TECHNICAL EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT
CAPSTAR TX LIMITED PARTNERSHIP
RADIO STATION KFI
LOS ANGELES, CALIFORNIA

January 12, 2007

640 KHZ 50 KW U ND

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Technical Narrative

The technical exhibit of which this narrative is part has been prepared on behalf of Capstar TX Limited Partnership, licensee of AM broadcast station KFI, Los Angeles, California. KFI is licensed as a Class A station for operation on 640 kilohertz with unlimited power of 50 kilowatts utilizing a non-directional antenna. By means of this application, the licensee proposes to construct a new tower that is shorter than the presently licensed one, which is no longer standing, and add top-loading to maintain the existing licensed radiation efficiency. The new tower will replace the one that was felled by an aircraft collision in December of 2004 at the same transmitter site.

The proposal is classified as a minor change according to 47 CFR 73.3571(a)(2). As a Class A station operating on one of the channels listed in 73.25(c), the proposal satisfies 47 CFR 73.21(a)(2) which permits operation with a nominal power of not less than 0.25 kilowatt nor more than 50 kilowatts at any time. The Federal Aviation Administration has been notified of the proposal as new tower construction is proposed.

Proposed Transmitter Location

The location of the proposed KFI facility will remain unchanged at NAD27 coordinates:

33-52-47 North
118-00-47 West

Proposed Antenna

A single tower will be employed for unlimited time non-directional operation. As indicated on Figure 1, the radiating element for the tower will be 205.7 meters (675 feet) in height and will have an overall height of 208.5 meters (684 feet) above ground level. The radiating element will have a capacitive "hat" at its top to produce 23.3 degrees of top-loading, as is also shown on Figure 1. The capacitive "hat" will consist of a horizontal hexagonal-shaped structure constructed of six structural steel members extending from the tower to its vertices and six structural steel members connecting the vertices around its perimeter, with five lengths of ¼-inch EHS galvanized steel cable extending equally-spaced from the tower to the perimeter structural steel members between each pair of structural steel members that extend from the tower to the vertices – for a total of 30 cables.

Proposed Ground System

No changes will be made to the ground system. Its details will remain as licensed.

Section 73.24(g)

The provisions of 47 CFR 73.24(g) require that the population within the 1,000 mV/m contour not exceed 1 percent of the population within the 25 mV/m groundwave contour. At the proposed location, the proposed 1,000 mV/m contour encompasses 44,412 persons or 0.38 percent of the 11,796,436 persons in the 25 mV/m contour. Therefore, the requirements of Section 73.24(g) have been met.

Coverage Contours

The KFI field strength contours, which will remain unchanged, are depicted on Figure 2. These contours were calculated using ground conductivity values from the M-3 map of the FCC Rules. As indicated on Figure 2, the proposed 5 mV/m contour will completely encompass the city limits of Los Angeles. The Los Angeles city limits depicted were obtained from a map contained in the TIGER 2000 U.S. census files.

Daytime Allocation Study

The proposed radiation efficiency for the top-loaded tower equals the licensed value of 374.9 mV/m @ 1 kilometer for 1 kilowatt. Therefore, a daytime allocation study is not required.

Nighttime Allocation Study

The proposed KFI facility will continue to afford nighttime protection to all stations and international allotments operating on 630 kHz, 640 kHz, and 650 kHz. Figure 3 contains pertinent calculation data which demonstrate that this proposal comports with all nighttime interference protection requirements.

Waiver of Section 73.182(q)

As is the case with many fulltime stations that have occupied their channels for many years, the licensed KFI nighttime facility produces skywave interference limits that enter into the 50-percent exclusion RSS values of other domestic stations. Because KFI is a Class A (formerly Class I-A) station, this is the case for a number of Class B (formerly Class II) stations that accepted interference from KFI at the time they began operation. Radiation from the presently licensed antenna – which used a 750 foot tower for many years before it was felled by an airplane collision in December of 2004 - enters the 50% RSS of stations KTIB in Thibodaux, Louisiana, WOI in Ames, Iowa, WWLS in Moore, Oklahoma, KGVW in Belgrade, Montana, KHOW in Denver, Colorado, KPLY in Reno, Nevada, KSTE in Rancho Cordova, California, and WCRV in Collierville, Tennessee.

Footnote 1 of Section 73.182(q) of the FCC's Rules requires that stations making facility changes reduce the radiation toward the other stations whose 50-percent exclusion RSS values they enter by either 10-percent or to a value that eliminates their limit when 50-percent exclusion is applied, if higher. The purpose is to provide some degree of "interference reduction" whenever such a station chooses to make a change in its facilities. There is justification for this requirement be waived in this instance, as the need for tower replacement is due to factors beyond the KFI licensee's control and they would not have otherwise chosen to make the changes – as there is no accompanying improvement in coverage.

The 750-foot KFI tower would be 60 years old this year if it had not fallen after a small airplane collided with it near its top during December of 2004. While replacement of the former tower with one of identical characteristics was desired by the licensee of KFI, it was found to be necessary to reduce the height of the replacement tower to 675 feet in order to gain approval for its construction. A top-loaded 675-foot tower, with an amount of top loading that protects all other stations

from increased skywave signal levels, is proposed for use by KFI. As studies concluded that the common form of guy wire top loading would result in inferior local skywave-to-groundwave self-interference (or fading) because the tower is approximately one-half wavelength in height, the top loading will be accomplished with a fifty-foot wide horizontal hexagon-shaped "capacitance hat" constructed of structural steel members and wires. Mechanical loading considerations require that a significantly larger cross-section tower be employed to support the "capacitance hat" and the cost of the 675-foot top-loaded tower will be greater than would be the case if the 750-foot tower could be replaced. The licensee would not have chosen this course of action, it was imposed on them by regulatory authorities.

It would be necessary for KFI to suffer a significant reduction in coverage in order to effectuate a 10-percent reduction in signal toward the other stations that receive 50-percent exclusion RSS contributions from the licensed KFI tower, as a power reduction would be required. KFI operates with a nondirectional antenna and the type of design change to reduce interference that is sometimes possible with directional antennas is not an option in this case.

Given the foregoing, a waiver of the "10-percent reduction" requirement of Section 73.182(q) of the Rules is respectfully requested. Such a waiver would be consistent with others that have been granted by the FCC under circumstances where stations had to make changes due to circumstances beyond their licensees' control.

Current Distribution of Proposed Tower

Normally, FCC construction permits that authorize new top-loaded towers have a standard condition requiring that current-distribution measurements be made and submitted prior to licensing. As is explained extensively in the Appendix to this exhibit, modern antenna modeling techniques were used to design the capacitive

"hat" to be used for top loading the proposed KFI tower. Thus, current distribution measurements should not be required. It is requested that the construction permit for the proposed KFI tower not require them.

Environmental Considerations

The proposed KFI operation was evaluated in terms of both the electric and magnetic field components which will be present at the base of each tower. Using Figures 1 through 4 of Supplement A to OET Bulletin 65, the worst case interpolated distance at which the electric and magnetic fields would fall below ANSI guidelines is 4 meters. Accordingly, the areas surrounding the base of each tower will be appropriately restricted with a fence having a minimum radius of 4 meters (13 feet) unless data obtained after construction has been completed indicates otherwise. The fence will assure that persons on the property outside the fenced area will not be exposed to radiofrequency field levels in excess of those recommended by the ANSI. In addition, warning signs will be posted.

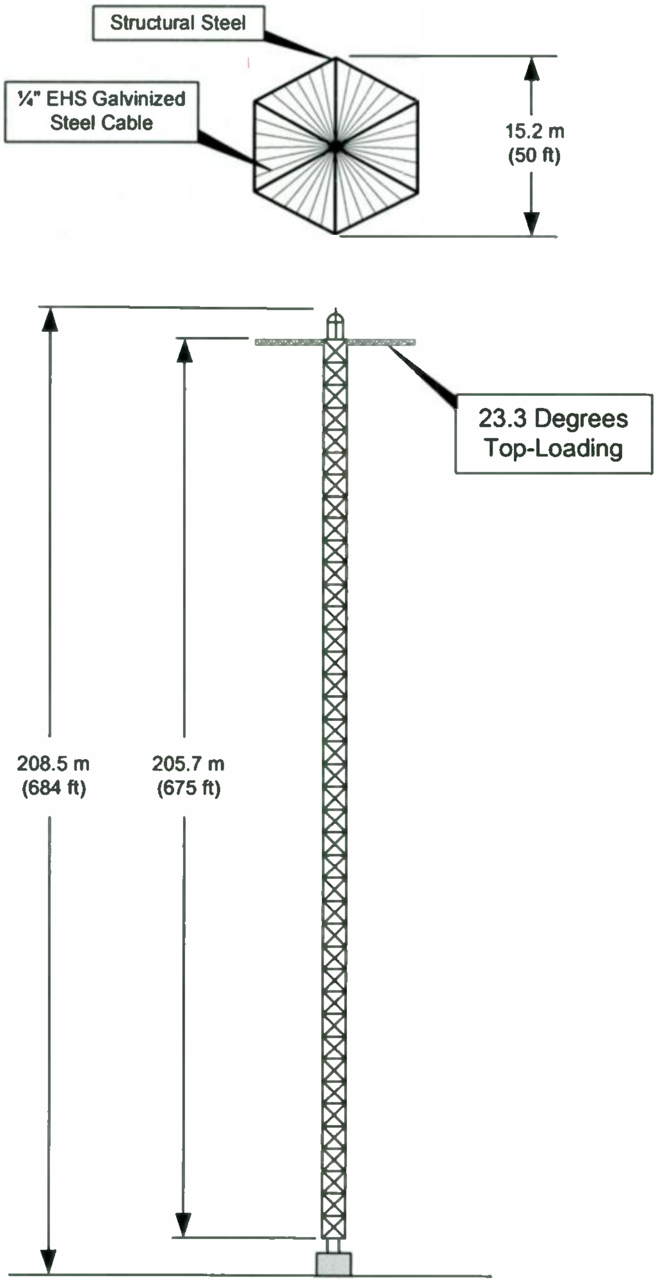
This statement addresses only human exposure to radiofrequency radiation and not to other non-radiofrequency radiation matters listed in the National Environmental Policy Act of 1969.

Ronald D. Rackley
du Treil, Lundin & Rackley, Inc.
201 Fletcher Avenue
Sarasota, Florida 34237
(941) 329-6000

January 12, 2007

Figure 1

JANUARY 2007



ASR: 1011538

Site Coordinates(NAD 27)
33° 52' 47" N
118° 00' 47" W

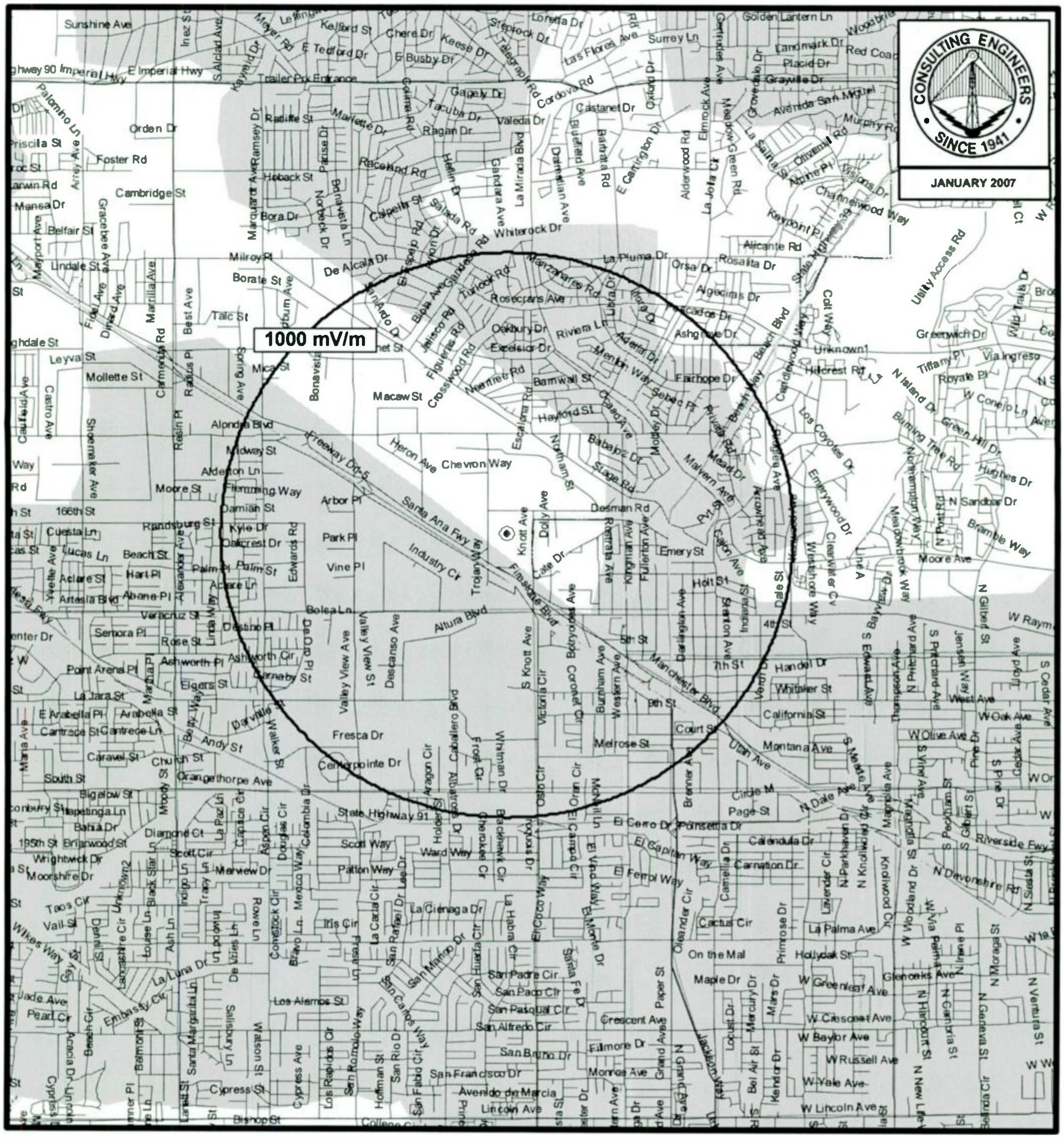
Not To Scale

SKETCH OF ANTENNA ELEMENT

RADIO STATION KFI
LOS ANGELES, CALIFORNIA
640 KHZ 50 KW U ND

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

Figure 2
Sheet 1 of 2



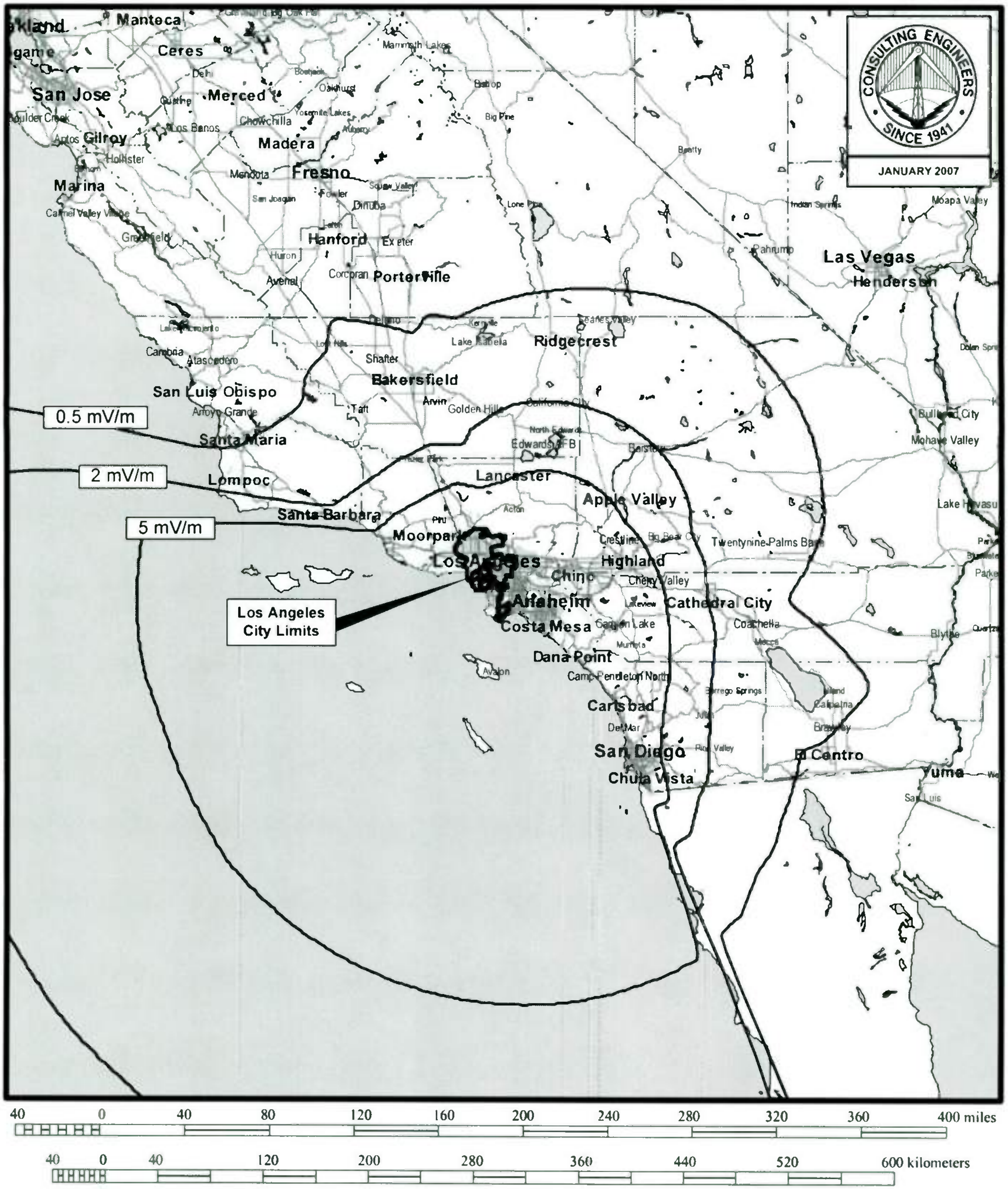
1 0 1 2.0 3 4.0 miles

1 0 1 2.0 3 4.0 5.0 kilometers

PROPOSED FIELD STRENGTH CONTOUR

RADIO STATION KFI
LOS ANGELES, CALIFORNIA
640 KHZ 50 KW U ND

du Treil, Lundin & Rackley, Inc. Sarasota, Florida



PROPOSED FIELD STRENGTH CONTOURS

RADIO STATION KFI
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Nighttime Allocation Study

Night Allocation Protection Report

Call: KFI
Freq: 640 kHz
LOS ANGELES, CA, US
Lat: 33-52-47 N
Lng: 118-00-47 W
Power: 50.0 kW
Theo RMS: 374.91 mV/m @ 1km

#	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	-999.0	0	1	158.1	23.3	0.0	0.0

Call Letters	Ct	St	City	SWFF (100uV/m)	Req Prot (mV/m)	Permis (mV/m)	Cur Rad (mV/m)	Margin (mV/m)
KTIB	US	LA	THIBODAUX	9.00	4.77*	2651.5	2651.0	0.5
50% = 8.71, 25% = 10.263; WWLS=5.24 HCXY1-A=5.06 **KFI=4.77** WSM=3.50 WVLG=3.02 WGST=2.84								
WOI	US	IA	AMES	9.21	4.88*	2651.5	2651.0	0.5
50% = 7.683, 25% = 8.843; WWLS=5.93 **KFI=4.88** WCRV=2.68 WSM=2.60 HCXY1-A=2.29								
WWLS	US	OK	MOORE	15.62	8.28*	2651.5	2651.0	0.5
50% = 8.284, 25% = 9.228; **KFI=8.28** HCXY1-A=3.21 WSM=2.50								
DKGVW	US	MT	BELGRADE	22.66	11.98*	2642.9	2642.2	0.7
50% = 11.979, 25% = 11.979; **KFI=11.98**								
KHOW	US	CO	DENVER	27.41	1.45*	2637.2	2636.4	0.8
50% = 2.245, 25% = 3.078; **KFI=1.45** KPLY=1.32 KJSL=1.10 CFCO/A=0.93 KTKK=0.92 KMKI=0.92 CKOV/A=0.83 KFXD=0.78 WDGY=0.77								
KPLY	US	NV	RENO	85.31	4.23*	2479.2	2475.2	4.0
50% = 4.23, 25% = 4.95; **KFI=4.23** CKOV/A=1.71 XEFB/A=1.36 KSLR=1.35								
KSTE	US	CA	RANCHO CORDOVA	98.53	4.79*	2430.6	2425.6	5.0
50% = 5.547, 25% = 6.559; **KFI=4.79** WSM=2.80 KTNN=2.51 KMTI=1.79 CISL/A=1.66								
WCRV	US	TN	COLLIERVILLE	8.37	4.44*	2651.0	2651.0	0.0
50% = 8.839, 25% = 12.18; WSM=7.64 **KFI=4.44** WOI=4.13 WGST=3.96 HCXY1-A=3.72 WWLS=3.56 KJSL=3.31								
NEW	US	WI	RHINELANDER	5.55	2.95	2651.5	2651.0	0.5
50% = 7.66, 25% = 9.664; WOI=7.66 WMFN=3.47 KFI=2.95 CFOB/A=2.84 WWLS=2.43								
NEW	US	WI	RHINELANDER	5.57	2.95	2651.5	2651.0	0.5
50% = 7.699, 25% = 9.689; WOI=7.70 WMFN=3.45 KFI=2.95 CFOB/A=2.84 WWLS=2.44								
XETAM/O	MX	TA	CD.VICTORIA	7.04	3.73	2651.5	2651.0	0.5
50% = 5.91, 25% = 6.512; KFI=3.73 XEWM/A=3.61 KTIB=2.82 WWLS=2.08 HCXY1-A=1.77								
CBN/ (0)	CA	NF	ST. JOHN'S	0.98	0.50	2651.51E	2651.00	0.5
CBN/A (0)	CA	NF	ST. JOHN'S	0.97	0.50	2651.51E	2651.00	0.5
CBN/P (0)	CA	NF	ST. JOHN'S	0.98	0.50	2651.51E	2651.00	0.5
KYUK (0)	US	AK	BETHEL	0.60	0.10	2651.51E	2651.00	0.5
TGW-D (35)	GT		VOZDEGUATEMA	1.01	0.50	2651.51E	2651.00	0.5
XENQ1/A	MX	HG	TULANCINGO	5.91	3.13	2651.51	2651.00	0.5
50% = 6.146, 25% = 6.466; XEWM/A=4.43 KFI=3.13 KTIB=2.89 HCXY1-A=2.01								

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Call                                            SWFF    Req Prot   Permis   Cur Rad    Margin
Letters         Ct St City                   (100uV/m)   (mV/m)    (mV/m)    (mV/m)    (mV/m)
-------------   -- -- --------------        --------- --------- --------- --------- ---------
WMFN            US MI ZEELAND                   5.05      2.68    2651.5    2651.0       0.5
   50% = 7.176, 25% = 9.689; WOI=6.41 WSM=3.22 WCRV=2.91 CFMJ/A=2.76 KFI=2.68
   WGST=2.59 CFCO/A=2.53 WWLS=2.46

XETY/O          MX CL TECOMAN                   8.22      4.36    2651.4    2650.9       0.5
   50% = 4.358, 25% = 5.082; KFI=4.36 XEWM/A=2.10 HCXY1-A=1.56

XEYQ1/O         MX ZA FRESNILLO                12.21      6.47    2648.1    2647.5       0.6
   50% = 6.466, 25% = 6.731; KFI=6.47 XEWM/A=1.87

NEW/            CA BC NELSON                   16.42      8.68    2642.9    2642.2       0.7
   50% = 11.58, 25% = 11.58; KFI=8.68 DKGVW=7.66

XESRD/O         MX DU SANTIAGO PAPASQ          23.13     12.18    2633.2    2632.3       0.9
   50% = 12.184, 25% = 12.184; KFI=12.18

XEHHI/O         MX CH HIDALGO DEL PAR          31.03     16.27    2621.3    2620.2       1.1
   50% = 16.27, 25% = 16.27; KFI=16.27

XEHHI/O         MX CH HIDALGO DEL PAR          31.38     16.44    2620.0    2618.8       1.1
   50% = 16.444, 25% = 16.444; KFI=16.44

KFXD            US ID BOISE                    38.76      2.03    2612.8    2611.5       1.3
   50% = 5.444, 25% = 6.563; KHOW=4.38 CKOV/A=3.23 KFI=2.03 KCIS=1.85
   CHED/A=1.80 KPLY=1.64

KTKK            US UT KEARNS                   49.27      2.55    2587.0    2585.2       1.8
   50% = 9.215, 25% = 10.012; KHOW=6.67 KFXD=6.36 KPLY=2.97 KFI=2.55

KTKK            US UT KEARNS                   49.24      2.55    2587.0    2585.2       1.8
   50% = 9.168, 25% = 9.969; KHOW=6.67 KFXD=6.29 KPLY=2.97 KFI=2.55

KTKK            US UT SANDY                    50.29      2.60    2585.1    2583.2       1.9
   50% = 8.752, 25% = 9.637; KFXD=6.44 KHOW=5.92 KPLY=3.08 KFI=2.60

KMTI            US UT MANTI                    60.42      3.09    2557.3    2554.9       2.4
   50% = 9.326, 25% = 10.85; KTNN=7.59 WSM=5.42 KGAB=4.60 KFI=3.09

NEW             US AZ CASA GRANDE              99.41      4.83    2430.6    2425.6       5.0
   50% = 12.39, 25% = 13.299; KTNN=8.91 KMTI=6.45 WSM=5.71 KFI=4.83

KIDD            US CA MONTEREY                133.35      6.09    2285.3    2277.3       8.0
   50% = 13.562, 25% = 14.868; KPLY=13.56 KFI=6.09

NEW             US IN TERRE HAUTE               6.35      3.52    2771.1    2651.0     120.2
   50% = 12.038, 25% = 14.08; WOI=7.42 WSM=6.79 WCRV=6.62 WGST=4.36 WHLO=4.21
   WMFN=4.08

NEW             US IN TERRE HAUTE               6.35      3.52    2771.1    2651.0     120.2
   50% = 12.038, 25% = 14.08; WOI=7.42 WSM=6.79 WCRV=6.62 WGST=4.36 WHLO=4.21
   WMFN=4.08

NEW             US IN WEST TERRE HAUT           6.35      3.52    2771.1    2651.0     120.2
   50% = 12.038, 25% = 14.08; WOI=7.42 WSM=6.79 WCRV=6.62 WGST=4.36 WHLO=4.21
   WMFN=4.08

NEW             US IN TERRE HAUTE               6.35      3.52    2771.1    2651.0     120.2
   50% = 12.038, 25% = 14.08; WOI=7.42 WSM=6.79 WCRV=6.62 WGST=4.36 WHLO=4.21
   WMFN=4.08
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CURRENT DISTRIBUTION ANALYSIS

OF

PROPOSED KFI TOP LOADED TOWER

CURRENT DISTRIBUTION ANALYSIS OF
PROPOSED KFI TOP LOADED TOWER

Because of the small differences in radiation efficiency and vertical radiation characteristics between towers having equivalent electrical height with and without top-loading, a study was undertaken using the FCC's standard calculation methods - which assume sinusoidal current distribution - to determine the amount of top loading to add to the proposed 158.1 electrical degree (675-foot) tower to produce the same horizontal plane radiation efficiency that was produced by the licensed 175.7 electrical degree (750-foot) tower while it was still in existence. This study determined that it is necessary to add 23.3 degrees of top loading to have the same radiation efficiency. The vertical radiation characteristics of such a tower were then studied, using the FCC's standard methods, and it was found that skywave radiation would not exceed that of the licensed 175.7 degree tower toward any other station requiring protection at night. These parameters were chosen for the antenna to be proposed in the KFI 675-foot tower construction permit application and they are completely consistent with the FCC's standard calculation methods for antenna and allocation analysis.

When the design effort turned to the question of how to physically add 23.3 degrees of top loading to the proposed 158.1 degree tower, an analysis method that represents actual tower current distribution better than the FCC's sinusoidal-current-distribution method was desired. The sinusoidal model does not come close to representing real-world conditions for towers that are approximately one-half wavelength high or higher. It assumes a current of zero when the tower height is exactly 180 degrees, for instance, which would make it impossible to feed power into a half-wave antenna since no current could be made to flow at the feedpoint for any applied voltage. Although methods using an assumed sinusoidal current distribution produce far-field results that are generally acceptable for predicting skywave signal levels at distant points, given the statistical nature of the model that is used for predicting nighttime skywave interference at distant stations and the number of dB within a standard deviation of the data upon which the propagation model is based, other matters related to the performance of the proposed tower are better studied using more advanced methods of antenna analysis. One such matter is radiation at high vertical angles that is highly

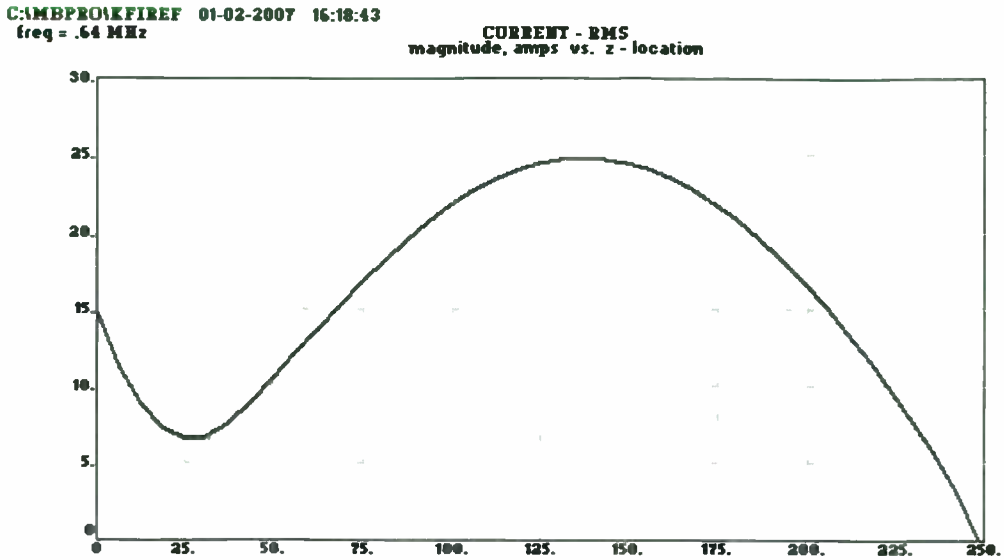
sensitive to the distribution of current along the length of a tower and can produce self-interference or "fading" within the groundwave coverage area of a station such as KFI.

Moment method modeling, which calculates tower current distribution rather than assuming it to have a sinusoidal characteristic, was used to design the top loading scheme for the proposed tower. It represents the state-of-the-art for calculating both tower current distribution and vertical radiation characteristics in such cases as this. Modern research and experience dictate that moment method modeled current distributions should match "real-world" conditions much more closely than the sinusoidal current distribution assumption that the FCC ordinarily uses for analyzing current distribution measurements when new top-loaded antennas are licensed. Both the MININEC Broadcast Professional and NEC-4 software packages were used for the moment method modeling, with no significant differences in their results. Because of its common availability, the details of the MININEC Broadcast Professional model are provided herein.

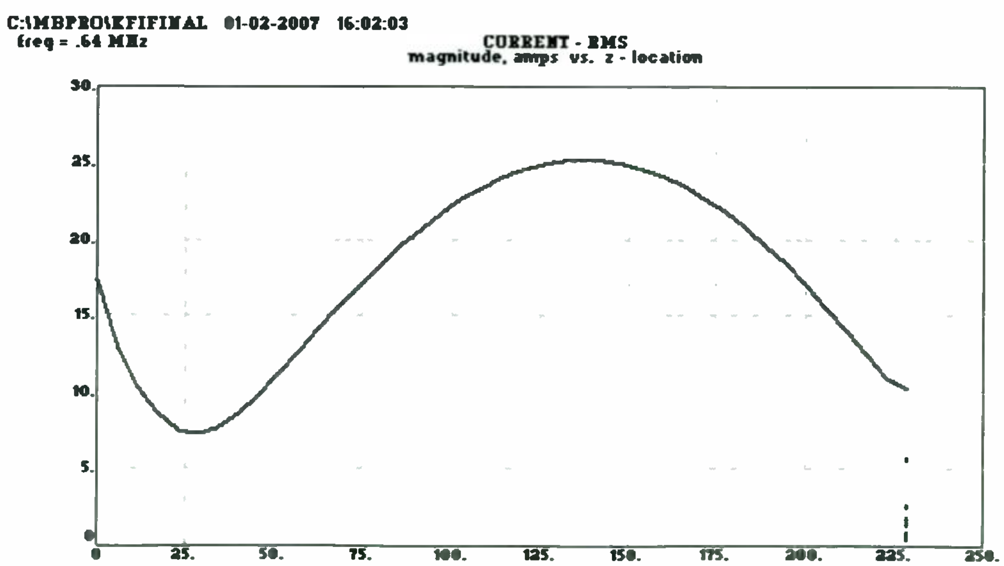
The top loading analysis of the proposed KFI tower was performed using the current distribution of a tower with an electrical height of 158.1 + 23.3 = 181.4 electrical degrees as a reference. The physical characteristics of the horizontal structure at the top of the tower, which will serve as a capacitance disk or "top hat," were designed to match the predicted current distribution along the proposed 158.1 degree tower with that of the lower portion of the reference 181.4 electrical degree tower. Current distributions for both the "base line" and optimized top-loaded models are plotted on the graphs that are shown on sheet 5. It is important to note that the two current distributions on the attached graphs match closely, with the largest difference being that there is no current flowing above 675 feet on the top loaded tower for obvious reasons.

The model for the 181.4-degree reference tower used a conductor with the equivalent radius of a triangular tower having a face width of 42 inches, the width of the former KFI tower and a typical value for towers within the height range that is under consideration. The height was adjusted for an assumed propagation velocity of 95% of the speed of light in free space to account for the delaying effects of the horizontal components of cross member currents that are distributed along its height, a value within the range that experience indicates is appropriate for a tower with the width-to-height ratio of the assumed reference tower. Details of the modeled geometry are shown on sheet 6 and a list of the modeled current nodes is shown on sheet 7.

The model for the 158.1-degree proposed tower used a conductor with the equivalent radius of an 84-inch triangular tower, as called for in the mechanical top loading design. The height was adjusted for an assumed propagation velocity of 90% of the speed of light in free space to account for the delaying effects of the horizontal components of cross member currents that are distributed along its height, a value within the range that experience indicates is appropriate for a tower with the width-to-height ratio of the proposed tower. Details of the modeled geometry are shown on sheets 8 through 11 and a list of the modeled current nodes is shown on sheets 12 through 15.



REFERENCE
181.4 DEGREE TOWER
CALCULATED CURRENT DISTRIBUTION



PROPOSED
158.1 + 23.3 DEGREE TOP LOADED TOWER
CALCULATED CURRENT DISTRIBUTION

C:\MBPRO\KFIREF 01-02-2007 16:20:37

GEOMETRY
Dimensions in meters
Environment: PERFECT GROUND

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.5	40
		0	0	248.5		

Number of wires = 1
current nodes = 40

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	6.2125	1	6.2125
segment/radius ratio	1	12.425	1	12.425
radius	1	.5	1	.5

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.64	0	1	.01326218	.01326218

Sources

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

C:\MBPRO\KFIREF   01-02-2007   16:21:41

CURRENT NODES

	coordinates (meters)			connections		node
wire	X	Y	Z	end1	end2	no.
1	0	0	0	GND	1	1
1	0	0	6.2125	1	1	2
1	0	0	12.425	1	1	3
1	0	0	18.6375	1	1	4
1	0	0	24.85	1	1	5
1	0	0	31.0625	1	1	6
1	0	0	37.275	1	1	7
1	0	0	43.4875	1	1	8
1	0	0	49.7	1	1	9
1	0	0	55.9125	1	1	10
1	0	0	62.125	1	1	11
1	0	0	68.3375	1	1	12
1	0	0	74.55	1	1	13
1	0	0	80.7625	1	1	14
1	0	0	86.975	1	1	15
1	0	0	93.1875	1	1	16
1	0	0	99.4	1	1	17
1	0	0	105.6125	1	1	18
1	0	0	111.825	1	1	19
1	0	0	118.0375	1	1	20
1	0	0	124.25	1	1	21
1	0	0	130.4625	1	1	22
1	0	0	136.675	1	1	23
1	0	0	142.8875	1	1	24
1	0	0	149.1	1	1	25
1	0	0	155.3125	1	1	26
1	0	0	161.525	1	1	27
1	0	0	167.7375	1	1	28
1	0	0	173.95	1	1	29
1	0	0	180.1625	1	1	30
1	0	0	186.375	1	1	31
1	0	0	192.5875	1	1	32
1	0	0	198.8	1	1	33
1	0	0	205.0125	1	1	34
1	0	0	211.225	1	1	35
1	0	0	217.4375	1	1	36
1	0	0	223.65	1	1	37
1	0	0	229.8625	1	1	38
1	0	0	236.075	1	1	39
1	0	0	242.2875	1	END	40

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GEOMETRY
Dimensions in meters
Environment: PERFECT GROUND

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.	40
		0	0	228.6		
2	none	0	0	228.6	.083	3
		7.62	0	228.6		
3	none	0	0	228.6	.0032	3
		7.01	10.	228.6		
4	none	0	0	228.6	.0032	3
		6.71	20.	228.6		
5	none	0	0	228.6	.0032	3
		6.61	30.	228.6		
6	none	0	0	228.6	.0032	3
		6.71	40.	228.6		
7	none	0	0	228.6	.0032	3
		7.01	50.	228.6		
8	none	0	0	228.6	.083	3
		7.62	60.	228.6		
9	none	0	0	228.6	.0032	3
		7.01	70.	228.6		
10	none	0	0	228.6	.0032	3
		6.71	80.	228.6		
11	none	0	0	228.6	.0032	3
		6.61	90.	228.6		
12	none	0	0	228.6	.0032	3
		6.71	100.	228.6		
13	none	0	0	228.6	.0032	3
		7.01	110.	228.6		
14	none	0	0	228.6	.083	3
		7.62	120.	228.6		
15	none	0	0	228.6	.0032	3
		7.01	130.	228.6		
16	none	0	0	228.6	.0032	3
		6.71	140.	228.6		
17	none	0	0	228.6	.0032	3
		6.61	150.	228.6		
18	none	0	0	228.6	.0032	3
		6.71	160.	228.6		
19	none	0	0	228.6	.0032	3
		7.01	170.	228.6		
20	none	0	0	228.6	.083	3
		7.62	180.	228.6		
21	none	0	0	228.6	.0032	3
		7.01	190.	228.6		
22	none	0	0	228.6	.0032	3
		6.71	200.	228.6		

wire	caps	Radius	Angle	Z	radius	segs
23	none	0	0	228.6	.0032	3
		6.61	210.	228.6		
24	none	0	0	228.6	.0032	3
		6.71	220.	228.6		
25	none	0	0	228.6	.0032	3
		7.01	230.	228.6		
26	none	0	0	228.6	.083	3
		7.62	240.	228.6		
27	none	0	0	228.6	.0032	3
		7.01	250.	228.6		
28	none	0	0	228.6	.0032	3
		6.71	260.	228.6		
29	none	0	0	228.6	.0032	3
		6.61	270.	228.6		
30	none	0	0	228.6	.0032	3
		6.71	280.	228.6		
31	none	0	0	228.6	.0032	3
		7.01	290.	228.6		
32	none	0	0	228.6	.083	3
		7.62	300.	228.6		
33	none	0	0	228.6	.0032	3
		7.01	310.	228.6		
34	none	0	0	228.6	.0032	3
		6.71	320.	228.6		
35	none	0	0	228.6	.0032	3
		6.61	330.	228.6		
36	none	0	0	228.6	.0032	3
		6.71	340.	228.6		
37	none	0	0	228.6	.0032	3
		7.01	350.	228.6		
38	none	7.62	0	228.6	.083	1
		7.01	10.	228.6		
39	none	7.01	10.	228.6	.083	1
		6.71	20.	228.6		
40	none	6.71	20.	228.6	.083	1
		6.61	30.	228.6		
41	none	6.61	30.	228.6	.083	1
		6.71	40.	228.6		
42	none	6.71	40.	228.6	.083	1
		7.01	50.	228.6		
43	none	7.01	50.	228.6	.083	1
		7.62	60.	228.6		
44	none	7.62	60.	228.6	.083	1
		7.01	70.	228.6		
45	none	7.01	70.	228.6	.083	1
		6.71	80.	228.6		
46	none	6.71	80.	228.6	.083	1
		6.61	90.	228.6		
47	none	6.61	90.	228.6	.083	1
		6.71	100.	228.6		

wire	caps	Radius	Angle	Z	radius	segs
48	none	6.71	100.	228.6	.083	1
		7.01	110.	228.6		
49	none	7.01	110.	228.6	.083	1
		7.62	120.	228.6		
50	none	7.62	120.	228.6	.083	1
		7.01	130.	228.6		
51	none	7.01	130.	228.6	.083	1
		6.71	140.	228.6		
52	none	6.71	140.	228.6	.083	1
		6.61	150.	228.6		
53	none	6.61	150.	228.6	.083	1
		6.71	160.	228.6		
54	none	6.71	160.	228.6	.083	1
		7.01	170.	228.6		
55	none	7.01	170.	228.6	.083	1
		7.62	180.	228.6		
56	none	7.62	180.	228.6	.083	1
		7.01	190.	228.6		
57	none	7.01	190.	228.6	.083	1
		6.71	200.	228.6		
58	none	6.71	200.	228.6	.083	1
		6.61	210.	228.6		
59	none	6.61	210.	228.6	.083	1
		6.71	220.	228.6		
60	none	6.71	220.	228.6	.083	1
		7.01	230.	228.6		
61	none	7.01	230.	228.6	.083	1
		7.62	240.	228.6		
62	none	7.62	240.	228.6	.083	1
		7.01	250.	228.6		
63	none	7.01	250.	228.6	.083	1
		6.71	260.	228.6		
64	none	6.71	260.	228.6	.083	1
		6.61	270.	228.6		
65	none	6.61	270.	228.6	.083	1
		6.71	280.	228.6		
66	none	6.71	280.	228.6	.083	1
		7.01	290.	228.6		
67	none	7.01	290.	228.6	.083	1
		7.62	300.	228.6		
68	none	7.62	300.	228.6	.083	1
		7.01	310.	228.6		
69	none	7.01	310.	228.6	.083	1
		6.71	320.	228.6		
70	none	6.71	320.	228.6	.083	1
		6.61	330.	228.6		
71	none	6.61	330.	228.6	.083	1
		6.71	340.	228.6		
72	none	6.71	340.	228.6	.083	1
		7.01	350.	228.6		
73	none	7.01	350.	228.6	.083	1
		7.62	0	228.6		

Number of wires = 73
current nodes = 220

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	40	1.165181	1	5.715
segment/radius ratio	1	5.715	3	730.2084
radius	3	.0032	1	1.

ELECTRICAL DESCRIPTION

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.64	0	1	.002487377	.01220013

Sources

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

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CURRENT NODES

	coordinates (meters)			connections		node
wire	X	Y	Z	end1	end2	no.
1	0	0	0	GND	1	1
1	0	0	5.715	1	1	2
1	0	0	11.43	1	1	3
1	0	0	17.145	1	1	4
1	0	0	22.86	1	1	5
1	0	0	28.575	1	1	6
1	0	0	34.29	1	1	7
1	0	0	40.005	1	1	8
1	0	0	45.72	1	1	9
1	0	0	51.435	1	1	10
1	0	0	57.15	1	1	11
1	0	0	62.865	1	1	12
1	0	0	68.58	1	1	13
1	0	0	74.295	1	1	14
1	0	0	80.01	1	1	15
1	0	0	85.72501	1	1	16
1	0	0	91.44	1	1	17
1	0	0	97.15501	1	1	18
1	0	0	102.87	1	1	19
1	0	0	108.585	1	1	20
1	0	0	114.3	1	1	21
1	0	0	120.015	1	1	22
1	0	0	125.73	1	1	23
1	0	0	131.445	1	1	24
1	0	0	137.16	1	1	25
1	0	0	142.875	1	1	26
1	0	0	148.59	1	1	27
1	0	0	154.305	1	1	28
1	0	0	160.02	1	1	29
1	0	0	165.735	1	1	30
1	0	0	171.45	1	1	31
1	0	0	177.165	1	1	32
1	0	0	182.88	1	1	33
1	0	0	188.595	1	1	34
1	0	0	194.31	1	1	35
1	0	0	200.025	1	1	36
1	0	0	205.74	1	1	37
1	0	0	211.455	1	1	38
1	0	0	217.17	1	1	39
1	0	0	222.885	1	END	40
2	0	0	228.6	1	2	41
2	3.81	0	228.6	2	END	42
3	0	0	228.6	1	3	43
3	3.451751	.6086369	228.6	3	END	44
4	0	0	228.6	1	4	45
4	3.152669	1.147478	228.6	4	END	46

CURRENT NODES

	coordinates (meters)			connections		node
wire	X	Y	Z	end1	end2	no.
5	0	0	228.6	1	5	47
5	2.862214	1.6525	228.6	5	END	48
6	0	0	228.6	1	6	49
6	2.570079	2.156552	228.6	6	END	50
7	0	0	228.6	1	7	51
7	2.252971	2.684986	228.6	7	END	52
8	0	0	228.6	1	8	53
8	1.905	3.299557	228.6	8	END	54
9	0	0	228.6	1	9	55
9	1.198781	3.293623	228.6	9	END	56
10	0	0	228.6	1	10	57
10	.5825897	3.30403	228.6	10	END	58
11	0	0	228.6	1	11	59
11	4.02151E-08	3.305	228.6	11	END	60
12	0	0	228.6	1	12	61
12	-.5825896	3.30403	228.6	12	END	62
13	0	0	228.6	1	13	63
13	-1.198781	3.293623	228.6	13	END	64
14	0	0	228.6	1	14	65
14	-1.905	3.299557	228.6	14	END	66
15	0	0	228.6	1	15	67
15	-2.252971	2.684986	228.6	15	END	68
16	0	0	228.6	1	16	69
16	-2.570079	2.156553	228.6	16	END	70
17	0	0	228.6	1	17	71
17	-2.862214	1.6525	228.6	17	END	72
18	0	0	228.6	1	18	73
18	-3.152669	1.147478	228.6	18	END	74
19	0	0	228.6	1	19	75
19	-3.451751	.608637	228.6	19	END	76
20	0	0	228.6	1	20	77
20	-3.81	9.27199E-08	228.6	20	END	78
21	0	0	228.6	1	21	79
21	-3.451751	-.6086368	228.6	21	END	80
22	0	0	228.6	1	22	81
22	-3.152669	-1.147478	228.6	22	END	82
23	0	0	228.6	1	23	83
23	-2.862214	-1.6525	228.6	23	END	84
24	0	0	228.6	1	24	85
24	-2.570079	-2.156552	228.6	24	END	86
25	0	0	228.6	1	25	87
25	-2.252971	-2.684986	228.6	25	END	88
26	0	0	228.6	1	26	89
26	-1.905	-3.299557	228.6	26	END	90
27	0	0	228.6	1	27	91
27	-1.198781	-3.293623	228.6	27	END	92
28	0	0	228.6	1	28	93
28	-.5825898	-3.30403	228.6	28	END	94
29	0	0	228.6	1	29	95
29	-1.20645E-07	-3.305	228.6	29	END	96
30	0	0	228.6	1	30	97
30	.5825895	-3.30403	228.6	30	END	98

CURRENT NODES

	coordinates (meters)			connections		node
wire	X	Y	Z	end1	end2	no.
31	0	0	228.6	1	31	99
31	1.198781	-3.293623	228.6	31	END	100
32	0	0	228.6	1	32	101
32	1.905	-3.299557	228.6	32	END	102
33	0	0	228.6	1	33	103
33	2.252971	-2.684986	228.6	33	END	104
34	0	0	228.6	1	34	105
34	2.570079	-2.156553	228.6	34	END	106
35	0	0	228.6	1	35	107
35	2.862214	-1.6525	228.6	35	END	108
36	0	0	228.6	1	36	109
36	3.152669	-1.147478	228.6	36	END	110
37	0	0	228.6	1	37	111
37	3.451751	-.608637	228.6	37	END	112
38	7.62	0	228.6	2	38	113
38	6.903503	1.217274	228.6	38	-3	114
39	6.903503	1.217274	228.6	3	39	115
39	6.305337	2.294955	228.6	39	-4	116
40	6.305337	2.294955	228.6	4	40	117
40	5.724428	3.305	228.6	40	-5	118
41	5.724428	3.305	228.6	5	41	119
41	5.140158	4.313105	228.6	41	-6	120
42	5.140158	4.313105	228.6	6	42	121
42	4.505941	5.369972	228.6	42	-7	122
43	4.505941	5.369972	228.6	7	43	123
43	3.81	6.599114	228.6	43	-8	124
44	3.81	6.599114	228.6	8	44	125
44	2.397561	6.587246	228.6	44	-9	126
45	2.397561	6.587246	228.6	9	45	127
45	1.165179	6.60806	228.6	45	-10	128
46	1.165179	6.60806	228.6	10	46	129
46	1.19209E-07	6.61	228.6	46	-11	130
47	8.04302E-08	6.61	228.6	11	47	131
47	-1.165179	6.60806	228.6	47	-12	132
48	-1.165179	6.60806	228.6	12	48	133
48	-2.397561	6.587246	228.6	48	-13	134
49	-2.397561	6.587246	228.6	13	49	135
49	-3.81	6.599114	228.6	49	-14	136
50	-3.81	6.599114	228.6	14	50	137
50	-4.505941	5.369972	228.6	50	-15	138
51	-4.505941	5.369972	228.6	15	51	139
51	-5.140158	4.313105	228.6	51	-16	140
52	-5.140158	4.313105	228.6	16	52	141
52	-5.724428	3.305	228.6	52	-17	142
53	-5.724428	3.305	228.6	17	53	143
53	-6.305337	2.294955	228.6	53	-18	144
54	-6.305337	2.294955	228.6	18	54	145
54	-6.903503	1.217274	228.6	54	-19	146
55	-6.903503	1.217274	228.6	19	55	147
55	-7.62	2.38419E-07	228.6	55	-20	148

CURRENT NODES

wire	coordinates (meters) X	Y	Z	connections end1	end2	node no.
56	-7.62	1.8544E-07	228.6	20	56	149
56	-6.903503	-1.217274	228.6	56	-21	150
57	-6.903503	-1.217274	228.6	21	57	151
57	-6.305337	-2.294955	228.6	57	-22	152
58	-6.305337	-2.294955	228.6	22	58	153
58	-5.724428	-3.305	228.6	58	-23	154
59	-5.724428	-3.305	228.6	23	59	155
59	-5.140158	-4.313105	228.6	59	-24	156
60	-5.140158	-4.313105	228.6	24	60	157
60	-4.505941	-5.369972	228.6	60	-25	158
61	-4.505941	-5.369972	228.6	25	61	159
61	-3.81	-6.599114	228.6	61	-26	160
62	-3.81	-6.599114	228.6	26	62	161
62	-2.397562	-6.587246	228.6	62	-27	162
63	-2.397562	-6.587246	228.6	27	63	163
63	-1.16518	-6.60806	228.6	63	-28	164
64	-1.16518	-6.60806	228.6	28	64	165
64	-2.38419E-07	-6.61	228.6	64	-29	166
65	-2.41291E-07	-6.61	228.6	29	65	167
65	1.165179	-6.60806	228.6	65	-30	168
66	1.165179	-6.60806	228.6	30	66	169
66	2.397561	-6.587246	228.6	66	-31	170
67	2.397561	-6.587246	228.6	31	67	171
67	3.81	-6.599114	228.6	67	-32	172
68	3.81	-6.599114	228.6	32	68	173
68	4.505941	-5.369972	228.6	68	-33	174
69	4.505941	-5.369972	228.6	33	69	175
69	5.140158	-4.313105	228.6	69	-34	176
70	5.140158	-4.313105	228.6	34	70	177
70	5.724428	-3.305	228.6	70	-35	178
71	5.724428	-3.305	228.6	35	71	179
71	6.305337	-2.294956	228.6	71	-36	180
72	6.305337	-2.294956	228.6	36	72	181
72	6.903503	-1.217274	228.6	72	-37	182
73	6.903503	-1.217274	228.6	37	73	183
73	7.62	0	228.6	73	-2	184