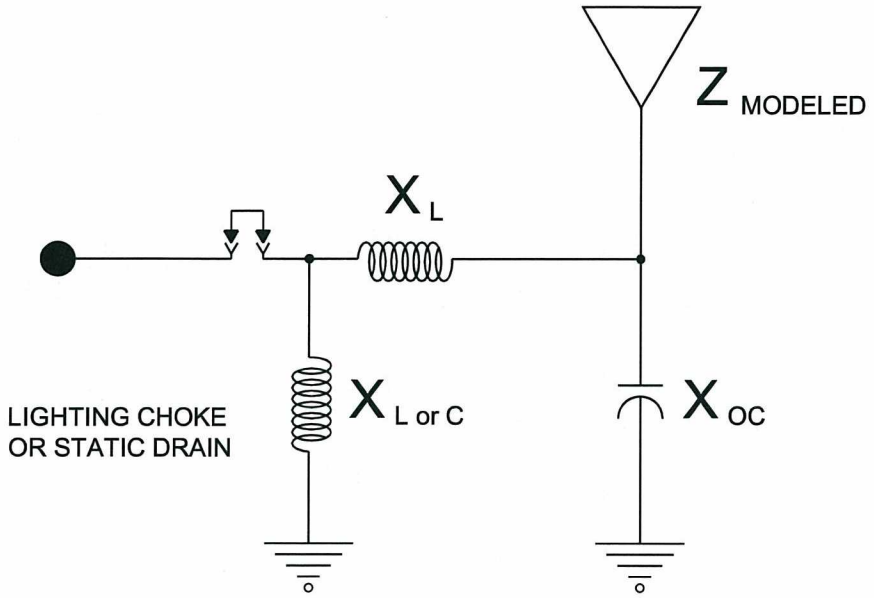
FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	85.670	132.900	80.7540	155.0566	+0.8091

Item 4

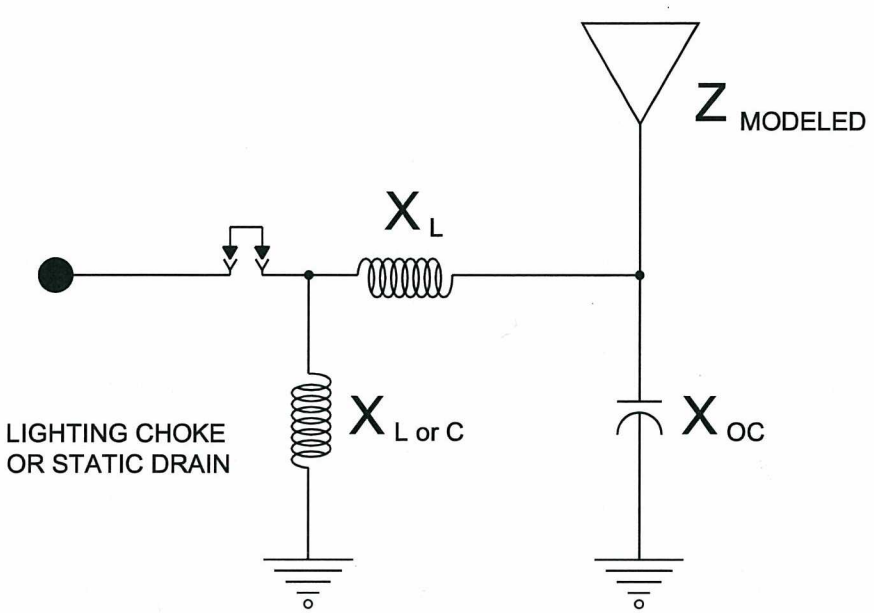
Method of Moments Model Details for Directional Antenna- KMXA

The array of towers was modeled using MININEC with the individual tower characteristics that were verified by the individual tower impedance measurements. Calculations were made to determine the complex voltage values for sources located at ground level under each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna pattern. The following pages contain details of the method of moments model of the directional antenna patterns.

Tower	Wire	Base Node
1	1	1
2	2	21
3	3	41
4	4	61
5	5	81
6	6	101
7	7	121



TOWER	X_{LC} (Ω)	X_L (Ω)	X_{OC} (Ω)	INPUT Z	LOAD Z	CURRENT PHASE DELTA
TWR #1	+j3550	+j20.0	-j9000	135.1038 +j90.0368	139.890 +j68.533	+1.34
TWR #6	+j3550	+j16.0	-j9000	83.5106 +j141.8026	87.991 +j128.520	+0.834
TWR #7	+j3550	+j26.0	-j9000	31.9828 +j127.2592	33.608 +j104.570	+0.318



TOWER	X_{LC} (Ω)	X_L (Ω)	X_{OC} (Ω)	INPUT Z	LOAD Z	CURRENT PHASE DELTA
TWR #1	+j3550	`+j20.0	-j9000	43.3030 +j344.4488	49.084 +j347.120	+0.4489
TWR #2	-j22.5k	+j22.0	-j9000	59.0970 +j192.7245	55.970 +j166.470	-0.5122
TWR #3	+j3550	+j24.0	-j9000	17.7002 +j117.6826	18.530 +j96.611	+0.1762
TWR #4	+j3550	+j35.0	-j9000	57.0381 +j242.1757	62.525 +j218.790	+0.5799
TWR #5	-j22.5k	+j30.0	-j9000	28.7612 +j180.4850	27.390 +j146.740	-0.2499
TWR #6	+j3550	+j16.0	-j9000	-19.7060 +j139.8172	-20.753 +j127.640	-0.1971*

* NEGATIVE RESISTANCE TOWER

Bob Allen, H&D 1/5/2012 10:44 AM KMXA CIRCUIT MOM TABLE REV.dwg PDF FILE: KMXA NITE XFORM.pdf

HATFIELD & DAWSON
CONSULTING ENGINEERS

NIGHTTIME BASE TRANSFORMATIONS

RADIO STATION KMXA AURORA, CO 12/2011

DAY PATTERN MININEC OUTPUT

C:\Expert MBPro V.14\kmxa2Nrun2 12-16-2011 09:27:00

KMXA 1090 Aurora

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.22	20
		0	0	109.5		
2	none	80.	79.	0	.22	20
		80.	79.	110.		
3	none	160.	79.	0	.22	20
		160.	79.	107.5		
4	none	228.	214.	0	.22	20
		228.	214.	108.75		
5	none	180.	195.74	0	.22	20
		180.	195.74	110.		
6	none	161.2	169.4	0	.22	20
		161.2	169.4	108.5		
7	none	300.	159.4	0	.22	20
		300.	159.4	108.		

Number of wires = 7
current nodes = 140

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.375	2	5.5
radius	1	.22	1	.22

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,090.	0	1	.0149306	.0152778

Sources

source	node	sector	magnitude	phase	type
1	1	1	2,442.45	41.2	voltage
2	101	1	3,982.43	142.3	voltage
3	121	1	1,687.27	231.6	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	21	0	448.	0	0	0
2	41	0	450.	0	0	0
3	61	0	449.	0	0	0
4	81	0	456.	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							
1,090.	139.89	68.533	155.77	26.1	3.5446	-5.0376	-1.6336
source = 2; node 101, sector 1							
1,090.	87.991	128.52	155.75	55.6	5.9131	-2.9663	-3.0547
source = 3; node 121, sector 1							
1,090.	33.608	104.57	109.84	72.2	8.5503	-2.0411	-4.2599

Parallel combination of all sources.

1.09E+06	28.308	39.0284	48.2137	54.	3.0844	-5.8429	-1.3103

C:\Expert MBPro V.14\kmxa2Nrun2 12-16-2011 09:27:00

CURRENT rms
Frequency = 1090 KHz
Input power = 50,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	11.0956	15.1	10.7125	2.89031
2	0	0	5.475	11.5348	10.6	11.3362	2.13088
3	0	0	10.95	11.7704	7.9	11.6579	1.62305
4	0	0	16.425	11.8943	5.7	11.8348	1.1881
5	0	0	21.9	11.9144	3.9	11.8872	.80473
6	0	0	27.375	11.8332	2.3	11.8241	.464919
7	0	0	32.85	11.6522	.8	11.651	.16541
8	0	0	38.325	11.3727	359.5	11.3723	-.0951602
9	0	0	43.8	10.9967	358.3	10.9921	-.317307
10	0	0	49.275	10.5267	357.3	10.5147	-.501197
11	0	0	54.75	9.96594	356.3	9.94492	-.646887
12	0	0	60.225	9.31811	355.4	9.28752	-.754451
13	0	0	65.7	8.58759	354.5	8.54796	-.82407
14	0	0	71.175	7.77907	353.7	7.73183	-.85602
15	0	0	76.65	6.89736	352.9	6.8447	-.850691
16	0	0	82.125	5.94724	352.2	5.89202	-.808558
17	0	0	87.6	4.93267	351.5	4.87835	-.730016
18	0	0	93.075	3.85562	350.8	3.80622	-.615172
19	0	0	98.55	2.71291	350.2	2.67308	-.463161
20	0	0	104.025	1.48705	349.5	1.4623	-.270206
END	0	0	109.5	0	0	0	0
GND	15.2647	-78.5302	0	2.63518	53.4	1.57031	2.11621
22	15.2647	-78.5302	5.5	1.94381	53.4	1.15802	1.56121
23	15.2647	-78.5302	11.	1.48121	53.5	.881474	1.19037
24	15.2647	-78.5302	16.5	1.08501	53.6	.643947	.873251
25	15.2647	-78.5302	22.	.735834	53.9	.43396	.594248
26	15.2647	-78.5302	27.5	.426438	54.6	.247248	.347444
27	15.2647	-78.5302	33.	.154094	57.8	.0821388	.130377

28	15.2647	-78.5302	38.5	.0849195	223.1	-.0619928	-.0580364
29	15.2647	-78.5302	44.	.286335	229.7	-.185316	-.218279
30	15.2647	-78.5302	49.5	.453585	230.6	-.287802	-.350583
31	15.2647	-78.5302	55.	.586137	230.9	-.369367	-.45511
32	15.2647	-78.5302	60.5	.684036	231.1	-.429933	-.532037
33	15.2647	-78.5302	66.	.747445	231.1	-.469472	-.58161
34	15.2647	-78.5302	71.5	.77664	231.1	-.488017	-.60416
35	15.2647	-78.5302	77.	.771995	231.	-.485651	-.600099
36	15.2647	-78.5302	82.5	.733933	230.9	-.462477	-.569888
37	15.2647	-78.5302	88.	.662822	230.8	-.418547	-.513957
38	15.2647	-78.5302	93.5	.558733	230.7	-.353701	-.432525
39	15.2647	-78.5302	99.	.420833	230.6	-.267176	-.325143
40	15.2647	-78.5302	104.5	.24562	230.4	-.156459	-.189341
END	15.2647	-78.5302	110.	0	0	0	0
GND	30.5294	-157.06	0	2.10177	3.7	2.09745	.134707
42	30.5294	-157.06	5.375	1.55559	3.7	1.55235	.100369
43	30.5294	-157.06	10.75	1.19081	3.8	1.18819	.0789636
44	30.5294	-157.06	16.125	.877921	4.1	.875721	.0621131
45	30.5294	-157.06	21.5	.601602	4.6	.599627	.048705
46	30.5294	-157.06	26.875	.356177	6.2	.354123	.0381944
47	30.5294	-157.06	32.25	.140185	12.4	.136889	.0302173
48	30.5294	-157.06	37.625	.0583707	155.2	-.0529962	.024465
49	30.5294	-157.06	43.	.216808	174.5	-.215823	.02064
50	30.5294	-157.06	48.375	.352082	177.	-.351599	.0184394
51	30.5294	-157.06	53.75	.460558	177.8	-.460224	.0175492
52	30.5294	-157.06	59.125	.541876	178.1	-.541589	.0176427
53	30.5294	-157.06	64.5	.595907	178.2	-.595623	.0183809
54	30.5294	-157.06	69.875	.622622	178.2	-.622319	.0194134
55	30.5294	-157.06	75.25	.622056	178.1	-.621722	.0203788
56	30.5294	-157.06	80.625	.594268	178.	-.5939	.0209041
57	30.5294	-157.06	86.	.539251	177.8	-.538857	.0205994
58	30.5294	-157.06	91.375	.45674	177.6	-.456343	.0190473
59	30.5294	-157.06	96.75	.3457	177.4	-.34534	.0157695
60	30.5294	-157.06	102.125	.202857	177.1	-.202604	.0101341
END	30.5294	-157.06	107.5	0	0	0	0
GND	-189.021	127.496	0	1.41287	55.5	.800859	1.16397
62	-189.021	127.496	5.4375	1.04391	55.5	.591312	.860294
63	-189.021	127.496	10.875	.797219	55.6	.450253	.657899
64	-189.021	127.496	16.3125	.585736	55.9	.328387	.485024
65	-189.021	127.496	21.75	.399146	56.6	.219934	.333087
66	-189.021	127.496	27.1875	.233674	58.3	.1228	.198807
67	-189.021	127.496	32.625	.0885483	65.8	.0362335	.0807957
68	-189.021	127.496	38.0625	.045417	208.4	-.039965	-.0215756
69	-189.021	127.496	43.5	.151584	225.8	-.105745	-.108609
70	-189.021	127.496	48.9375	.241807	228.3	-.16094	-.180468
71	-189.021	127.496	54.375	.313796	229.1	-.205349	-.237276
72	-189.021	127.496	59.8125	.367344	229.5	-.238765	-.279165
73	-189.021	127.496	65.25	.402422	229.6	-.261002	-.306303
74	-189.021	127.496	70.6875	.419088	229.5	-.271909	-.318904
75	-189.021	127.496	76.125	.417453	229.5	-.271359	-.317224
76	-189.021	127.496	81.5625	.397661	229.3	-.259242	-.301543
77	-189.021	127.496	87.	.359825	229.1	-.235423	-.272121
78	-189.021	127.496	92.4375	.303895	228.9	-.199656	-.229106
79	-189.021	127.496	97.875	.229331	228.7	-.151362	-.172285
80	-189.021	127.496	103.313	.134132	228.4	-.0889775	-.100371
END	-189.021	127.496	108.75	0	0	0	0

GND	-173.251	48.8291	0	1.86067	133.	-1.26818	1.36155
82	-173.251	48.8291	5.5	1.36407	133.	-.929622	.998236
83	-173.251	48.8291	11.	1.03242	132.9	-.703313	.75581
84	-173.251	48.8291	16.5	.749049	132.9	-.509711	.54888
85	-173.251	48.8291	22.	.500006	132.7	-.3393	.367263
86	-173.251	48.8291	27.5	.280039	132.3	-.188478	.207118
87	-173.251	48.8291	33.	.0870617	129.8	-.0557606	.0668618
88	-173.251	48.8291	38.5	.0804795	317.7	.0594901	-.0542022
89	-173.251	48.8291	44.	.221992	315.2	.157535	-.156406
90	-173.251	48.8291	49.5	.338301	314.8	.238474	-.239953
91	-173.251	48.8291	55.	.42949	314.7	.302349	-.305036
92	-173.251	48.8291	60.5	.495759	314.8	.349204	-.3519
93	-173.251	48.8291	66.	.537394	314.9	.379114	-.380874
94	-173.251	48.8291	71.5	.554774	315.	.392197	-.392373
95	-173.251	48.8291	77.	.548368	315.1	.388616	-.386892
96	-173.251	48.8291	82.5	.518688	315.3	.368557	-.364969
97	-173.251	48.8291	88.	.466212	315.4	.332183	-.327121
98	-173.251	48.8291	93.5	.391223	315.6	.279524	-.273719
99	-173.251	48.8291	99.	.293378	315.8	.210182	-.204681
100	-173.251	48.8291	104.5	.170491	315.9	.122459	-.118621
END	-173.251	48.8291	110.	0	0	0	0
GND	-158.449	-29.653	0	18.0938	86.7	1.04217	18.0638
102	-158.449	-29.653	5.425	19.3943	84.	2.02805	19.2879
103	-158.449	-29.653	10.85	20.1172	82.4	2.65223	19.9416
104	-158.449	-29.653	16.275	20.5749	81.2	3.15142	20.3321
105	-158.449	-29.653	21.7	20.8043	80.2	3.55424	20.4984
106	-158.449	-29.653	27.125	20.8209	79.3	3.87201	20.4577
107	-158.449	-29.653	32.55	20.6334	78.5	4.10995	20.2199
108	-158.449	-29.653	37.975	20.2482	77.8	4.27091	19.7927
109	-158.449	-29.653	43.4	19.6714	77.2	4.3568	19.1829
110	-158.449	-29.653	48.825	18.9095	76.6	4.3692	18.3978
111	-158.449	-29.653	54.25	17.9695	76.1	4.30966	17.4451
112	-158.449	-29.653	59.675	16.859	75.6	4.17988	16.3327
113	-158.449	-29.653	65.1	15.5866	75.2	3.98174	15.0694
114	-158.449	-29.653	70.525	14.1611	74.8	3.7173	13.6645
115	-158.449	-29.653	75.95	12.5915	74.4	3.38875	12.127
116	-158.449	-29.653	81.375	10.8867	74.	2.9982	10.4657
117	-158.449	-29.653	86.8	9.05349	73.7	2.5474	8.68772
118	-158.449	-29.653	92.225	7.09536	73.3	2.03701	6.79666
119	-158.449	-29.653	97.65	5.00584	73.	1.46475	4.78675
120	-158.449	-29.653	103.075	2.75178	72.7	.820093	2.62674
END	-158.449	-29.653	108.5	0	0	0	0
GND	-280.818	-105.553	0	10.8704	159.4	-10.1765	3.82162
122	-280.818	-105.553	5.4	11.4894	158.4	-10.6807	4.23441
123	-280.818	-105.553	10.8	11.8091	157.8	-10.9298	4.47134
124	-280.818	-105.553	16.2	11.9853	157.3	-11.053	4.63443
125	-280.818	-105.553	21.6	12.0378	156.8	-11.0669	4.73631
126	-280.818	-105.553	27.	11.9754	156.5	-10.979	4.78234
127	-280.818	-105.553	32.4	11.8033	156.1	-10.7941	4.77538
128	-280.818	-105.553	37.8	11.5256	155.8	-10.5159	4.7174
129	-280.818	-105.553	43.2	11.1463	155.6	-10.1482	4.61008
130	-280.818	-105.553	48.6	10.6693	155.3	-9.6947	4.45506
131	-280.818	-105.553	54.	10.0991	155.1	-9.15943	4.25406
132	-280.818	-105.553	59.4	9.4402	154.9	-8.54668	4.00894
133	-280.818	-105.553	64.8	8.6976	154.7	-7.86111	3.7217
134	-280.818	-105.553	70.2	7.8765	154.5	-7.10754	3.39444

18.157∠85.9°

11.14

135	-280.818	-105.553	75.6	6.98202	154.3	-6.29064	3.02928
136	-280.818	-105.553	81.	6.01911	154.1	-5.41498	2.62825
137	-280.818	-105.553	86.4	4.99175	153.9	-4.48423	2.19299
138	-280.818	-105.553	91.8	3.90182	153.8	-3.50017	1.72424
139	-280.818	-105.553	97.2	2.74587	153.6	-2.45981	1.22031
140	-280.818	-105.553	102.6	1.50587	153.5	-1.34713	.672968
END	-280.818	-105.553	108.	0	0	0	0

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CURRENT MOMENTS(amp-degrees) rms

Frequency = 1090 KHz
Input power = 50,000. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	1,002.67	0.0	1,002.67	0.0
2	2.27637	122.2	2.27637	122.2
3	3.992	76.8	3.992	76.8
4	2.88061	134.	2.88061	134.
5	1.36652	17.3	1.36652	17.3
6	1,768.19	78.1	1,768.19	78.1
7	1,004.03	155.9	1,004.03	155.9

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

tower	magnitude	phase (deg)
1	1,002.67	0.0
2	2.27637	122.2
3	3.992	76.8
4	2.88061	134.
5	1.36652	17.3
6	1,768.19	78.1
7	1,004.03	155.9

NIGHT PATTERN MININEC OUTPUT

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KMXA 1090 Aurora

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.22	20
		0	0	109.5		
2	none	80.	79.	0	.22	20
		80.	79.	110.		
3	none	160.	79.	0	.22	20
		160.	79.	107.5		
4	none	228.	214.	0	.22	20
		228.	214.	108.75		
5	none	180.	195.74	0	.22	20
		180.	195.74	110.		
6	none	161.2	169.4	0	.22	20
		161.2	169.4	108.5		
7	none	300.	159.4	0	.22	20
		300.	159.4	108.		

Number of wires = 7
current nodes = 140

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.375	2	5.5
radius	1	.22	1	.22

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1,090.	0	1	.0149306	.0152778

Sources

source	node	sector	magnitude	phase	type
1	1	1	419.193	351.5	voltage
2	21	1	515.71	113.6	voltage
3	41	1	175.242	249.2	voltage
4	61	1	357.169	308.3	voltage
5	81	1	496.562	82.	voltage
6	101	1	235.815	228.3	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	121	0	420.57	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							
1,090.	49.084	347.12	350.57	82.	51.077	-.34015	-11.23
source = 2; node 21, sector 1							
1,090.	55.97	166.47	175.63	71.4	11.831	-1.4718	-5.4145
source = 3; node 41, sector 1							
1,090.	18.53	96.611	98.372	79.1	13.066	-1.3321	-5.7815
source = 4; node 61, sector 1							
1,090.	62.525	218.79	227.55	74.1	17.304	-1.005	-6.8489
source = 5; node 81, sector 1							
1,090.	27.39	146.74	149.27	79.4	18.04	-.96394	-7.0104
source = 6; node 101, sector 1							
1,090.	-20.753	127.64	129.32	99.2	****	****	****

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CURRENT rms
Frequency = 1090 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	.845641	269.5	-6.66E-03	-.845615
2	0	0	5.475	1.01275	268.2	-.0319617	-1.01225
3	0	0	10.95	1.11406	267.5	-.0481984	-1.11301
4	0	0	16.425	1.18988	267.	-.0613953	-1.1883
5	0	0	21.9	1.24515	266.7	-.0722694	-1.24306
6	0	0	27.375	1.28189	266.4	-.0810926	-1.27932
7	0	0	32.85	1.30109	266.1	-.0879774	-1.29811
8	0	0	38.325	1.30338	265.9	-.0929781	-1.30006
9	0	0	43.8	1.28927	265.7	-.0961252	-1.28569
10	0	0	49.275	1.25924	265.6	-.0974434	-1.25547
11	0	0	54.75	1.21379	265.4	-.0969611	-1.20992
12	0	0	60.225	1.15348	265.3	-.0947136	-1.14958
13	0	0	65.7	1.07889	265.2	-.0907461	-1.07506
14	0	0	71.175	.990679	265.1	-.0851146	-.987015
15	0	0	76.65	.889505	265.	-.0778791	-.886089
16	0	0	82.125	.776018	264.9	-.0691035	-.772935
17	0	0	87.6	.650757	264.8	-.0588455	-.648091
18	0	0	93.075	.513995	264.7	-.0471367	-.51183
19	0	0	98.55	.365283	264.7	-.0339395	-.363703
20	0	0	104.025	.20218	264.6	-.0190206	-.201284
END	0	0	109.5	0	0	0	0
GND	15.2647	-78.5302	0	2.07661	42.2	1.53878	1.39445

22	15.2647	-78.5302	5.5	2.27131	40.5	1.72749	1.47466
23	15.2647	-78.5302	11.	2.38213	39.5	1.83745	1.51601
24	15.2647	-78.5302	16.5	2.45643	38.8	1.9148	1.5387
25	15.2647	-78.5302	22.	2.50002	38.2	1.96523	1.5453
26	15.2647	-78.5302	27.5	2.51536	37.7	1.99117	1.53698
27	15.2647	-78.5302	33.	2.50381	37.2	1.99388	1.51443
28	15.2647	-78.5302	38.5	2.46631	36.8	1.97423	1.47822
29	15.2647	-78.5302	44.	2.40374	36.5	1.93297	1.42885
30	15.2647	-78.5302	49.5	2.31698	36.2	1.87084	1.36687
31	15.2647	-78.5302	55.	2.20696	35.9	1.78861	1.29289
32	15.2647	-78.5302	60.5	2.07474	35.6	1.68714	1.20752
33	15.2647	-78.5302	66.	1.92143	35.3	1.56733	1.11147
34	15.2647	-78.5302	71.5	1.74822	35.1	1.43015	1.00545
35	15.2647	-78.5302	77.	1.55632	34.9	1.2766	.890184
36	15.2647	-78.5302	82.5	1.34691	34.7	1.10762	.766379
37	15.2647	-78.5302	88.	1.12097	34.5	.924031	.634613
38	15.2647	-78.5302	93.5	.879015	34.3	.726245	.495213
39	15.2647	-78.5302	99.	.620359	34.1	.51367	.347835
40	15.2647	-78.5302	104.5	.341009	33.9	.28297	.190303
END	15.2647	-78.5302	110.	0	0	0	0
GND	30.5294	-157.06	0	1.25984	170.1	-1.24092	.217523
42	30.5294	-157.06	5.375	1.32548	169.5	-1.3032	.241993
43	30.5294	-157.06	10.75	1.35841	169.1	-1.33404	.256141
44	30.5294	-157.06	16.125	1.37537	168.8	-1.3494	.266013
45	30.5294	-157.06	21.5	1.3785	168.6	-1.35132	.272358
46	30.5294	-157.06	26.875	1.36876	168.4	-1.34075	.275488
47	30.5294	-157.06	32.25	1.34675	168.2	-1.31825	.275569
48	30.5294	-157.06	37.625	1.31293	168.	-1.2843	.272711
49	30.5294	-157.06	43.	1.26777	167.8	-1.23934	.267004
50	30.5294	-157.06	48.375	1.21173	167.7	-1.18383	.258533
51	30.5294	-157.06	53.75	1.14532	167.5	-1.11828	.247383
52	30.5294	-157.06	59.125	1.06908	167.4	-1.04323	.233647
53	30.5294	-157.06	64.5	.983602	167.2	-.959271	.21742
54	30.5294	-157.06	69.875	.889495	167.1	-.866994	.198802
55	30.5294	-157.06	75.25	.787374	166.9	-.767016	.177891
56	30.5294	-157.06	80.625	.677825	166.8	-.659916	.154779
57	30.5294	-157.06	86.	.561333	166.7	-.546182	.129534
58	30.5294	-157.06	91.375	.43814	166.5	-.426062	.102166
59	30.5294	-157.06	96.75	.307897	166.4	-.299228	.0725467
60	30.5294	-157.06	102.125	.168619	166.2	-.163769	.0401501
END	30.5294	-157.06	107.5	0	0	0	0
GND	-189.021	127.496	0	1.11006	234.2	-.648575	-.900884
62	-189.021	127.496	5.4375	1.24683	232.4	-.760481	-.988055
63	-189.021	127.496	10.875	1.3269	231.4	-.827433	-1.03731
64	-189.021	127.496	16.3125	1.38348	230.7	-.876704	-1.07024
65	-189.021	127.496	21.75	1.42063	230.1	-.911655	-1.08953
66	-189.021	127.496	27.1875	1.44003	229.6	-.933663	-1.09634
67	-189.021	127.496	32.625	1.44258	229.2	-.94343	-1.09132
68	-189.021	127.496	38.0625	1.4289	228.8	-.941421	-1.07494
69	-189.021	127.496	43.5	1.39951	228.5	-.927999	-1.04759
70	-189.021	127.496	48.9375	1.35494	228.2	-.903536	-1.00969
71	-189.021	127.496	54.375	1.29573	227.9	-.868402	-.961662
72	-189.021	127.496	59.8125	1.22252	227.7	-.823013	-.903989
73	-189.021	127.496	65.25	1.13594	227.5	-.767829	-.837143
74	-189.021	127.496	70.6875	1.03673	227.3	-.703335	-.761662
75	-189.021	127.496	76.125	.925589	227.1	-.630031	-.678068

76	-189.021	127.496	81.5625	.803216	226.9	-.548406	-.586861
77	-189.021	127.496	87.	.670198	226.8	-.458877	-.488464
78	-189.021	127.496	92.4375	.526839	226.6	-.361665	-.383089
79	-189.021	127.496	97.875	.372718	226.5	-.256493	-.270426
80	-189.021	127.496	103.313	.205408	226.4	-.141687	-.148719
END	-189.021	127.496	108.75	0	0	0	0
GND	-173.251	48.8291	0	2.35259	2.6	2.35022	.105624
82	-173.251	48.8291	5.5	2.54542	1.7	2.54426	.0770219
83	-173.251	48.8291	11.	2.65238	1.3	2.65175	.0579313
84	-173.251	48.8291	16.5	2.72103	.9	2.72071	.0416284
85	-173.251	48.8291	22.	2.75732	.6	2.75719	.0273095
86	-173.251	48.8291	27.5	2.76384	.3	2.7638	.0146702
87	-173.251	48.8291	33.	2.74202	.1	2.74202	3.58E-03
88	-173.251	48.8291	38.5	2.69293	359.9	2.69293	-6.E-03
89	-173.251	48.8291	44.	2.61755	359.7	2.61751	-.0141175
90	-173.251	48.8291	49.5	2.51685	359.5	2.51677	-.0207702
91	-173.251	48.8291	55.	2.3919	359.4	2.39176	-.0259702
92	-173.251	48.8291	60.5	2.24385	359.2	2.24366	-.0297281
93	-173.251	48.8291	66.	2.07395	359.1	2.0737	-.0320581
94	-173.251	48.8291	71.5	1.88349	359.	1.8832	-.0329798
95	-173.251	48.8291	77.	1.6738	358.9	1.67349	-.0325175
96	-173.251	48.8291	82.5	1.44617	358.8	1.44585	-.0306987
97	-173.251	48.8291	88.	1.20167	358.7	1.20135	-.0275494
98	-173.251	48.8291	93.5	.940849	358.6	.940566	-.0230854
99	-173.251	48.8291	99.	.663015	358.5	.66279	-.0172877
100	-173.251	48.8291	104.5	.363925	358.4	.363786	-.0100313
END	-173.251	48.8291	110.	0	0	0	0
GND	-158.449	-29.653	0	1.28962	129.1	-.812723	1.00129
102	-158.449	-29.653	5.425	1.3802	129.7	-.881655	1.0619
103	-158.449	-29.653	10.85	1.42897	130.1	-.919873	1.09352
104	-158.449	-29.653	16.275	1.45857	130.4	-.944519	1.11145
105	-158.449	-29.653	21.7	1.47187	130.6	-.957758	1.11764
106	-158.449	-29.653	27.125	1.47011	130.8	-.960502	1.11296
107	-158.449	-29.653	32.55	1.45401	131.	-.953281	1.09791
108	-158.449	-29.653	37.975	1.42411	131.1	-.936485	1.07289
109	-158.449	-29.653	43.4	1.38092	131.2	-.910452	1.03827
110	-158.449	-29.653	48.825	1.32495	131.4	-.875537	.994448
111	-158.449	-29.653	54.25	1.25675	131.5	-.832122	.941803
112	-158.449	-29.653	59.675	1.17693	131.5	-.780615	.880792
113	-158.449	-29.653	65.1	1.08611	131.6	-.721464	.811867
114	-158.449	-29.653	70.525	.984986	131.7	-.655143	.735516
115	-158.449	-29.653	75.95	.874231	131.7	-.582127	.652234
116	-158.449	-29.653	81.375	.754491	131.8	-.502875	.562472
117	-158.449	-29.653	86.8	.62631	131.8	-.417777	.466611
118	-158.449	-29.653	92.225	.489958	131.9	-.327047	.364828
119	-158.449	-29.653	97.65	.345043	131.9	-.230446	.256806
120	-158.449	-29.653	103.075	.189327	131.9	-.126506	.140857
END	-158.449	-29.653	108.5	0	0	0	0
GND	-280.818	-105.553	0	.0240436	298.5	.0114881	-.0211216
122	-280.818	-105.553	5.4	.0181711	298.6	8.7E-03	-.0159555
123	-280.818	-105.553	10.8	.0142094	298.8	6.84E-03	-.0124537
124	-280.818	-105.553	16.2	.0107745	299.3	5.26E-03	-9.4E-03
125	-280.818	-105.553	21.6	7.71E-03	300.3	3.88E-03	-6.66E-03
126	-280.818	-105.553	27.	4.95E-03	302.6	2.67E-03	-4.17E-03
127	-280.818	-105.553	32.4	2.5E-03	309.9	1.6E-03	-1.92E-03
128	-280.818	-105.553	37.8	6.89E-04	7.3	6.84E-04	8.71E-05

129	-280.818	-105.553	43.2	1.85E-03	93.	-9.68E-05	1.85E-03
130	-280.818	-105.553	48.6	3.44E-03	102.4	-7.41E-04	3.36E-03
131	-280.818	-105.553	54.	4.78E-03	105.2	-1.25E-03	4.61E-03
132	-280.818	-105.553	59.4	5.83E-03	106.3	-1.64E-03	5.59E-03
133	-280.818	-105.553	64.8	6.57E-03	106.7	-1.89E-03	6.29E-03
134	-280.818	-105.553	70.2	7.E-03	106.9	-2.03E-03	6.7E-03
135	-280.818	-105.553	75.6	7.1E-03	106.8	-2.05E-03	6.8E-03
136	-280.818	-105.553	81.	6.88E-03	106.6	-1.97E-03	6.6E-03
137	-280.818	-105.553	86.4	6.33E-03	106.3	-1.78E-03	6.07E-03
138	-280.818	-105.553	91.8	5.42E-03	106.	-1.49E-03	5.21E-03
139	-280.818	-105.553	97.2	4.15E-03	105.6	-1.11E-03	3.99E-03
140	-280.818	-105.553	102.6	2.46E-03	105.2	-6.43E-04	2.37E-03
END	-280.818	-105.553	108.	0	0	0	0

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CURRENT MOMENTS(amp-degrees) rms

Frequency = 1090 KHz
Input power = 500. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	113.88	266.	113.88	266.
2	217.792	37.	217.792	37.
3	113.839	168.	113.839	168.
4	124.452	229.	124.452	229.
5	238.076	360.	238.076	360.
6	124.389	131.	124.389	131.
7	.109446	355.2	.109446	355.2

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

tower	magnitude	phase (deg)
1	113.88	266.
2	217.792	37.
3	113.839	168.
4	124.452	229.
5	238.076	360.
6	124.389	131.
7	.109446	355.2

NETBW CALCULATION OF IMPEDANCE AT ATU OUTPUT (SAMPLE DEVICE LOCTION) AS MODIFIED BY BASE CAPACITANCE, FEED PIPE/SERIES CIRCUIT IMPEDANCE, LIGHTING CHOKE/STATIC DRAIN, AND STRAYS

DAY PATTERN

TOWER # 1 NW

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	139.890	68.533	135.1038	90.0368	+1.3388

TOWER # 6 SE

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	87.991	128.520	83.5106	141.8026	+0.8354

TOWER # 7 S

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	33.608	104.570	31.9828	127.2592	+0.3189

NETBW CALCULATION OF IMPEDANCE AT ATU OUTPUT (SAMPLE DEVICE LOCTION) AS MODIFIED BY BASE CAPACITANCE, FEED PIPE/SERIES CIRCUIT IMPEDANCE, LIGHTING CHOKE/STATIC DRAIN, AND STRAYS

NIGHT PATTERN

TOWER # 1 NW

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	49.084	347.120	43.3030	344.4488	+0.4489

TOWER # 2 NC

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	55.970	166.470	59.0970	192.7245	-0.5122

TOWER # 3 NE

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	18.530	96.110	17.7002	117.6826	+0.1762

TOWER # 4 SW

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	62.525	218.790	57.0381	242.1757	+0.5799

TOWER # 5 SC

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	27.390	146.740	28.7612	180.4850	-0.2499

TOWER # 6 SE

FREQUENCY (KHZ)	LOAD RESISTANCE	LOAD REACTANCE	INPUT RESISTANCE	INPUT REACTANCE	PHASE SHIFT
1090.0	-20.753	127.640	-19.7060	139.8172	-0.1971

Item 5

Certified Array Geometry – KMXA

Per the provisions of the Commission's Public Notice DA 09-2340, October 29, 2009, paragraph 5, licensed stations applying to be re-licensed under the MM Docket 93-177 Rules are exempt from the requirement to submit an as-built surveyor's certification when there is no change in the theoretical patterns, as is the case in this application.

Item 6

Sampling System Measurements – KMXA

The KMXA sample system has a single solid outer conductor foam insulated coaxial cable to each tower. At each tower the coaxial cable is directly connected to the current transformer. Impedance measurements were made of the antenna monitor sampling system using a HP 8753C network analyzer calibrated measurement system.

The measurements were made looking into the antenna monitor ends of the sampling lines for two conditions: with the far end open circuited for length and impedance determination, and with the current sampling device connected as in normal operation.

The following table shows the frequency closest to the carrier frequency where resonance (zero reactance corresponding with low resistance) was found. As frequencies of resonance occur at odd multiples of 90 degrees electrical length, the sampling line length of the resonant frequency below carrier frequency, which is the closest one to the carrier frequency, was found to be 270 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by ratioing the carrier frequency to the resonant frequency.

Tower	Sampling Line Open-Circuited Resonance (kHz)	Sampling Line Electrical Length at 1090 kHz (Degrees)	1140 kHz Measured Impedance with Sample Device Connected
Tower 1 (NW)	970.20	303.3395	49.6 -J0.1
Tower 2 (NC)	970.25	303.3239	49.8 J0.6
Tower 3 (NE)	969.96	303.4146	50.3 -J1.6
Tower 4 (SW)	970.03	303.3927	50.2 -J1.6
Tower 5 (SC)	969.60	303.5272	49.2 +J0.5
Tower 6 (SE)	969.10	303.6838	50.3 -J1.76
Tower 7 (S)	968.75	303.7935	50.9 -J1.8

The sampling line lengths meet the requirement that they be equal in length within 1 electrical degree.

In order to determine the characteristic impedance values of the sampling lines, open-circuited measurements were made with frequencies offset to produce +/- 45 degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where R_1 +j X_1 and R_2 +j X_2 are the measured impedances of the +45 and -45 degree offset frequencies, respectively:

$$Zo = ((R1^2 + X1^2)^{1/2} \times (R2^2 + X2^2)^{1/2})^{1/2}$$

Line #	high R	high X	Low R	low X	Z high	Z low	Z average
1	7.86	49.95	5.58	-49.99	50.56	50.30	50.43
2	7.83	49.94	5.51	-49.85	50.55	50.15	50.35
3	7.78	49.91	5.55	-50.12	50.51	50.43	50.47
4	7.81	49.88	5.52	-49.97	50.49	50.27	50.38
5	7.82	49.91	5.58	-49.96	50.52	50.27	50.39
6	7.83	50	5.54	-50.03	50.61	50.34	50.47
7	7.78	50.02	5.57	-50.32	50.62	50.63	50.62

The sampling line measured characteristic impedances meet the requirement that they be equal within 2 Ohms.

The current sample devices were calibrated by measuring their outputs with the HP 8753 network analyzer. The seven sample devices were placed side by side monitoring the output of an amplifier used with the network analyzer terminated in a load. Their outputs were connected to the inputs of the network analyzer with equal short lengths of coaxial cable.

Tower #	Serial Number	Current	Phase
1	1452	1.0003	reference
2	1456	0.9654	-0.12
3	15010	0.9946	-0.03
4	1455	0.9770	-0.03
5	1919	0.9965	-0.27
6	1451	0.9808	-0.11
7	15695	0.9977	-0.15

All transformers are Delta Electronics model TCT-1.

Maximum indicated current error 1.0003 to 0.9654 = 0.0349 or 3.48% with a manufacturer's tolerance of 4% (+/- 2%).

Maximum indicated phase error 1.00 to -0.27 = 0.27 degree with a manufacturer's tolerance of 4 degrees (+/-2°).

The station's antenna monitor, a Potomac Instruments AM-19, was calibrated by reference to the network analyzer.

Item 7

Reference Field Strength Measurements - KMXA

Reference field strength measurements were made along radials at the azimuths with radiation values specified on the construction permit and additionally on the major lobe radials for both the daytime and nighttime directional patterns. Measurements were made with a Potomac Instruments model FIM-41, serial number 1541. This meter was most recently calibrated on 10/29/09.

The measured field strengths, point descriptions, and measured coordinates (WGS-84) are shown on the following page.

REFERENCE POINT FIELD MEASUREMENTS

RADIAL	POINT #	LAT	LON	DESCRIPTION	FIELD mV/m
DAY					
135.5	1	39 39 57	104 37 25.5	150' E of culvert, N. side of Quincy	39.5
	2	39 38 13.8	104 37 19	100' S of powerlines on private rd.	35.7
	3	39 33 52.7	104 31 35	road 50 aprox 1 km W of pavement end	9.4
223.5	1	39 36 48.1	104 43 23	E. Dorado & S. Versailles	84
	2	39 36 56	104 43 08.4	St. in Front of 5433 Winnepeg St.	85
	3	39 36 26.4	104 43 48.5	Quemoy Ave. and Lake St.	79
281	1	39 40 30.8	104.42 56	Gun Club Rd. S of Jewell -nr end guardrail	590
	2	39 40 49.4	104 45 22.9	S. Genoa at fire hydrant	326
	3	39 40 56.8	104 45 54.4	circle at end of Cathay Court	312
NIGHT					
13	1	39 40 55.2	104 39 10.3	E side of Jewell near landmarks	22.5
	2	39 44 18.9	104 38 7.6	N side of Colfax W of underpass pipeline	
				marker 0523	3.5
	3	39 45 15.5	104 37 51.8	S side E 26th powerpole w/survey marker	2
45	1	39 40 54.9	104 38 11.7	S side Jewell 500' past pavement	25.5
	2	39 45 11.8	104 32 44.5	E colfax 50' W of Cavenaugh N side of Rd.	5.6
	3	39 44 11.4	104 33 50.5	Quail Run Rd. @ end of pavement	6.7
85	1	39 40 25.6	104 32 4.7	2256 S. Flint Ridge Court Rd.	7.8
	2	39 40 10.9	104 36 10.8	S Watkins Rd (Rd. 97) 100 M S. of Yale	16.7
	3	39 40 02.6	104 38 05.2	on Yale 0.33 km W of #29801	33.2
115	*	39 38 47	104 36 11.7	opp 33001 sign gravel drive W side of Rd 9	9.1
121	*	39 38 26.8	104 36 12	at sign 400' W intersec Quincy on Rd 97	7.3
125	*	39 38 18.2	104 36 22	N side Quincy at phone box & culvert	6.9
130	*	39 38 18.5	104 36 55.6	N side Quincy at sign opp box on HT line	6
288	1	39 40 49.6	104 42 55.6	Gun Club & Murphy Ck sign, end of rt lane	164
	2	39 40 55.7	104.43 20.9	Jewell at Denver Airport sign	153
	3	39 41 30.2	104 45 42.5	Ensenada and Arkansas Sts.	100
342	1	39 43 32.1	104.40 57.1	intersec 6th Parkway & Newcastle	1.89
	2	39 43 18.7	104 40 51.9	at fire hydrant on 3rd E of Newcastle	2.13
	3	39 40 55.3	104 39 52.2	27676 Jewell 50' E of main driveway	12.1
NOTES				NAD-83 coordinates	
				Radials marked * are in close proximity and	
				access restricted to Rd 97 and Quincy	
				so one meas each per FCC staff	
				Meter FIM-41 sn 500 cal 12 July 02 and	
				checked with more recently cal units	

Item 8

Direct Measurement of Power - KMXA

Common point impedance measurements were made with an AIM-120 network analyzer. The measurements were made at the phasor cabinet input adjacent to the common point current meter used to determine operating power. The impedance measured at this point was adjusted to a value of 50 ohms +/- j0 for both the day and night common point networks.

The licensed nominal daytime power is 50 kW, and the authorized daytime input power is 46.818 kW. Although the Commission engineering database does not show the authorized daytime power, this value is shown on the most recent complete license document, BL-850710AD, which is included as an appendix to this application.

FCC Form 352
June 1974

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

File No.: BL-850710AD
FAC ID: 10057
Call Sign: ~~KYBG~~ KmXA

AM BROADCAST STATION LICENSE

Subject to the provisions of the Communications Act of 1934, as amended, subsequent Acts, Treaties, and Commission Rules made thereunder, and further subject to conditions set forth in this license,[1] the LICENSEE

CENTURY DENVER BROADCASTING CORPORATION

is hereby authorized to use and operate the radio transmitting apparatus hereinafter described for the purpose of broadcasting for the term ending 3 a.m. Local Time April 1, 1990 in accordance with the following:

1. Station location: Aurora, Colorado

2. Main Studio location: (Listed only if not at transmitter site or not within boundaries of principal community)

3. Remote control location: 1790 Grant Street
Denver, CO

4. Transmitter location: 9 miles at 107.3° T from center of Aurora, Aurora, CO

North latitude: 39 ° 39' 53"
West longitude: 104 ° 39' 24"

5. Transmitter(s): Type Accepted. (See Sections 73.1660, 73.1665 and 73.1670 of the Commission's Rules.)

6. Antenna and ground system: Attached

7. Obstruction marking and lighting specifications — FCC Form 715, paragraphs: 1, 3, 11 & 21.

8. Frequency (kHz.): 1090

9. Nominal power (kW): 50.0 Day
0.50 Night

Antenna input power (kW):

46.818 Day

☐ Non-directional antenna: current _____ amperes; resistance _____ ohms.
☒ Directional antenna : current 30.6 amperes; resistance 50 ohms.

0.54 Night

☐ Non-directional antenna: current _____ amperes; resistance _____ ohms.
☒ Directional antenna : current 3.29 amperes; resistance 50 ohms.

10. Hours of operation: Specified in construction permit (BP -840420AB
11. Conditions: - - -

12-06-91 - Superseded to correct theoretical and operating parameters, and monitoring point bearing.

The Commission reserves the right during said license period of terminating this license or making effective any change, or modification of this license which may be necessary to comply with any decision of the Commission rendered as a result of any hearing held under the rules of the Commission prior to the commencement of this license period or any decision rendered as a result of any such hearing which has been designated but not held, prior to the commencement of this license period.

This license is issued on the licensee's representation that the statements contained in licensee's application are true and that the undertakings therein contained so far as they are consistent herewith, will be carried out in good faith. The licensee shall, during the term of this license, render such broadcasting service as will serve public interest, convenience, or necessity to the full extent of the privileges herein conferred.

This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequency designated in the license beyond the term hereof, nor in any other manner than authorized herein. Neither the license nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. This license is subject to the right of use or control by the Government of the United States conferred by Section 606 of the Communications Act of 1934, as amended.

[1] This license consists of this page and pages 2, 3 & 4

Dated: SEP 25 1986 ajs

FEDERAL COMMUNICATIONS COMMISSION

SEP 25 1986

FCC Form 353-A
June 1980

File NO.: BL850710AD Call Sign: KYBG Date:

1. **DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM** DA- 2

No. and Type of Elements: Seven uniform cross-section, guyed steel radiators. RMS theo. 220.56 mv/m/km night, 2082.46 mv/m/km day: Standard augmented RMS: 231.86 mV/m/km night, 2187.92 mV/m/km day. #5 tower supports on STL dish sidemounted thereon.

Height above Insulators: 260; (103.6°)

Overall Height: 265'

Spacing and Orientation: From Tower #1 Tower #2 is spaced 200.8' (80°) and #3 from #2 200.8' (80°), both on a bearing of 79° T from Tower #1. Tower #6 is 404.2' (161.2°) from #1 at a bearing of 169.4° T. Tower #5 is 200.8' (80°) from #6 at a bearing of 259° T and #4 is 200.8' (80°) from #5 at a bearing of 259° T. Tower #7 is spaced 752.6' (300°) from #1 on a bearing of 159.4° true.

Nondirectional Antenna None authorized

Ground System consists of 120-226' copper radials plus 120-75 radials interspersed about base of each tower. Radials are shortened and bonded to copper strap midway between elements. In addition 120-50' are interspersed with long radials.

2. **THEORETICAL SPECIFICATIONS**

	Tower	#1	#2	#3	#4	#5	#6	#7
Phasing:	Night	-94°	37°	168°	-131°	0°	131°	-
	Day	0°	--	--	--	--	78°	156°
Field Ratio:	Night	0.915	1.750	0.915	1.000	1.913	1.000	--
	Day	1.00	--	--	--	--	1.76	1.00

3. **OPERATING SPECIFICATIONS**

Phase Indication*:	Night	-139°	0°	134.5°	-155.8°	-31.2°	89.5°	-
	Day	-74°	--	--	--	--	0°	68.8°
Antenna Base Current Ratio:	Night	0.496	1.00	0.615	0.521	0.876	0.474	--
	Day	0.669	--	--	--	--	1.00	0.591
Antenna Monitor Sample Current Ratio:	Night	0.490	1.00	0.612	0.52	0.872	0.472	--
	Day	0.679	-	-	-	--	1.00	0.60

* **As indicated by** Potomac Instruments AM-19(204) Seriial #1842.

ANTENNA SAMPLING SYSTEM APPROVED UNDER SECTION 73.68(b) OF THE RULES.

DESCRIPTION OF AND FIELD STRENGTH OF MONITORING POINTS:

Direction of 135.5 degree true North. From the KKBB transmitter site driveway, proceed 2.85 miles right (east) to the intersection of Arapahoe County roads 22 and 85. Turn right (south) onto Arapahoe County road 85 and proceed 2.0 miles south to Arapahoe County road 30. Turn right (west) and proceed 1.1 miles to the monitor point. The point is on the north side of the road approximatley 150 feet east of the bridge. The monitor point is 2.49 miles from the antenna system. The field intensity measured at this point should not exceed 33.7 mV/m, Daytime.

Direction of 223.5 degree true North. From the KKBB transmitter site driveway, proceed 2.85 miles right (east) to the intersection of Arapahoe County roads 22 and 85. Turn right (south) onto Arapahoe County road 85 and proceed 2.0 miles south to Arapahoe Conuty road 30. Turn right (west) and proceed 4.7 miles to the monitor point. The point is on the north edge of the road one half way between the road and the fence approximately 250 feet east of the turn off. The monitor point is 2.52 miles from the antenna system. The field intensity measured at this point should not exceed 187 mV/m, Daytime.

Direction of 13 degree true North. Leaving Monitor Point #8, proceed east along the road parallel to and south of the railroad tracks for approximately 0.78 miles. Turn right (south) and proceed approximately 0.28 miles, passing over I-70. Turn left (east) on the access road south of I-70 and proceed approximately 0.95 miles. Turn left (north) onto the overpass over I-70. Proceed 0.14 miles to the access road north of I-70. Turn right (east) onto the access road. Proceed approximately 1.4 miles to the underpass under I-70. Turn right (southeast) and proceed 0.05 miles under the highway to the road south of I-70. Turn right (southwest) and proceed 0.08 miles to Monitor Point #1. The Monitor Point is located on the north side of the road. The field intensity measured at this point should not exceed 1.84 mV/m, Nighttime.

Direction of 45 degree true North. Leaveing Monitor Point #1, proceed northeast on the road of I-70 for approximately 0.08 miles to the underpass I-70. Turn left (northwest) under the highway 0.05 miles to the access road north of I-70. Turn right (northeast) onto the access road. Proceed approximately 1.67 miles to Watkins Road. Turn right (south) onto Watkins Road. Proceed approximately 1.25 miles to a side road on the left. Turn left (east) onto the side road (6th Ave). Proceed approximately 1.05 miles. Turn right (south). Proceed 0.17 miles to Monitor Point #2. The monitor Point is located on the west side of the road. The field intensity measured at this point should not exceed 1.2 mV/m, Nighttime.

Direction of 85 degree true North. Leaving Monitor Point #2, proceed north approximately 0.17 miles. Turn left (west). Proceed 1.05 miles to Watkins Road. Turn left (south). Proceed approximately 3.0 miles along Watkins

Road to Jewell Ave. on the right (west). Continue southbound on Watkins Road 0.92 miles past the side road to Monitor Point #3. The Monitor Point is located on the east side of the road. The field intensity measured at this point should not exceed 1.87 mV/m, Nighttime.

Direction of 115 degree true North. Leaving Monitor Point #5, proceed southbound 0.12 miles on Watkins Road to the intersection with Airline Road. Turn left (east). Proceed approximately 1.0 miles to a side road on the left (north). Continue eastbound 0.10 miles past the side road to Monitor Point #4. The monitor Point is located on the south side of the road. The field intensity measured at this point should not exceed 2.7 mV/m, Nighttime.

Direction of 121 degree true North. Leaving Monitor Point #3, proceed south on Watkins Road approximately 2.07 miles to an intersection. Turn around and proceed north bound on Watkins Road 0.12 miles from the intersection to Monitor Point #5. The Monitor Point is located on the west side of the road. The field intensity measured at this point should not exceed 6.36 mV/m, Nighttime.

Direction of 125 degree true North. Leaving Monitor Point #4, proceed west bound approximately 1.10 miles to Watkins Road. Continue westbound 0.24 miles past the Watkins Road intersection to Monitor Point #6. The Monitor Point is located on the north side of the road. The field intensity measured at this point should not exceed 7.8 mV/m, Nighttime.

Direction of 130 degree true North. Leaving Monitor Point #6, proceed west bound 0.42 miles to Monitor Point #7. The Monitor Point is on the south side of the road. The field intensity measured at this point should not exceed 3.96 mV/m, Nighttime.

Direction of 342.0 degree true North. Leaving the transmitter site, turn left (west) and proceed along the curving road approximately 1.27 miles to "T" intersection. Turn left (west) and proceed approximately 0.47 miles to a 90 degree curve. Follow the curve to the right (north) and proceed approximately 4.0 miles to the underpass under Interstate Highway I-70. Proceed approximately 0.33 miles past I-70. Turn left (west) on the road parallel to and south of the railroad tracks. Proceed 0.68 miles to Monitor Point #8. The Monitor Point is located on the north side of the road. The field intensity measured at this point should not exceed 2.76 mV/m, Nighttime.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

ENTRAVISION HOLDINGS, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☐ Station License ☒ Direct Measurement of Power

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
KMXA	NOT APPLICABLE	1090 KHZ	UNLIMITED	0.5	50.0

2. Station location

State	City or Town
COLORADO	AURORA

3. Transmitter location

State	County	City or Town	Street address (or other identification)
CO	ARAPAHOE	NR. AURORA	9 MILES E. OF AURORA

4. Main studio location

State	County	City or Town	Street address (or other identification)
CO	DENVER	DENVER	STE 500, 777 GRANT ST.

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

State	County	City or Town	Street address (or other identification)
CO	DENVER	DENVER	STE 500, 777 GRANT ST.

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. ENG. RPT.

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 A	30.60 A

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50.0	50.0	0.0	0.0

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
System consists of					does	not
seven tower						
see attached					apply	
substitute page						

Manufacturer and type of antenna monitor:

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.
uniform cross section guyed towers	79.15	80.0	81.0	Exhibit No. dna

Excitation [x] 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	West Longitude
39 ° 39 ' 53 "	104 ° 39 ' 24 "

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. dna

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

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
Tower Registration Numbers 1024258 through 1024264

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

Rebuild of antenna feed system

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)
Benj. F. Dawson III, P.E.	
Address (include ZIP Code) Hatfield & Dawson Consulting Engineers 9500 Greenwood Avenue North Seattle, WA 98103 USA	Date June 15, 2011
	Telephone No. (Include Area Code) 206 783 9151

[ ] Technical Director
[x] Registered Professional Engineer
[ ] Chief Operator
[ ] Technical Consultant
[x] Other (specify) Consulting Engineer

FCC Form 302-AM Paragraph 8
Antenna Indications for Directional Operation

Towers	Antenna Monitor Phase Reading in Deg.	Antenna Monitor Phase Reading in Deg.	Antenna Monitor Sample Current Ratio	Antenna Monitor Sample Current Ratio
	Night	Day	Night	Day
1	-93.8	-72.1	0.392	0.608
2	39.9	--	0.880	--
3	167.1	--	0.561	--
4	-129.2	--	0.506	--
5	0	--	1.0	--
6	126.1	0	0.578	1.0
7	---	73.2	--	0.600