DUPLICATE

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Federal Communications Commission
Washington, D. C. 20554

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

FOR FCC USE ONLY

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY
FILE NO. BL-20090716ADW

SECTION I - APPLICANT FEE INFORMATION

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

KEVIN PLUMB

MAILING ADDRESS (Line 1) (Maximum 35 characters)
DISNEY WORLDWIDE SERVICES, INC.

MAILING ADDRESS (Line 2) (Maximum 35 characters)
77 WEST 66TH STREET, 16TH FLOOR, ATTN: JOHN ZUCKER

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
NEW YORK	NY	10023-6298

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
212-456-7777 x 7387	WEPN	Fac. ID # 65636

2. A. Is a fee submitted with this application? [✓] Yes [ ] No

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

[ ] Governmental Entity [ ] Noncommercial educational licensee [ ] Other (Please explain):

C. If Yes, provide the following information: 0008797839

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

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
M M R	0 0 0 1	$ 615.00	

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

(A)	(B)	(C)	FOR FCC USE ONLY
M O R	0 0 0 1	$ 705.00	

ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.

TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
$ 1320.00	

CLEAR ALL PAGES

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT NEW YORK AM RADIO, LLC		
MAILING ADDRESS 77 WEST 66TH STREET, 16TH FLOOR, ATTN: JOHN ZUCKER		
CITY NEW YORK	STATE NY	ZIP CODE 10023-6298

2. This application is for:

[✓] Commercial [ ] Noncommercial

[✓] AM Directional [ ] AM Non-Directional

Call letters	Community of License	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
WEPN	NEW YORK, NY	BP-20070403ABM	NA	NOV. 28, 2010

3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620? [ ] Yes [✓] No

If No, explain in an Exhibit. per 73.1620 (a)(4), PTA is requested.

Exhibit No.

4. Have all the terms, conditions, and obligations set forth in the above described construction permit been fully met? [✓] Yes [ ] No

If No, state exceptions in an Exhibit.

Exhibit No.

5. Apart from the changes already reported, has any cause or circumstance arisen since the grant of the underlying construction permit which would result in any statement or representation contained in the construction permit application to be now incorrect? [ ] Yes [✓] No

If Yes, explain in an Exhibit.

Exhibit No.

6. Has the permittee filed its Ownership Report (FCC Form 323) or ownership certification in accordance with 47 C.F.R. Section 73.3615(b)? [✓] Yes [ ] No [ ] Does not apply

If No, explain in an Exhibit.

Exhibit No.

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination? [ ] Yes [✓] No

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

Exhibit No.

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
Jane B. Stewart	Jane B Stewart	
Title	Date	Telephone Number
SVP, Legal & Business Affairs, Broadcasting	7/15/09	212.456.7777

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

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

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

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

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

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CARL T. JONES
CORPORATION

**ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.
IN SUPPORT OF
AN APPLICATION FOR STATION LICENSE
STATION WEPN(AM) – NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
Facility ID: 65636**

Applicant: New York AM Radio, LLC

JULY, 2009

Carl T. Jones Corporation
7901 Yarnwood Court, Springfield, Virginia 22153-2899 (703) 569-7704 Fax: (703) 569-6417

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FCC FORM 302-AM

ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.

ATTACHED FIGURES

APPENDICES

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

New York AM Radio, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

[X] 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
WEPN	BP-20070403ABM	1050	Unlimited	50	50

2. Station location	
State	City or Town
New York	New York

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
NJ	Hudson	Secaucus	380 Secaucus Road

4. Main studio location			
State	County	City or Town	Street address (or other identification)
NY	Manhattan	New York	2 Penn Plaza, 17th Fl.

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
NY	Manhattan	New York	2 Penn Plaza, 17th Fl.

6. Has type-approved stereo generating equipment been installed? [ ] Yes [X] No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? [X] Yes [ ] No

[ ] Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed.

Exhibit No. Eng Stmt

8. Operating constants:			
RF common point or antenna current (in amperes) without modulation for night system	32.45	RF common point or antenna current (in amperes) without modulation for day system	32.45
Measured antenna or common point resistance (in ohms) at operating frequency Night	Day	Measured antenna or common point reactance (in ohms) at operating frequency Night	Day
50	50	-j12	-j12

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1 (ASR# 1260128)	0	0	1.00	1.00	---	---
2 (ASR# 1260129)	99.0	99.0	0.48	0.48	---	---
3 (ASR# 1260130)	-57.6	-57.6	0.50	0.50	---	---

Manufacturer and type of antenna monitor: Potomac Instruments, Model 1901-3

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

Type Radiator	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
tapered, self-supporting, base insulated	147.5	151.2	152.1	Exhibit No. N/A

Excitation ☒ Series ☐ Shunt

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

North Latitude	°	'	"	West Longitude	°	'	"
	40	46	36		74	03	08

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. Eng Stmt

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

Exhibit No. On File

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

N/A

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

N/A

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)
Carl T. Jones, Jr.	[signature]
Address (include ZIP Code) Carl T. Jones Corporation 7901 Yarnwood Court Springfield, VA 22153	Date July 10, 2009 Telephone No. (Include Area Code) (703) 569-7704

☐ Technical Director

☒ Registered Professional Engineer

☐ Chief Operator

☐ Technical Consultant

☐ Other (specify)

ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.
IN SUPPORT OF
AN APPLICATION FOR STATION LICENSE
STATION WEPN(AM) – NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
Facility ID: 65636

Applicant: New York AM Radio, LLC

I am a Consulting Engineer, president in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission. I am a Registered Professional Engineer in the Commonwealth of Virginia, Registration No. 013391.

1.0 GENERAL

This office has been authorized by New York AM Radio, LLC ("New York Radio"), licensee of AM Station WEPN(AM), to prepare this engineering statement and the associated figures and appendices in support of an Application for License to cover outstanding Construction Permit, File Number BP-20070403ABM, granted November 28, 2007. The construction permit authorizes New York Radio to relocate the transmitter facilities of WEPN(AM) and to make changes to the station's directional antenna pattern. The construction permit site is located in Secaucus, New Jersey approximately 3.7 km southeast of the present licensed site. The construction permit authorizes operation of Station WEPN(AM) on a frequency of 1050 kHz at a power of 50 kW during both daytime and nighttime hours using the same directional pattern for daytime and nighttime operation (DA-1).

Following the construction of the new facility, this office was authorized by New York Radio to adjust the directional antenna system for compliance with the terms of the construction permit using computer modeling and sample system verification techniques as described in Section 47 CFR 73.151(c). The measurement and modeling techniques that were used to perform the proof of performance are described in this engineering statement. The measurement data and the pertinent computer generated input and output files are contained in the associated figures and Appendices A, B and C.

A special condition of the construction permit requires the performance of partial proofs of performance on Station WWRL both prior to and after construction of the WEPN towers. The special condition also states that the Permittee is responsible for installation and continued maintenance of detuning apparatus necessary to prevent adverse effects upon the radiation patterns of WWRL. As demonstrated herein, New York Radio has fully satisfied the special condition with respect to WWRL.

New York Radio contracted with RF Safety Solutions LLC to perform measurements of the electromagnetic fields in the vicinity of the towers and impedance matching equipment to insure compliance with radiofrequency energy safety guidelines. The steps taken by New York Radio to restrict access in areas where the maximum permissible exposure is exceeded result in a fully compliant facility. The complete report prepared by RF Safety Solutions LLC is contained in Appendix E.

2.0 COMPUTER MODELING AND SAMPLE SYSTEM VERIFICATION

The proof of performance contained herein is based on the computer modeling and sample system verification procedures described Section 47 CFR 73.151(c). The WEPN antenna array consists of three identical, triangular, tapered, steel, self-supporting, series-fed towers. The height of each tower is 186 electrical degrees and therefore, tower mounted loop sampling devices are employed. The loops are mounted at a height on each tower which corresponds to the height at which the current is at a minimum when the tower is detuned as determined by modeling. The loops are mounted in an identical manner at identical heights on each tower. Since the towers are identical, the tower cross section at the loop mounting height is identical on all three towers.

2.1 INDIVIDUAL TOWER IMPEDANCE MEASUREMENTS

Impedance measurements were performed at the base of each tower by the undersigned at the output J-Plug of the antenna matching network. This measurement location corresponds to the input to the tower feed line. The impedance measurements were performed using a Hewlett-Packard Model 4396A network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. The impedance was measured for each tower in the array with the other two towers shorted to ground. The short circuit to ground for the non-excited towers was at the same J-Plug location that was used to perform the impedance measurement.

2.2 INDIVIDUAL TOWER COMPUTER MODELS

A Method of Moments (MoM) computer model was developed to model each element in the array using Expert MININEC Broadcast Professional (Version 12.5). The WEPN towers are all equal height, tapered, wide-based, self-supporting structures with base insulators. Each tower was modeled using multiple wires to represent the legs and connecting members. Structural drawings of the actual towers were used to faithfully reproduce the geometry of each individual tower in the model. Included in the model were only a few of the horizontal and none of the diagonal cross members.

Each tower has been constructed on elevated piers such that the bases of the towers are above the 100 year flood plane. The model has accounted for this by elevating the bases of the towers an equivalent height above the ground plane and extending ground connections from the base of the towers to the ground plane. Resistive loads of one megaohm were included in each of the tower legs to represent the high impedance tower base insulators.

To replicate the individual measured base impedances to within FCC Rule tolerances, the towers' physical heights were individually adjusted in the model and lumped series inductances and shunt capacitances were inserted at the bases of the towers. In order to modify the individual tower heights, only the top section of each tower (uniform cross section portion of the tower) was increased or decreased in length.

A wire-frame representation of a single tower in the multiple wire tower model is included herein as Figure 1. A tabulation of the details employed in the individual tower modeling is included herein as Figure 2. A comparison of the measured individual tower impedances, the modeled individual tower impedances and the adjusted modeled individual tower impedances is contained in Figure 3. Also included in Figure 3 is the lumped shunt capacitance and lumped series inductance used at the base of each tower to establish the adjusted modeled impedance. The adjusted tower height percentage change and the magnitude of the lumped series inductances and shunt capacitances are all within the corresponding tolerances set forth in the Rules.

As demonstrated in Figure 3, the adjusted modeled individual tower resistances and reactances are within ±2 ohms and ±4 percent of the respective measured individual tower resistances and reactances. The text files containing all necessary input and output data associated with the individual tower modeling are contained in Appendix A.

Finally, one of the individual tower models was used to determine the height at which the current was minimized when the tower was detuned in the horizontal plane. This height, 170 feet above the base, is the height at which the sampling loop was installed on each tower. The overall height of the individual tower was unchanged from the overall physical height of the towers. The text files containing the geometry and current data associated with the detuned tower are contained in Appendix C.

2.3 DIRECTIONAL ANTENNA COMPUTER MODEL

The theoretical directional antenna parameters were used in combination with the individual tower computer models to produce the directional antenna computer model. From the computer model, tower current distributions were derived that, when numerically integrated and normalized to the reference tower, are identical to the authorized field parameters of the theoretical directional antenna pattern. The modeled relative antenna monitor parameters are also equivalent to the theoretical field parameters in that the loops are mounted at the location where the current is minimum when the towers are detuned in the horizontal plane. The antenna monitor parameters are tabulated in Figure 4. The text files containing all necessary input and output data associated with the directional antenna computer models are contained in Appendix B.

2.4 COMMON POINT IMPEDANCE AND CURRENT

The networks associated with the directional antenna system were adjusted for proper impedance transformation and the common point impedance matching networks were set for Z = 50 – j12 ohms. The transmitter output power level was adjusted such that the common point current was 32.45 amperes to achieve an input power of 52,650 Watts.

2.5 SAMPLE SYSTEM DESCRIPTION AND VERIFICATION MEASURMENTS

The antenna sampling system utilizes identical Kintronic Labs, Model SLSS-5312I, stainless steel, insulated, sample loops mounted in an identical manner at the same height on each tower. The loops are insulated from the tower. The outer conductor of the sample cable is electrically connected to the tower as soon as practical below the sample loop connector. The sample loops have dimensions of 53"H x 12"W.

Kintronic Labs, Model IC-LDF4-50A-UJ, isolation inductors are used to allow the sample cable to cross the base of each tower. The isolation inductors are fabricated using equal lengths of Andrew Type LDF4-50A, ½-inch, unjacketed, coaxial cable. Equal lengths of RFS Cellwave Type LCF12–50J, ½-inch, phase stabilized, coaxial cable are used to connect the isolation inductor to the sample loop and to connect the grounded end of the isolation inductor to the phase monitor. The sample cables between the phase monitor and the grounded end of the isolation inductor, including excess lengths of cable, are contained in metal cable trays that are mounted to the elevated wooden walkway between the towers and the transmitter building such that each cable is subjected to the same environmental conditions. The phase monitor that is employed at WEPN is a new Potomac Instruments, Model 1901-3.

The sample lines, including the lengths of cable comprising the isolation inductors, were verified to be equal in length by measuring the open-circuit series resonate frequency closest to the carrier frequency. The characteristic impedance was verified by measuring the impedance at frequencies corresponding to odd multiples of 1/8 wavelength immediately above and below the open circuit series resonant frequency closest to the carrier frequency, while the line was open circuited at the sample loop end of the line. The characteristic impedance was calculated by the following formula:

$$Z = \sqrt{\sqrt{R_1^2 + X_1^2} \times \sqrt{R_2^2 + X_2^2}}$$

where: Z = Characteristic impedance and

R1 + j X1 and **R2 + j X2** are the measured impedances at 45 degree offset frequencies.

A tabulation of the sample line length verification and characteristic impedance measurements is included herein as Figure 5. All sample line verification measurements were performed by the undersigned using a Hewlett-Packard Model 4396A network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. As demonstrated by the measured values in Figure 5, the measured sample line lengths are within 1 electrical degree of each other and the measured characteristic impedances are well within 2 Ohms of each other as required by Section CFR73.151(c)(2)(i) of the FCC's Rules and Regulations.

An impedance measurement was performed at the input to each sample line, at the antenna monitor end of the line, with the sample loop connected. The measurement was performed at the WEPN operating frequency of 1050 kHz. The measured impedances are contained in the table of Figure 5.

2.7 POST-CONSTRUCTION SURVEY CERTIFICATION

The orientation and distances between the individual antenna towers in the array were confirmed by a post-construction survey conducted by Kevin S. Bogerman, a licensed professional land surveyor in the state of New Jersey, license number 41379. Figure 6 summarizes the results of the survey which is contained in Figure 7. As demonstrated by the survey data all towers were constructed to within 0.13 degrees of the design location.

2.8 REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were performed on four radial bearings: 19°, 68°, 124°, and 227.5°. The 68° and 227.5° radial bearings correspond to the directions of the two pattern minima. These radial bearings are identified on the construction permit. The 19° and 227.5° radial bearings correspond to the directions of pattern maxima. Three reference field strength measurements were performed for each of the four radials. The measurements were performed by Tom Morgan and Jerry Corby, contract engineers to the station. These individuals are experienced in performing field strength measurements on directional antenna systems. Two field meters were used to perform the measurements: Potomac Instruments Model FIM-41, Serial Number 267, most recently calibrated in May, 2008; Potomac Instruments Model FIM-41, Serial Number 304, most recently calibrated in January, 2000. The two field strength meters were compared with one another at several full scale settings and found to agree within the manufacturer's stated accuracy. The GPS coordinates (NAD27) and descriptions of the reference point locations are provided in Figure 8 along with the corresponding measured field strength value for each established reference location.

3.0 HARMONIC AND SPURIOUS EMISSIONS MEASUREMENTS

Harmonic and spurious emissions measurements were performed in the major lobe of the WEPN directional pattern at a distance corresponding to an approximate 1.0 V/m field strength. The measurements were performed by the undersigned using a Potomac Instruments Model FIM-41 field strength meter. A tabulation and analysis of the spurious emissions measurements is contained in Figure 9. Particular attention was directed to intermodulation products associated with high powered stations located in the Meadowlands including: WWRL (1600 kHz), WOR (710 kHz), WINS (1010 kHz), and WBBR (1130 kHz).

Initial measurements indicated that all intermodulation, harmonic and spurious emissions were below the required limits as defined in Section 47 CFR 73.44 with the exception of a third-order intermodulation product on 970 kHz[1]. The intermodulation product on 970 kHz results from the non-linear mixing within the WEPN transmitter of the WEPN 2nd harmonic with the WBBR fundamental (2 x 1050 kHz – 1130 kHz = 970 kHz). A filter was designed and installed at the input to the WEPN common point network to attenuate the incoming 1130 kHz signal. A final measurement was then performed at the same location as that of the initial spurious emissions measurements that verified that the intermodulation product on 970 kHz was greater than 80 dB below the WEPN carrier. The measurement was performed while the WNYM transmitter was off the air to isolate the WEPN emission. A second measurement was made with both the WNYM and the WEPN transmitters off the air to determine the signal level that was present on 970 kHz from sources other than the WEPN and WNYM transmitters. The difference in the measured signal powers for the two measurements was computed to establish the field strength contribution from the WEPN transmitter alone.

[1] WNYM licensed to Hackensack, New Jersey operates on 970KHz.

4.0 CONSTRUCTION PERMIT SPECIAL CONDITION

A special condition contained in the WEPN construction permit requires the performance of partial proofs of performance on Station WWRL both prior to and after construction of the WEPN towers. In addition, the special condition requires the installation of detuning apparatus to prevent adverse impact to the WWRL directional patterns.

The WWRL technical staff has performed measurements on the WWRL day and night patterns that demonstrate to their satisfaction that the construction of the WEPN towers has had no adverse impact on either the WWRL daytime or nighttime patterns. A letter from Access.1 New York License Company LLC, licensee of WWRL, (attached in Appendix D) states that there has been no adverse impact to its patterns and supports the Commission's grant of program test authority and a subsequent license for WEPN.

With regard to the requirement to install detuning apparatus, this office performed studies of the WWRL patterns using the Numerical Electromagnetic Code, version 4. The results of these studies indicated that construction of the new WEPN towers would have no material adverse impact on the WWRL patterns and therefore, no detuning or filtering circuits have been added to the WEPN towers with respect to WWRL. The measurements performed by WWRL confirm the study's conclusion that there would be no adverse impact. Further, as described in the previous section, all intermodulation products resulting from interaction of the WEPN and WWRL signals are below the limits of Section 47 CFR 73.44. Therefore, it is submitted that New York Radio has fully satisfied the special condition contained in the construction permit with regard to WWRL.

5.0 COMPLIANCE WITH RADIO FREQUENCY GUIDELINES

New York Radio contracted with RF Safety Solutions LLC to perform measurements of the electromagnetic fields in the vicinity of the towers and ATU buildings to insure compliance with radiofrequency energy safety guidelines. The complete report prepared by RF Safety Solutions LLC is contained in Appendix E.

As described in the measurement report of Appendix E, the WEPN towers are located in a wetlands area accessible only from an elevated wooden walkway. Access to the wooden walkway is restricted by multiple locked gates with appropriate warning signs. Further, access to each elevated tower and ATU building is restricted by an additional locked gate with warning sign.

As further described in the report, the Maximum Permissible Exposure ("MPE') level at the 1050 kHz operating frequency is only exceeded on the pile caps that support the towers, on the ladder leading down to the pile caps and on the westernmost side of the porch in front of each ATU building and behind the filter cabinet within the phasor building. For each area that exceeds the MPE, New York Radio has installed a chain with appropriate warning sign limiting access to these areas. No areas that exceed the MPE are accessible by the general public.

Should station personnel or contractors be required to enter the restricted areas where the MPE is exceeded, the licensee will reduce power, operate non-directionally at reduced power, or turn off the transmitter, as necessary, to ensure that exposure is limited to levels below the MPE level. It is believed that the WEPN facility fully complies with the FCC's Rules and Regulations with respect to human exposure to radio frequency energy.

6.0 SUMMARY

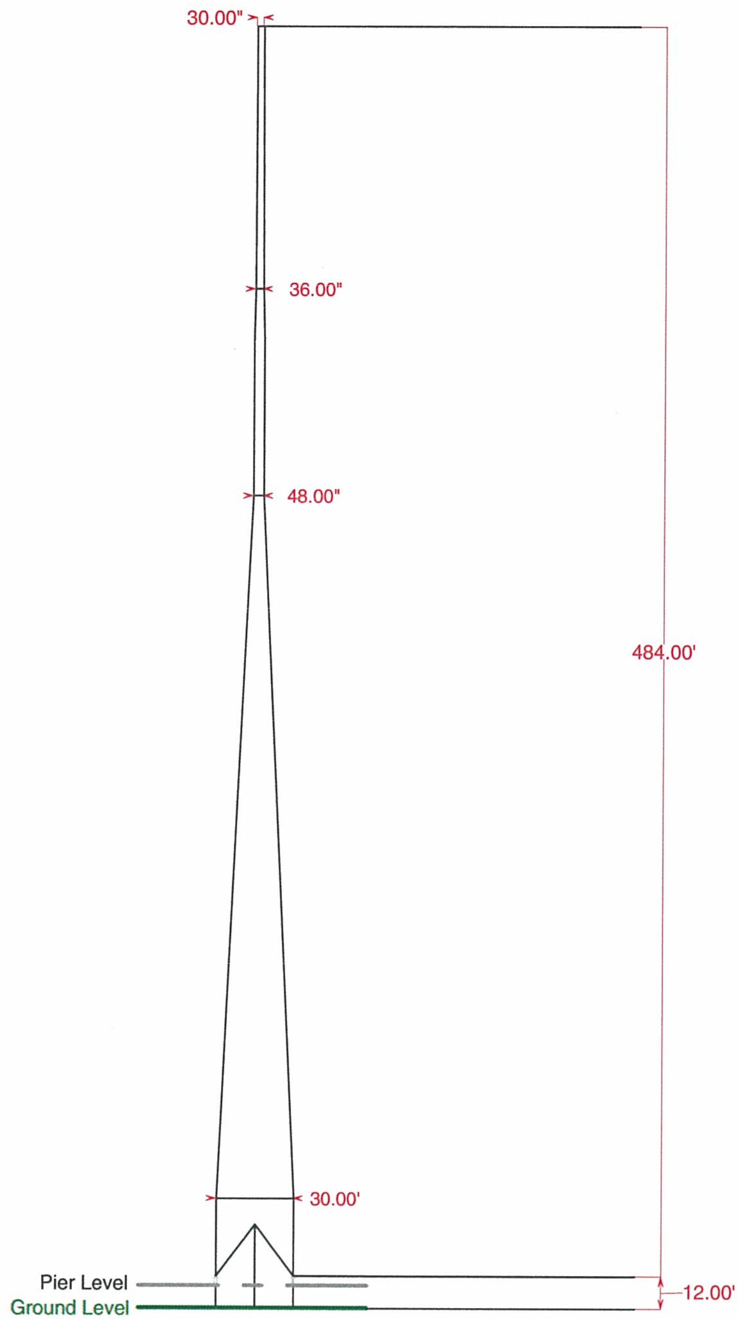
It is submitted that the WEPN directional antenna system has been constructed and adjusted to conform to the technical specifications contained in the Construction Permit, granted November 28, 2007. The pattern performance has been verified using computer modeling and sample system verification procedures in accordance with Section 47 CFR 73.151(c) and it is believed that the antenna system, as constructed and adjusted, fully complies with the terms of the Construction Permit and the FCC's Rules and Regulations.

This engineering statement and the attached figures were prepared by the undersigned or under the direct supervision of the undersigned and are believed to be true and correct.

Dated: July 9, 2009

COMMONWEALTH OF VIRGINIA
CARL THOMAS JONES JR
Lic. No. 013391
PROFESSIONAL ENGINEER

Figure 1



WIREFRAME TOWER MODEL
STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JUNE, 2009

Figure 2

TOWER MODEL HEIGHT AND RADIUS

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

Tower	Physical Height (meters)	Modeled Height (meters)	Percent of Physical Height	Modeled Radius (meters)	Percent of Equivalent Radius
1	147.5	162.6	110.2	See Note	See Note
2	147.5	170.3	115.5	See Note	See Note
3	147.5	164.1	111.3	See Note	See Note

Note: The complete structure of the wide-based self-supporting towers was modeled using thin wires of a radius typically found in such construction. The actual radius values for each of the elements that make up each tower are shown in the geometry files contained in the Appendices. A scale drawing based on the actual physical height is contained in Figure 1.

Figure 3

MEASURED AND MODELED IMPEDANCES

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

Tower	Measured Tower Base Impedance[1]	Modeled Tower Base Impedance	Shunt Capacitance (pF)	Modeled plus Shunt Capacitance	Lumped Series Inductance (uH)	Total Adjusted Tower Base Impedance
1	37.6 +j -86.8	46.2 -j 107.2	150.0	37.7 -j -98.5	1.8	37.7 +j -86.6
2	27.2 +j -41.9	31.9 -j 71.0	250.0	25.5 -j -64.8	3.5	25.5 +j -41.7
3	35.4 +j -89.2	46.7 -j 101.7	220.0	35.3 -j -90.7	0.1	35.3 +j -90.0

[1] Measured at output of matching network with other towers shorted

Figure 4

ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

DAYTIME		
Tower	Ratio	Phase (deg)
1	1.000	0.0
2	0.480	99.0
3	0.500	-57.6
Common Point Impedance = 50 -j 12 ohms Common Point Current = 32.45 amperes Antenna Input Power = 52,650 Watts		

NIGHTTIME		
Tower	Ratio	Phase (deg)
1	1.000	0.0
2	0.480	99.0
3	0.500	-57.6
Common Point Impedance = 50 -j 12 ohms Common Point Current = 32.45 amperes Antenna Input Power = 52,650 Watts		

Figure 5

SAMPLE LINE VERIFICATION MEASUREMENTS

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

Tower	Open Circuit Series Resonant Frequency[1] (kHz)	Open Circuit Measured Line Length[2] (degrees)	Resonant Frequency -45 degree Offset Frequency (kHz)	Resonant Frequency -45 degree Offset Impedance (Ohms)	Resonant Frequency +45 degree Offset Frequency (kHz)	Resonant Frequency +45 degree Offset Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)	Reference Impedance Sample Loop Connected[3] (Ohms)
1	955.8	494.4	860.2	8.42 -j 45.40	1051.3	7.00 +j 49.90	48.24	7.4 -j 32.7
2	956.1	494.2	860.5	8.27 -j 45.40	1051.7	7.12 +j 49.60	48.09	7.4 -j 32.7
3	956.5	494.0	860.8	8.31 -j 45.50	1052.1	7.14 +j 49.80	48.24	7.4 -j 33.1

[1] At this frequency, the sample line electrical length is equal to 450°.
[2] At carrier frequency (1050 kHz)
[3] Measured at antenna monitor end of sample line with sample loop connected. Impedance measured at WEPN operating frequency of 1050kHz

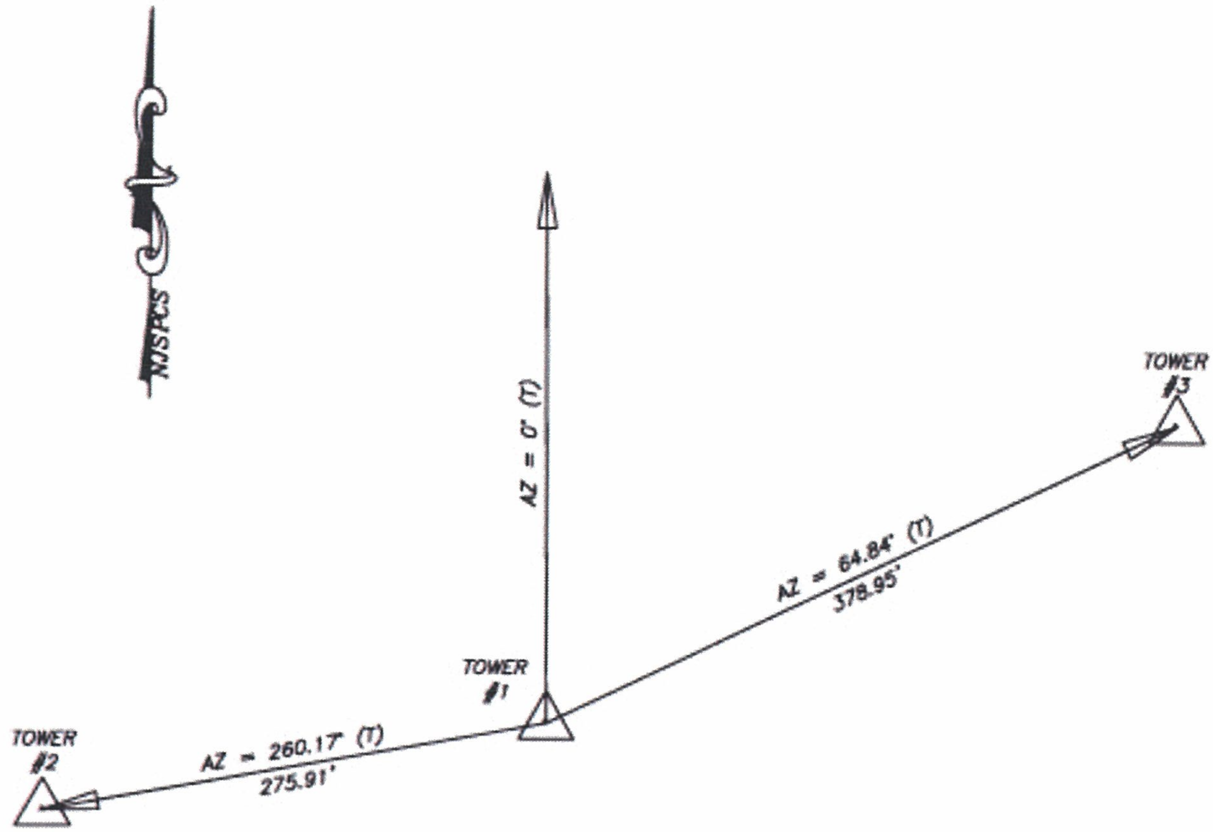
Figure 6

POST-CONSTRUCTION SURVEY SUMMARY

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

	As Designed			As Constructed			Distance from Designed Location	
	Spacing		Orientation	Spacing		Orientation		
Tower	(deg)	(feet)	(deg. T)	(deg)	(feet)	(deg. T)	(deg)	(feet)
1	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2	106.00	275.82	260.10	106.04	275.91	260.17	0.13	0.35
3	145.60	378.86	64.80	145.64	378.95	64.84	0.11	0.28

FIGURE 7



NOTES:
1. AZIMUTHS AND DISTANCES ARE MEASURED FROM THE CENTERLINES OF EACH TOWER.
2. FIELDWORK PERFORMED JUNE 2009.

PROJECT NO.: 06100

AS-BUILT TOWER ALIGNMENT

KEVIN S. BOGERMAN
PROFESSIONAL
LAND SURVEYOR No.41379

McNALLY ENGINEERING, LLC.

ESPN

LOT 12.01 - BLOCK 451
NORTH BERGEN
HUDSON COUNTY, NEW JERSEY, STATE

Mc NALLY ENGINEERING, L.L.C.
Certificate of Authorization 24GA27928700, exp. 8/31/10
393 RAMAPO VALLEY ROAD
OAKLAND, NJ 07436
(201) 337-9051

SCALE:	DATE:	SHEET NO.:	DWG. No.:
1" = 100'	06/24/2009	1 OF 4	TA-1

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

68.0 Degree Radial

Point Number	Distance (km)	Field (mV/m	Geographic Coordinates (NAD27) Latitude	Longitude	Description
1	3.10	960	40°47' 12.72"	74°1' 4.08"	NE corner of intersection, near payphone, in street near curb.
2	3.58	750	40°47' 15.18"	74°0' 48.42"	At intersection, walk down Monroe. Just before next intersection on right, there is an open yard. Take reading on sidewalk near yard.
3	4.35	650	40°47' 28.5"	74°0' 15.48"	Take reading in center of Guttenberg town hall parking lot.

124.0 Degree Radial

Point Number	Distance (km)	Field (mV/m	Geographic Coordinates (NAD27) Latitude	Longitude	Description
1	1.43	1300	40°45' 57.66"	74°1' 48.9"	Kerrigan Ave. and 23rd. Take reading on sidewalk at NE corner of intersection
2	1.92	720	40°45' 50.64"	74°1' 44.46"	Go to NW corner of intersection. Walk approximately 20 feet north on Hudson. Take reading in center of road.
3	2.51	720	40°45' 50.7"	74°1' 37.92"	NE corner of intersection in front of basketball court.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

19.0 Degree Radial

Point Number	Distance (km)	Field (mV/m	Geographic Coordinates (NAD27) Latitude	Longitude	Description
1	0.77	2920	40°47' 00.00"	74°2' 59.00"	NE corner of Home Depot, even with front of building, middle of "stop bar"
2	1.27	3100	40°47' 15.00"	74°2' 52.00"	West of Harmon Meadow Blvd., near entrance of Raymour & Flannagan. On sidewalk at sign "East, the Plaza"
3	1.57	2520	40°47' 25.00"	74°2' 48.00"	Rear of 450 Harmon Meadow Blvd. at curb in front of satellite dish (largest dish, "Scientific Atlanta")

227.5 Degree Radial

Point Number	Distance (km)	Field (mV/m	Geographic Coordinates (NAD27) Latitude	Longitude	Description
1	2.05	262	40°45' 51.00"	74°4' 14.00"	Street (no name) off Secaucus Rd., south side of road between Turnpike and Railroad at west end of guard rail
2	2.45	242	40°45' 42.00"	74°4' 27.00"	Railroad station South Drive, Employee parking lot. North end of lot, outer curb of right parking space.
3	5.25	72	40°44' 43.00"	74°5' 58.00"	NJ Transit parking area (outside larger gated parking lot) SE corner of paved lot

MEASURED SPURIOUS AND HARMONIC EMISSIONS
STATION WEPN - NEW YORK, NEW YORK
1050 kHz - 50 kW, DA-1
JULY, 2009

Measured Attenuation

Emission	Frequency (kHz)	Field Strength (mV/m)	Below Carrier (dBc)	Reference Carrier Level	FCC Limit (dBc)	Comments
F1	1050	1120	----	----	----	----
F2	710	----	----	----	----	----
F3	1600	340	----	----	----	----
F4	1010	----	----	----	----	----
F5	1130	----	----	----	----	----
F3-F1	550	0.052	-76.31	F1 or F3	80	No detectable audio, source not from F1 or F3
2F1-F5	970	0.1118	-80.02	F1	80	**See Footnote 1**
2F1-F4	1090	5.8	-45.72	F1	45	F4 audio present
2F1-F2	1390	5	-47.00	F1	80	Splatter from 1380 - no detectable audio from F1 or F2
F1+F2	1760	0.031	-91.16	F1	80	No detectable audio from F1 or F2
F1+F4	2060	0.034	-90.35	F1	80	F1 audio present
2F1	2100	0.045	-87.92	F1	80	F1 audio present
2F3-F1	2150	0.032	-80.53	F3	80	F3 audio present
3F1-F2	2440	0.03	-91.44	F1	80	F2 audio present
F1+F3	2650	0.032	-90.88	F1	80	F3 audio present
2F1+F2	2810	0.022	-94.14	F1	80	F1 audio present
2F1+F4	3110	0.038	-89.39	F1	80	F4 audio present
3F1	3150	0.047	-87.54	F1	80	F1 audio present
2F1+F5	3230	0.016	-96.90	F1	80	----
2F1+F3	3700	0.025	-93.03	F1	80	Combination of F1 and F3 audio present
3F1+F2	3860	<0.010	<-100.98	F1	80	----
4F1	4200	<0.010	<-100.98	F1	80	----
2F3+F1	4250	<0.010	<-90.63	F3	80	----

[1] Measured with 970 kHz off-air at 0.15 mV/m and with both 970 kHz and 1050 kHz off-air at 0.10 mV/m. Emission is calculated as $((0.15)^2-(0.10)^2)^{1/2}$ = 0.1118 or -80.01 dB.

APPENDIX A

Individual Tower Modeling

IMPEDANCE - TOWER 1
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.05	46.217	-107.25	116.78	293.3	6.8371	-2.5592	-3.5138

GEOMETRY - TOWER 1
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.0025	4
		0	0	3.6576		
2	none	0	0	3.6576	.0025	6
		0	0	9.7476		
3	none	0	0	9.7476	.005	6
		5.28	0	3.6576		
4	none	0	0	9.7476	.005	6
		-2.64	4.57	3.6576		
5	none	0	0	9.7476	.005	6
		-2.64	-4.57	3.6576		
6	none	5.28	0	0	.0254	4
		5.28	0	3.6576		
7	none	5.28	0	3.6576	.0254	9
		5.28	0	12.7976		
8	none	5.28	0	12.7976	.0254	6
		4.93	0	18.8976		
9	none	4.93	0	18.8976	.0254	6
		4.58	0	24.9976		
10	none	4.58	0	24.9976	.0254	6
		4.22	0	31.0876		
11	none	4.22	0	31.0876	.0254	6
		3.87	0	37.1876		
12	none	3.87	0	37.1876	.0254	6
		3.52	0	43.2776		
13	none	3.52	0	43.2776	.0254	6
		3.17	0	49.3776		
14	none	3.17	0	49.3776	.0254	6
		2.82	0	55.4776		
15	none	2.82	0	55.4776	.0254	6
		2.46	0	61.5676		
16	none	2.46	0	61.5676	.0254	6
		2.11	0	67.6676		
17	none	2.11	0	67.6676	.0254	6
		1.76	0	73.7576		
18	none	1.76	0	73.7576	.0254	6
		1.41	0	79.8576		
19	none	1.41	0	79.8576	.0254	6
		1.06	0	85.9576		
20	none	1.06	0	85.9576	.0254	6
		.7	0	92.0476		
21	none	.7	0	92.0476	.0254	6
		.7	0	98.1476		
22	none	.7	0	98.1476	.0254	6
		.7	0	104.238		

GEOMETRY - TOWER 1 - (Continued)

23	none	.7	0	104.238	.0254	6
		.7	0	110.338		
24	none	.7	0	110.338	.0254	6
		.53	0	116.438		
25	none	.53	0	116.438	.0254	6
		.53	0	122.528		
26	none	.53	0	122.528	.0254	6
		.53	0	128.628		
27	none	.53	0	128.628	.0254	6
		.53	0	134.718		
28	none	.53	0	134.718	.0254	6
		.44	0	140.818		
29	none	.44	0	140.818	.0254	6
		.44	0	146.918		
30	none	.44	0	146.918	.0254	8
		.44	0	162.58		
31	none	-2.64	4.57	0	.0254	4
		-2.64	4.57	3.6576		
32	none	-2.64	4.57	3.6576	.0254	9
		-2.64	4.57	12.7976		
33	none	-2.64	4.57	12.7976	.0254	6
		-2.46	4.27	18.8976		
34	none	-2.46	4.27	18.8976	.0254	6
		-2.29	3.96	24.9976		
35	none	-2.29	3.96	24.9976	.0254	6
		-2.11	3.66	31.0876		
36	none	-2.11	3.66	31.0876	.0254	6
		-1.94	3.35	37.1876		
37	none	-1.94	3.35	37.1876	.0254	6
		-1.76	3.05	43.2776		
38	none	-1.76	3.05	43.2776	.0254	6
		-1.58	2.74	49.3776		
39	none	-1.58	2.74	49.3776	.0254	6
		-1.41	2.44	55.4776		
40	none	-1.41	2.44	55.4776	.0254	6
		-1.23	2.13	61.5676		
41	none	-1.23	2.13	61.5676	.0254	6
		-1.06	1.83	67.6676		
42	none	-1.06	1.83	67.6676	.0254	6
		-.88	1.52	73.7576		
43	none	-.88	1.52	73.7576	.0254	6
		-.7	1.22	79.8576		
44	none	-.7	1.22	79.8576	.0254	6
		-.53	.91	85.9576		
45	none	-.53	.91	85.9576	.0254	6
		-.35	.61	92.0476		
46	none	-.35	.61	92.0476	.0254	6
		-.35	.61	98.1476		
47	none	-.35	.61	98.1476	.0254	6
		-.35	.61	104.238		
48	none	-.35	.61	104.238	.0254	6
		-.35	.61	110.338		
49	none	-.35	.61	110.338	.0254	6
		-.26	.46	116.438		

GEOMETRY - TOWER 1 - (Continued)

50	none	-.26	.46	116.438	.0254	6
		-.26	.46	122.528		
51	none	-.26	.46	122.528	.0254	6
		-.26	.46	128.628		
52	none	-.26	.46	128.628	.0254	6
		-.26	.46	134.718		
53	none	-.26	.46	134.718	.0254	6
		-.22	.38	140.818		
54	none	-.22	.38	140.818	.0254	6
		-.22	.38	146.918		
55	none	-.22	.38	146.918	.0254	8
		-.22	.38	162.58		
56	none	-2.64	-4.57	0	.0254	4
		-2.64	-4.57	3.6576		
57	none	-2.64	-4.57	3.6576	.0254	9
		-2.64	-4.57	12.7976		
58	none	-2.64	-4.57	12.7976	.0254	6
		-2.46	-4.27	18.8976		
59	none	-2.46	-4.27	18.8976	.0254	6
		-2.29	-3.96	24.9976		
60	none	-2.29	-3.96	24.9976	.0254	6
		-2.11	-3.66	31.0876		
61	none	-2.11	-3.66	31.0876	.0254	6
		-1.94	-3.35	37.1876		
62	none	-1.94	-3.35	37.1876	.0254	6
		-1.76	-3.05	43.2776		
63	none	-1.76	-3.05	43.2776	.0254	6
		-1.58	-2.74	49.3776		
64	none	-1.58	-2.74	49.3776	.0254	6
		-1.41	-2.44	55.4776		
65	none	-1.41	-2.44	55.4776	.0254	6
		-1.23	-2.13	61.5676		
66	none	-1.23	-2.13	61.5676	.0254	6
		-1.06	-1.83	67.6676		
67	none	-1.06	-1.83	67.6676	.0254	6
		-.88	-1.52	73.7576		
68	none	-.88	-1.52	73.7576	.0254	6
		-.7	-1.22	79.8576		
69	none	-.7	-1.22	79.8576	.0254	6
		-.53	-.91	85.9576		
70	none	-.53	-.91	85.9576	.0254	6
		-.35	-.61	92.0476		
71	none	-.35	-.61	92.0476	.0254	6
		-.35	-.61	98.1476		
72	none	-.35	-.61	98.1476	.0254	6
		-.35	-.61	104.238		
73	none	-.35	-.61	104.238	.0254	6
		-.35	-.61	110.338		
74	none	-.35	-.61	110.338	.0254	6
		-.26	-.46	116.438		
75	none	-.26	-.46	116.438	.0254	6
		-.26	-.46	122.528		
76	none	-.26	-.46	122.528	.0254	6
		-.26	-.46	128.628		

GEOMETRY - TOWER 1 - (Continued)

77	none	-.26	-.46	128.628	.0254	6
		-.26	-.46	134.718		
78	none	-.26	-.46	134.718	.0254	6
		-.22	-.38	140.818		
79	none	-.22	-.38	140.818	.0254	6
		-.22	-.38	146.918		
80	none	-.22	-.38	146.918	.0254	8
		-.22	-.38	162.58		
81	none	5.28	0	12.7976	.0254	5
		-2.64	4.57	12.7976		
82	none	-2.64	4.57	12.7976	.0254	5
		-2.64	-4.57	12.7976		
83	none	-2.64	-4.57	12.7976	.0254	5
		5.28	0	12.7976		
84	none	.7	0	92.0476	.0254	1
		-.35	.61	92.0476		
85	none	-.35	.61	92.0476	.0254	1
		-.35	-.61	92.0476		
86	none	-.35	-.61	92.0476	.0254	1
		.7	0	92.0476		
87	none	.53	0	116.438	.0254	1
		-.26	.46	116.438		
88	none	-.26	.46	116.438	.0254	1
		-.26	-.46	116.438		
89	none	-.26	-.46	116.438	.0254	1
		.53	0	116.438		
90	none	.44	0	162.58	.0254	1
		-.22	.38	162.58		
91	none	-.22	.38	162.58	.0254	1
		-.22	-.38	162.58		
92	none	-.22	-.38	162.58	.0254	1
		.44	0	162.58		
93	none	-14.5	-82.8	0	.0025	4
		-14.5	-82.8	3.6576		
94	none	-14.5	-82.8	3.6576	.0025	6
		-14.5	-82.8	9.7476		
95	none	-14.5	-82.8	9.7476	.005	6
		-9.22	-82.8	3.6576		
96	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-78.23	3.6576		
97	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-87.37	3.6576		
98	none	-9.22	-82.8	0	.0254	4
		-9.22	-82.8	3.6576		
99	none	-9.22	-82.8	3.6576	.0254	9
		-9.22	-82.8	12.7976		
100	none	-9.22	-82.8	12.7976	.0254	6
		-9.57	-82.8	18.8976		
101	none	-9.57	-82.8	18.8976	.0254	6
		-9.92	-82.8	24.9976		
102	none	-9.92	-82.8	24.9976	.0254	6
		-10.28	-82.8	31.0876		
103	none	-10.28	-82.8	31.0876	.0254	6
		-10.63	-82.8	37.1876		

GEOMETRY - TOWER 1 - (Continued)

104	none	-10.63	-82.8	37.1876	.0254	6
		-10.98	-82.8	43.2776		
105	none	-10.98	-82.8	43.2776	.0254	6
		-11.33	-82.8	49.3776		
106	none	-11.33	-82.8	49.3776	.0254	6
		-11.68	-82.8	55.4776		
107	none	-11.68	-82.8	55.4776	.0254	6
		-12.04	-82.8	61.5676		
108	none	-12.04	-82.8	61.5676	.0254	6
		-12.39	-82.8	67.6676		
109	none	-12.39	-82.8	67.6676	.0254	6
		-12.74	-82.8	73.7576		
110	none	-12.74	-82.8	73.7576	.0254	6
		-13.09	-82.8	79.8576		
111	none	-13.09	-82.8	79.8576	.0254	6
		-13.44	-82.8	85.9576		
112	none	-13.44	-82.8	85.9576	.0254	6
		-13.8	-82.8	92.0476		
113	none	-13.8	-82.8	92.0476	.0254	6
		-13.8	-82.8	98.1476		
114	none	-13.8	-82.8	98.1476	.0254	6
		-13.8	-82.8	104.238		
115	none	-13.8	-82.8	104.238	.0254	6
		-13.8	-82.8	110.338		
116	none	-13.8	-82.8	110.338	.0254	6
		-13.97	-82.8	116.438		
117	none	-13.97	-82.8	116.438	.0254	6
		-13.97	-82.8	122.528		
118	none	-13.97	-82.8	122.528	.0254	6
		-13.97	-82.8	128.628		
119	none	-13.97	-82.8	128.628	.0254	6
		-13.97	-82.8	134.718		
120	none	-13.97	-82.8	134.718	.0254	6
		-14.06	-82.8	140.818		
121	none	-14.06	-82.8	140.818	.0254	6
		-14.06	-82.8	146.918		
122	none	-14.06	-82.8	146.918	.0254	12
		-14.06	-82.8	170.3		
123	none	-17.14	-78.23	0	.0254	4
		-17.14	-78.23	3.6576		
124	none	-17.14	-78.23	3.6576	.0254	9
		-17.14	-78.23	12.7976		
125	none	-17.14	-78.23	12.7976	.0254	6
		-16.96	-78.53	18.8976		
126	none	-16.96	-78.53	18.8976	.0254	6
		-16.79	-78.84	24.9976		
127	none	-16.79	-78.84	24.9976	.0254	6
		-16.61	-79.14	31.0876		
128	none	-16.61	-79.14	31.0876	.0254	6
		-16.44	-79.45	37.1876		
129	none	-16.44	-79.45	37.1876	.0254	6
		-16.26	-79.75	43.2776		
130	none	-16.26	-79.75	43.2776	.0254	6
		-16.08	-80.06	49.3776		

GEOMETRY - TOWER 1 - (Continued)

131	none	-16.08	-80.06	49.3776	.0254	6
		-15.91	-80.36	55.4776		
132	none	-15.91	-80.36	55.4776	.0254	6
		-15.73	-80.67	61.5676		
133	none	-15.73	-80.67	61.5676	.0254	6
		-15.56	-80.97	67.6676		
134	none	-15.56	-80.97	67.6676	.0254	6
		-15.38	-81.28	73.7576		
135	none	-15.38	-81.28	73.7576	.0254	6
		-15.2	-81.58	79.8576		
136	none	-15.2	-81.58	79.8576	.0254	6
		-15.03	-81.89	85.9576		
137	none	-15.03	-81.89	85.9576	.0254	6
		-14.85	-82.19	92.0476		
138	none	-14.85	-82.19	92.0476	.0254	6
		-14.85	-82.19	98.1476		
139	none	-14.85	-82.19	98.1476	.0254	6
		-14.85	-82.19	104.238		
140	none	-14.85	-82.19	104.238	.0254	6
		-14.85	-82.19	110.338		
141	none	-14.85	-82.19	110.338	.0254	6
		-14.76	-82.34	116.438		
142	none	-14.76	-82.34	116.438	.0254	6
		-14.76	-82.34	122.528		
143	none	-14.76	-82.34	122.528	.0254	6
		-14.76	-82.34	128.628		
144	none	-14.76	-82.34	128.628	.0254	6
		-14.76	-82.34	134.718		
145	none	-14.76	-82.34	134.718	.0254	6
		-14.72	-82.42	140.818		
146	none	-14.72	-82.42	140.818	.0254	6
		-14.72	-82.42	146.918		
147	none	-14.72	-82.42	146.918	.0254	12
		-14.72	-82.42	170.3		
148	none	-17.14	-87.37	0	.0254	4
		-17.14	-87.37	3.6576		
149	none	-17.14	-87.37	3.6576	.0254	9
		-17.14	-87.37	12.7976		
150	none	-17.14	-87.37	12.7976	.0254	6
		-16.96	-87.07	18.8976		
151	none	-16.96	-87.07	18.8976	.0254	6
		-16.79	-86.76	24.9976		
152	none	-16.79	-86.76	24.9976	.0254	6
		-16.61	-86.46	31.0876		
153	none	-16.61	-86.46	31.0876	.0254	6
		-16.44	-86.15	37.1876		
154	none	-16.44	-86.15	37.1876	.0254	6
		-16.26	-85.85	43.2776		
155	none	-16.26	-85.85	43.2776	.0254	6
		-16.08	-85.54	49.3776		
156	none	-16.08	-85.54	49.3776	.0254	6
		-15.91	-85.24	55.4776		
157	none	-15.91	-85.24	55.4776	.0254	6
		-15.73	-84.93	61.5676		

GEOMETRY - TOWER 1 - (Continued)

158	none	-15.73	-84.93	61.5676	.0254	6
		-15.56	-84.63	67.6676		
159	none	-15.56	-84.63	67.6676	.0254	6
		-15.38	-84.32	73.7576		
160	none	-15.38	-84.32	73.7576	.0254	6
		-15.2	-84.02	79.8576		
161	none	-15.2	-84.02	79.8576	.0254	6
		-15.03	-83.71	85.9576		
162	none	-15.03	-83.71	85.9576	.0254	6
		-14.85	-83.41	92.0476		
163	none	-14.85	-83.41	92.0476	.0254	6
		-14.85	-83.41	98.1476		
164	none	-14.85	-83.41	98.1476	.0254	6
		-14.85	-83.41	104.238		
165	none	-14.85	-83.41	104.238	.0254	6
		-14.85	-83.41	110.338		
166	none	-14.85	-83.41	110.338	.0254	6
		-14.76	-83.26	116.438		
167	none	-14.76	-83.26	116.438	.0254	6
		-14.76	-83.26	122.528		
168	none	-14.76	-83.26	122.528	.0254	6
		-14.76	-83.26	128.628		
169	none	-14.76	-83.26	128.628	.0254	6
		-14.76	-83.26	134.718		
170	none	-14.76	-83.26	134.718	.0254	6
		-14.72	-83.18	140.818		
171	none	-14.72	-83.18	140.818	.0254	6
		-14.72	-83.18	146.918		
172	none	-14.72	-83.18	146.918	.0254	12
		-14.72	-83.18	170.3		
173	none	-9.22	-82.8	12.7976	.0254	5
		-17.14	-78.23	12.7976		
174	none	-17.14	-78.23	12.7976	.0254	5
		-17.14	-87.37	12.7976		
175	none	-17.14	-87.37	12.7976	.0254	5
		-9.22	-82.8	12.7976		
176	none	-13.8	-82.8	92.0476	.0254	1
		-14.85	-82.19	92.0476		
177	none	-14.85	-82.19	92.0476	.0254	1
		-14.85	-83.41	92.0476		
178	none	-14.85	-83.41	92.0476	.0254	1
		-13.8	-82.8	92.0476		
179	none	-13.97	-82.8	116.438	.0254	1
		-14.76	-82.34	116.438		
180	none	-14.76	-82.34	116.438	.0254	1
		-14.76	-83.26	116.438		
181	none	-14.76	-83.26	116.438	.0254	1
		-13.97	-82.8	116.438		
182	none	-14.06	-82.8	170.3	.0254	1
		-14.72	-82.42	170.3		
183	none	-14.72	-82.42	170.3	.0254	1
		-14.72	-83.18	170.3		
184	none	-14.72	-83.18	170.3	.0254	1
		-14.06	-82.8	170.3		

GEOMETRY - TOWER 1 - (Continued)

185	none	49.2	104.5	0	.0025	4
		49.2	104.5	3.6576		
186	none	49.2	104.5	3.6576	.0025	6
		49.2	104.5	9.7476		
187	none	49.2	104.5	9.7476	.005	6
		54.48	104.5	3.6576		
188	none	49.2	104.5	9.7476	.005	6
		46.56	109.07	3.6576		
189	none	49.2	104.5	9.7476	.005	6
		46.56	99.93	3.6576		
190	none	54.48	104.5	0	.0254	4
		54.48	104.5	3.6576		
191	none	54.48	104.5	3.6576	.0254	9
		54.48	104.5	12.7976		
192	none	54.48	104.5	12.7976	.0254	6
		54.13	104.5	18.8976		
193	none	54.13	104.5	18.8976	.0254	6
		53.78	104.5	24.9976		
194	none	53.78	104.5	24.9976	.0254	6
		53.42	104.5	31.0876		
195	none	53.42	104.5	31.0876	.0254	6
		53.07	104.5	37.1876		
196	none	53.07	104.5	37.1876	.0254	6
		52.72	104.5	43.2776		
197	none	52.72	104.5	43.2776	.0254	6
		52.37	104.5	49.3776		
198	none	52.37	104.5	49.3776	.0254	6
		52.02	104.5	55.4776		
199	none	52.02	104.5	55.4776	.0254	6
		51.66	104.5	61.5676		
200	none	51.66	104.5	61.5676	.0254	6
		51.31	104.5	67.6676		
201	none	51.31	104.5	67.6676	.0254	6
		50.96	104.5	73.7576		
202	none	50.96	104.5	73.7576	.0254	6
		50.61	104.5	79.8576		
203	none	50.61	104.5	79.8576	.0254	6
		50.26	104.5	85.9576		
204	none	50.26	104.5	85.9576	.0254	6
		49.9	104.5	92.0476		
205	none	49.9	104.5	92.0476	.0254	6
		49.9	104.5	98.1476		
206	none	49.9	104.5	98.1476	.0254	6
		49.9	104.5	104.238		
207	none	49.9	104.5	104.238	.0254	6
		49.9	104.5	110.338		
208	none	49.9	104.5	110.338	.0254	6
		49.73	104.5	116.438		
209	none	49.73	104.5	116.438	.0254	6
		49.73	104.5	122.528		
210	none	49.73	104.5	122.528	.0254	6
		49.73	104.5	128.628		
211	none	49.73	104.5	128.628	.0254	6
		49.73	104.5	134.718		

GEOMETRY - TOWER 1 - (Continued)

212	none	49.73	104.5	134.718	.0254	6
		49.64	104.5	140.818		
213	none	49.64	104.5	140.818	.0254	6
		49.64	104.5	146.918		
214	none	49.64	104.5	146.918	.0254	9
		49.64	104.5	164.13		
215	none	46.56	109.07	0	.0254	4
		46.56	109.07	3.6576		
216	none	46.56	109.07	3.6576	.0254	9
		46.56	109.07	12.7976		
217	none	46.56	109.07	12.7976	.0254	6
		46.74	108.77	18.8976		
218	none	46.74	108.77	18.8976	.0254	6
		46.91	108.46	24.9976		
219	none	46.91	108.46	24.9976	.0254	6
		47.09	108.16	31.0876		
220	none	47.09	108.16	31.0876	.0254	6
		47.26	107.85	37.1876		
221	none	47.26	107.85	37.1876	.0254	6
		47.44	107.55	43.2776		
222	none	47.44	107.55	43.2776	.0254	6
		47.62	107.24	49.3776		
223	none	47.62	107.24	49.3776	.0254	6
		47.79	106.94	55.4776		
224	none	47.79	106.94	55.4776	.0254	6
		47.97	106.63	61.5676		
225	none	47.97	106.63	61.5676	.0254	6
		48.14	106.33	67.6676		
226	none	48.14	106.33	67.6676	.0254	6
		48.32	106.02	73.7576		
227	none	48.32	106.02	73.7576	.0254	6
		48.5	105.72	79.8576		
228	none	48.5	105.72	79.8576	.0254	6
		48.67	105.41	85.9576		
229	none	48.67	105.41	85.9576	.0254	6
		48.85	105.11	92.0476		
230	none	48.85	105.11	92.0476	.0254	6
		48.85	105.11	98.1476		
231	none	48.85	105.11	98.1476	.0254	6
		48.85	105.11	104.238		
232	none	48.85	105.11	104.238	.0254	6
		48.85	105.11	110.338		
233	none	48.85	105.11	110.338	.0254	6
		48.94	104.96	116.438		
234	none	48.94	104.96	116.438	.0254	6
		48.94	104.96	122.528		
235	none	48.94	104.96	122.528	.0254	6
		48.94	104.96	128.628		
236	none	48.94	104.96	128.628	.0254	6
		48.94	104.96	134.718		
237	none	48.94	104.96	134.718	.0254	6
		48.98	104.88	140.818		
238	none	48.98	104.88	140.818	.0254	6
		48.98	104.88	146.918		

GEOMETRY - TOWER 1 - (Continued)

239	none	48.98	104.88	146.918	.0254	9
		48.98	104.88	164.13		
240	none	46.56	99.93	0	.0254	4
		46.56	99.93	3.6576		
241	none	46.56	99.93	3.6576	.0254	9
		46.56	99.93	12.7976		
242	none	46.56	99.93	12.7976	.0254	6
		46.74	100.23	18.8976		
243	none	46.74	100.23	18.8976	.0254	6
		46.91	100.54	24.9976		
244	none	46.91	100.54	24.9976	.0254	6
		47.09	100.84	31.0876		
245	none	47.09	100.84	31.0876	.0254	6
		47.26	101.15	37.1876		
246	none	47.26	101.15	37.1876	.0254	6
		47.44	101.45	43.2776		
247	none	47.44	101.45	43.2776	.0254	6
		47.62	101.76	49.3776		
248	none	47.62	101.76	49.3776	.0254	6
		47.79	102.06	55.4776		
249	none	47.79	102.06	55.4776	.0254	6
		47.97	102.37	61.5676		
250	none	47.97	102.37	61.5676	.0254	6
		48.14	102.67	67.6676		
251	none	48.14	102.67	67.6676	.0254	6
		48.32	102.98	73.7576		
252	none	48.32	102.98	73.7576	.0254	6
		48.5	103.28	79.8576		
253	none	48.5	103.28	79.8576	.0254	6
		48.67	103.59	85.9576		
254	none	48.67	103.59	85.9576	.0254	6
		48.85	103.89	92.0476		
255	none	48.85	103.89	92.0476	.0254	6
		48.85	103.89	98.1476		
256	none	48.85	103.89	98.1476	.0254	6
		48.85	103.89	104.238		
257	none	48.85	103.89	104.238	.0254	6
		48.85	103.89	110.338		
258	none	48.85	103.89	110.338	.0254	6
		48.94	104.04	116.438		
259	none	48.94	104.04	116.438	.0254	6
		48.94	104.04	122.528		
260	none	48.94	104.04	122.528	.0254	6
		48.94	104.04	128.628		
261	none	48.94	104.04	128.628	.0254	6
		48.94	104.04	134.718		
262	none	48.94	104.04	134.718	.0254	6
		48.98	104.12	140.818		
263	none	48.98	104.12	140.818	.0254	6
		48.98	104.12	146.918		
264	none	48.98	104.12	146.918	.0254	9
		48.98	104.12	164.13		
265	none	54.48	104.5	12.7976	.0254	5
		46.56	109.07	12.7976		

GEOMETRY - TOWER 1 - (Continued)

266	none	46.56	109.07	12.7976	.0254	5
		46.56	99.93	12.7976		
267	none	46.56	99.93	12.7976	.0254	5
		54.48	104.5	12.7976		
268	none	49.9	104.5	92.0476	.0254	1
		48.85	105.11	92.0476		
269	none	48.85	105.11	92.0476	.0254	1
		48.85	103.89	92.0476		
270	none	48.85	103.89	92.0476	.0254	1
		49.9	104.5	92.0476		
271	none	49.73	104.5	116.438	.0254	1
		48.94	104.96	116.438		
272	none	48.94	104.96	116.438	.0254	1
		48.94	104.04	116.438		
273	none	48.94	104.04	116.438	.0254	1
		49.73	104.5	116.438		
274	none	49.64	104.5	164.13	.0254	1
		48.98	104.88	164.13		
275	none	48.98	104.88	164.13	.0254	1
		48.98	104.12	164.13		
276	none	48.98	104.12	164.13	.0254	1
		49.64	104.5	164.13		

Number of wires = 276
current nodes = 1593

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	275	.759995	30	1.95775
segment/radius ratio	275	29.921	2	406.
radius	1	2.5E-03	6	.0254

ELECTRICAL DESCRIPTION - TOWER 1

Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.05	0	1	2.66E-03	6.86E-03

Sources

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

ELECTRICAL DESCRIPTION - TOWER 1 (Continued)

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	0	0	0	0
2	32	1.E+06	0	0	0	0
3	186	1.E+06	0	0	0	0
4	340	1.E+06	0	0	0	0
5	527	0	0	.0035	0	0
6	558	1.E+06	0	0	0	0
7	716	1.E+06	0	0	0	0
8	874	1.E+06	0	0	0	0
9	1065	0	0	1.E-04	0	0
10	1096	1.E+06	0	0	0	0
11	1251	1.E+06	0	0	0	0
12	1406	1.E+06	0	0	0	0

IMPEDANCE - TOWER 2

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 527, sector 1							
1.05	31.934	-71.033	77.881	294.2	5.1712	-3.4022	-2.6509

GEOMETRY - TOWER 2

Dimensions in meters

Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.0025	4
		0	0	3.6576		
2	none	0	0	3.6576	.0025	6
		0	0	9.7476		
3	none	0	0	9.7476	.005	6
		5.28	0	3.6576		
4	none	0	0	9.7476	.005	6
		-2.64	4.57	3.6576		
5	none	0	0	9.7476	.005	6
		-2.64	-4.57	3.6576		
6	none	5.28	0	0	.0254	4
		5.28	0	3.6576		
7	none	5.28	0	3.6576	.0254	9
		5.28	0	12.7976		
8	none	5.28	0	12.7976	.0254	6
		4.93	0	18.8976		
9	none	4.93	0	18.8976	.0254	6
		4.58	0	24.9976		
10	none	4.58	0	24.9976	.0254	6
		4.22	0	31.0876		
11	none	4.22	0	31.0876	.0254	6
		3.87	0	37.1876		
12	none	3.87	0	37.1876	.0254	6
		3.52	0	43.2776		

GEOMETRY - TOWER 2 (Continued)

13	none	3.52	0	43.2776	.0254	6
		3.17	0	49.3776		
14	none	3.17	0	49.3776	.0254	6
		2.82	0	55.4776		
15	none	2.82	0	55.4776	.0254	6
		2.46	0	61.5676		
16	none	2.46	0	61.5676	.0254	6
		2.11	0	67.6676		
17	none	2.11	0	67.6676	.0254	6
		1.76	0	73.7576		
18	none	1.76	0	73.7576	.0254	6
		1.41	0	79.8576		
19	none	1.41	0	79.8576	.0254	6
		1.06	0	85.9576		
20	none	1.06	0	85.9576	.0254	6
		.7	0	92.0476		
21	none	.7	0	92.0476	.0254	6
		.7	0	98.1476		
22	none	.7	0	98.1476	.0254	6
		.7	0	104.238		
23	none	.7	0	104.238	.0254	6
		.7	0	110.338		
24	none	.7	0	110.338	.0254	6
		.53	0	116.438		
25	none	.53	0	116.438	.0254	6
		.53	0	122.528		
26	none	.53	0	122.528	.0254	6
		.53	0	128.628		
27	none	.53	0	128.628	.0254	6
		.53	0	134.718		
28	none	.53	0	134.718	.0254	6
		.44	0	140.818		
29	none	.44	0	140.818	.0254	6
		.44	0	146.918		
30	none	.44	0	146.918	.0254	8
		.44	0	162.58		
31	none	-2.64	4.57	0	.0254	4
		-2.64	4.57	3.6576		
32	none	-2.64	4.57	3.6576	.0254	9
		-2.64	4.57	12.7976		
33	none	-2.64	4.57	12.7976	.0254	6
		-2.46	4.27	18.8976		
34	none	-2.46	4.27	18.8976	.0254	6
		-2.29	3.96	24.9976		
35	none	-2.29	3.96	24.9976	.0254	6
		-2.11	3.66	31.0876		
36	none	-2.11	3.66	31.0876	.0254	6
		-1.94	3.35	37.1876		
37	none	-1.94	3.35	37.1876	.0254	6
		-1.76	3.05	43.2776		
38	none	-1.76	3.05	43.2776	.0254	6
		-1.58	2.74	49.3776		
39	none	-1.58	2.74	49.3776	.0254	6
		-1.41	2.44	55.4776		

GEOMETRY - TOWER 2 (Continued)

40	none	-1.41	2.44	55.4776	.0254	6
		-1.23	2.13	61.5676		
41	none	-1.23	2.13	61.5676	.0254	6
		-1.06	1.83	67.6676		
42	none	-1.06	1.83	67.6676	.0254	6
		-.88	1.52	73.7576		
43	none	-.88	1.52	73.7576	.0254	6
		-.7	1.22	79.8576		
44	none	-.7	1.22	79.8576	.0254	6
		-.53	.91	85.9576		
45	none	-.53	.91	85.9576	.0254	6
		-.35	.61	92.0476		
46	none	-.35	.61	92.0476	.0254	6
		-.35	.61	98.1476		
47	none	-.35	.61	98.1476	.0254	6
		-.35	.61	104.238		
48	none	-.35	.61	104.238	.0254	6
		-.35	.61	110.338		
49	none	-.35	.61	110.338	.0254	6
		-.26	.46	116.438		
50	none	-.26	.46	116.438	.0254	6
		-.26	.46	122.528		
51	none	-.26	.46	122.528	.0254	6
		-.26	.46	128.628		
52	none	-.26	.46	128.628	.0254	6
		-.26	.46	134.718		
53	none	-.26	.46	134.718	.0254	6
		-.22	.38	140.818		
54	none	-.22	.38	140.818	.0254	6
		-.22	.38	146.918		
55	none	-.22	.38	146.918	.0254	8
		-.22	.38	162.58		
56	none	-2.64	-4.57	0	.0254	4
		-2.64	-4.57	3.6576		
57	none	-2.64	-4.57	3.6576	.0254	9
		-2.64	-4.57	12.7976		
58	none	-2.64	-4.57	12.7976	.0254	6
		-2.46	-4.27	18.8976		
59	none	-2.46	-4.27	18.8976	.0254	6
		-2.29	-3.96	24.9976		
60	none	-2.29	-3.96	24.9976	.0254	6
		-2.11	-3.66	31.0876		
61	none	-2.11	-3.66	31.0876	.0254	6
		-1.94	-3.35	37.1876		
62	none	-1.94	-3.35	37.1876	.0254	6
		-1.76	-3.05	43.2776		
63	none	-1.76	-3.05	43.2776	.0254	6
		-1.58	-2.74	49.3776		
64	none	-1.58	-2.74	49.3776	.0254	6
		-1.41	-2.44	55.4776		
65	none	-1.41	-2.44	55.4776	.0254	6
		-1.23	-2.13	61.5676		
66	none	-1.23	-2.13	61.5676	.0254	6
		-1.06	-1.83	67.6676		

GEOMETRY - TOWER 2 (Continued)

67	none	-1.06	-1.83	67.6676	.0254	6
		-.88	-1.52	73.7576		
68	none	-.88	-1.52	73.7576	.0254	6
		-.7	-1.22	79.8576		
69	none	-.7	-1.22	79.8576	.0254	6
		-.53	-.91	85.9576		
70	none	-.53	-.91	85.9576	.0254	6
		-.35	-.61	92.0476		
71	none	-.35	-.61	92.0476	.0254	6
		-.35	-.61	98.1476		
72	none	-.35	-.61	98.1476	.0254	6
		-.35	-.61	104.238		
73	none	-.35	-.61	104.238	.0254	6
		-.35	-.61	110.338		
74	none	-.35	-.61	110.338	.0254	6
		-.26	-.46	116.438		
75	none	-.26	-.46	116.438	.0254	6
		-.26	-.46	122.528		
76	none	-.26	-.46	122.528	.0254	6
		-.26	-.46	128.628		
77	none	-.26	-.46	128.628	.0254	6
		-.26	-.46	134.718		
78	none	-.26	-.46	134.718	.0254	6
		-.22	-.38	140.818		
79	none	-.22	-.38	140.818	.0254	6
		-.22	-.38	146.918		
80	none	-.22	-.38	146.918	.0254	8
		-.22	-.38	162.58		
81	none	5.28	0	12.7976	.0254	5
		-2.64	4.57	12.7976		
82	none	-2.64	4.57	12.7976	.0254	5
		-2.64	-4.57	12.7976		
83	none	-2.64	-4.57	12.7976	.0254	5
		5.28	0	12.7976		
84	none	.7	0	92.0476	.0254	1
		-.35	.61	92.0476		
85	none	-.35	.61	92.0476	.0254	1
		-.35	-.61	92.0476		
86	none	-.35	-.61	92.0476	.0254	1
		.7	0	92.0476		
87	none	.53	0	116.438	.0254	1
		-.26	.46	116.438		
88	none	-.26	.46	116.438	.0254	1
		-.26	-.46	116.438		
89	none	-.26	-.46	116.438	.0254	1
		.53	0	116.438		
90	none	.44	0	162.58	.0254	1
		-.22	.38	162.58		
91	none	-.22	.38	162.58	.0254	1
		-.22	-.38	162.58		
92	none	-.22	-.38	162.58	.0254	1
		.44	0	162.58		
93	none	-14.5	-82.8	0	.0025	4
		-14.5	-82.8	3.6576		

GEOMETRY - TOWER 2 (Continued)

94	none	-14.5	-82.8	3.6576	.0025	6
		-14.5	-82.8	9.7476		
95	none	-14.5	-82.8	9.7476	.005	6
		-9.22	-82.8	3.6576		
96	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-78.23	3.6576		
97	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-87.37	3.6576		
98	none	-9.22	-82.8	0	.0254	4
		-9.22	-82.8	3.6576		
99	none	-9.22	-82.8	3.6576	.0254	9
		-9.22	-82.8	12.7976		
100	none	-9.22	-82.8	12.7976	.0254	6
		-9.57	-82.8	18.8976		
101	none	-9.57	-82.8	18.8976	.0254	6
		-9.92	-82.8	24.9976		
102	none	-9.92	-82.8	24.9976	.0254	6
		-10.28	-82.8	31.0876		
103	none	-10.28	-82.8	31.0876	.0254	6
		-10.63	-82.8	37.1876		
104	none	-10.63	-82.8	37.1876	.0254	6
		-10.98	-82.8	43.2776		
105	none	-10.98	-82.8	43.2776	.0254	6
		-11.33	-82.8	49.3776		
106	none	-11.33	-82.8	49.3776	.0254	6
		-11.68	-82.8	55.4776		
107	none	-11.68	-82.8	55.4776	.0254	6
		-12.04	-82.8	61.5676		
108	none	-12.04	-82.8	61.5676	.0254	6
		-12.39	-82.8	67.6676		
109	none	-12.39	-82.8	67.6676	.0254	6
		-12.74	-82.8	73.7576		
110	none	-12.74	-82.8	73.7576	.0254	6
		-13.09	-82.8	79.8576		
111	none	-13.09	-82.8	79.8576	.0254	6
		-13.44	-82.8	85.9576		
112	none	-13.44	-82.8	85.9576	.0254	6
		-13.8	-82.8	92.0476		
113	none	-13.8	-82.8	92.0476	.0254	6
		-13.8	-82.8	98.1476		
114	none	-13.8	-82.8	98.1476	.0254	6
		-13.8	-82.8	104.238		
115	none	-13.8	-82.8	104.238	.0254	6
		-13.8	-82.8	110.338		
116	none	-13.8	-82.8	110.338	.0254	6
		-13.97	-82.8	116.438		
117	none	-13.97	-82.8	116.438	.0254	6
		-13.97	-82.8	122.528		
118	none	-13.97	-82.8	122.528	.0254	6
		-13.97	-82.8	128.628		
119	none	-13.97	-82.8	128.628	.0254	6
		-13.97	-82.8	134.718		
120	none	-13.97	-82.8	134.718	.0254	6
		-14.06	-82.8	140.818		

GEOMETRY - TOWER 2 (Continued)

121	none	-14.06	-82.8	140.818	.0254	6
		-14.06	-82.8	146.918		
122	none	-14.06	-82.8	146.918	.0254	12
		-14.06	-82.8	170.3		
123	none	-17.14	-78.23	0	.0254	4
		-17.14	-78.23	3.6576		
124	none	-17.14	-78.23	3.6576	.0254	9
		-17.14	-78.23	12.7976		
125	none	-17.14	-78.23	12.7976	.0254	6
		-16.96	-78.53	18.8976		
126	none	-16.96	-78.53	18.8976	.0254	6
		-16.79	-78.84	24.9976		
127	none	-16.79	-78.84	24.9976	.0254	6
		-16.61	-79.14	31.0876		
128	none	-16.61	-79.14	31.0876	.0254	6
		-16.44	-79.45	37.1876		
129	none	-16.44	-79.45	37.1876	.0254	6
		-16.26	-79.75	43.2776		
130	none	-16.26	-79.75	43.2776	.0254	6
		-16.08	-80.06	49.3776		
131	none	-16.08	-80.06	49.3776	.0254	6
		-15.91	-80.36	55.4776		
132	none	-15.91	-80.36	55.4776	.0254	6
		-15.73	-80.67	61.5676		
133	none	-15.73	-80.67	61.5676	.0254	6
		-15.56	-80.97	67.6676		
134	none	-15.56	-80.97	67.6676	.0254	6
		-15.38	-81.28	73.7576		
135	none	-15.38	-81.28	73.7576	.0254	6
		-15.2	-81.58	79.8576		
136	none	-15.2	-81.58	79.8576	.0254	6
		-15.03	-81.89	85.9576		
137	none	-15.03	-81.89	85.9576	.0254	6
		-14.85	-82.19	92.0476		
138	none	-14.85	-82.19	92.0476	.0254	6
		-14.85	-82.19	98.1476		
139	none	-14.85	-82.19	98.1476	.0254	6
		-14.85	-82.19	104.238		
140	none	-14.85	-82.19	104.238	.0254	6
		-14.85	-82.19	110.338		
141	none	-14.85	-82.19	110.338	.0254	6
		-14.76	-82.34	116.438		
142	none	-14.76	-82.34	116.438	.0254	6
		-14.76	-82.34	122.528		
143	none	-14.76	-82.34	122.528	.0254	6
		-14.76	-82.34	128.628		
144	none	-14.76	-82.34	128.628	.0254	6
		-14.76	-82.34	134.718		
145	none	-14.76	-82.34	134.718	.0254	6
		-14.72	-82.42	140.818		
146	none	-14.72	-82.42	140.818	.0254	6
		-14.72	-82.42	146.918		
147	none	-14.72	-82.42	146.918	.0254	12
		-14.72	-82.42	170.3		

GEOMETRY - TOWER 2 (Continued)

148	none	-17.14	-87.37	0	.0254	4
		-17.14	-87.37	3.6576		
149	none	-17.14	-87.37	3.6576	.0254	9
		-17.14	-87.37	12.7976		
150	none	-17.14	-87.37	12.7976	.0254	6
		-16.96	-87.07	18.8976		
151	none	-16.96	-87.07	18.8976	.0254	6
		-16.79	-86.76	24.9976		
152	none	-16.79	-86.76	24.9976	.0254	6
		-16.61	-86.46	31.0876		
153	none	-16.61	-86.46	31.0876	.0254	6
		-16.44	-86.15	37.1876		
154	none	-16.44	-86.15	37.1876	.0254	6
		-16.26	-85.85	43.2776		
155	none	-16.26	-85.85	43.2776	.0254	6
		-16.08	-85.54	49.3776		
156	none	-16.08	-85.54	49.3776	.0254	6
		-15.91	-85.24	55.4776		
157	none	-15.91	-85.24	55.4776	.0254	6
		-15.73	-84.93	61.5676		
158	none	-15.73	-84.93	61.5676	.0254	6
		-15.56	-84.63	67.6676		
159	none	-15.56	-84.63	67.6676	.0254	6
		-15.38	-84.32	73.7576		
160	none	-15.38	-84.32	73.7576	.0254	6
		-15.2	-84.02	79.8576		
161	none	-15.2	-84.02	79.8576	.0254	6
		-15.03	-83.71	85.9576		
162	none	-15.03	-83.71	85.9576	.0254	6
		-14.85	-83.41	92.0476		
163	none	-14.85	-83.41	92.0476	.0254	6
		-14.85	-83.41	98.1476		
164	none	-14.85	-83.41	98.1476	.0254	6
		-14.85	-83.41	104.238		
165	none	-14.85	-83.41	104.238	.0254	6
		-14.85	-83.41	110.338		
166	none	-14.85	-83.41	110.338	.0254	6
		-14.76	-83.26	116.438		
167	none	-14.76	-83.26	116.438	.0254	6
		-14.76	-83.26	122.528		
168	none	-14.76	-83.26	122.528	.0254	6
		-14.76	-83.26	128.628		
169	none	-14.76	-83.26	128.628	.0254	6
		-14.76	-83.26	134.718		
170	none	-14.76	-83.26	134.718	.0254	6
		-14.72	-83.18	140.818		
171	none	-14.72	-83.18	140.818	.0254	6
		-14.72	-83.18	146.918		
172	none	-14.72	-83.18	146.918	.0254	12
		-14.72	-83.18	170.3		
173	none	-9.22	-82.8	12.7976	.0254	5
		-17.14	-78.23	12.7976		
174	none	-17.14	-78.23	12.7976	.0254	5
		-17.14	-87.37	12.7976		

GEOMETRY - TOWER 2 (Continued)

175	none	-17.14	-87.37	12.7976	.0254	5
		-9.22	-82.8	12.7976		
176	none	-13.8	-82.8	92.0476	.0254	1
		-14.85	-82.19	92.0476		
177	none	-14.85	-82.19	92.0476	.0254	1
		-14.85	-83.41	92.0476		
178	none	-14.85	-83.41	92.0476	.0254	1
		-13.8	-82.8	92.0476		
179	none	-13.97	-82.8	116.438	.0254	1
		-14.76	-82.34	116.438		
180	none	-14.76	-82.34	116.438	.0254	1
		-14.76	-83.26	116.438		
181	none	-14.76	-83.26	116.438	.0254	1
		-13.97	-82.8	116.438		
182	none	-14.06	-82.8	170.3	.0254	1
		-14.72	-82.42	170.3		
183	none	-14.72	-82.42	170.3	.0254	1
		-14.72	-83.18	170.3		
184	none	-14.72	-83.18	170.3	.0254	1
		-14.06	-82.8	170.3		
185	none	49.2	104.5	0	.0025	4
		49.2	104.5	3.6576		
186	none	49.2	104.5	3.6576	.0025	6
		49.2	104.5	9.7476		
187	none	49.2	104.5	9.7476	.005	6
		54.48	104.5	3.6576		
188	none	49.2	104.5	9.7476	.005	6
		46.56	109.07	3.6576		
189	none	49.2	104.5	9.7476	.005	6
		46.56	99.93	3.6576		
190	none	54.48	104.5	0	.0254	4
		54.48	104.5	3.6576		
191	none	54.48	104.5	3.6576	.0254	9
		54.48	104.5	12.7976		
192	none	54.48	104.5	12.7976	.0254	6
		54.13	104.5	18.8976		
193	none	54.13	104.5	18.8976	.0254	6
		53.78	104.5	24.9976		
194	none	53.78	104.5	24.9976	.0254	6
		53.42	104.5	31.0876		
195	none	53.42	104.5	31.0876	.0254	6
		53.07	104.5	37.1876		
196	none	53.07	104.5	37.1876	.0254	6
		52.72	104.5	43.2776		
197	none	52.72	104.5	43.2776	.0254	6
		52.37	104.5	49.3776		
198	none	52.37	104.5	49.3776	.0254	6
		52.02	104.5	55.4776		
199	none	52.02	104.5	55.4776	.0254	6
		51.66	104.5	61.5676		
200	none	51.66	104.5	61.5676	.0254	6
		51.31	104.5	67.6676		
201	none	51.31	104.5	67.6676	.0254	6
		50.96	104.5	73.7576		

GEOMETRY - TOWER 2 (Continued)

202	none	50.96	104.5	73.7576	.0254	6
		50.61	104.5	79.8576		
203	none	50.61	104.5	79.8576	.0254	6
		50.26	104.5	85.9576		
204	none	50.26	104.5	85.9576	.0254	6
		49.9	104.5	92.0476		
205	none	49.9	104.5	92.0476	.0254	6
		49.9	104.5	98.1476		
206	none	49.9	104.5	98.1476	.0254	6
		49.9	104.5	104.238		
207	none	49.9	104.5	104.238	.0254	6
		49.9	104.5	110.338		
208	none	49.9	104.5	110.338	.0254	6
		49.73	104.5	116.438		
209	none	49.73	104.5	116.438	.0254	6
		49.73	104.5	122.528		
210	none	49.73	104.5	122.528	.0254	6
		49.73	104.5	128.628		
211	none	49.73	104.5	128.628	.0254	6
		49.73	104.5	134.718		
212	none	49.73	104.5	134.718	.0254	6
		49.64	104.5	140.818		
213	none	49.64	104.5	140.818	.0254	6
		49.64	104.5	146.918		
214	none	49.64	104.5	146.918	.0254	9
		49.64	104.5	164.13		
215	none	46.56	109.07	0	.0254	4
		46.56	109.07	3.6576		
216	none	46.56	109.07	3.6576	.0254	9
		46.56	109.07	12.7976		
217	none	46.56	109.07	12.7976	.0254	6
		46.74	108.77	18.8976		
218	none	46.74	108.77	18.8976	.0254	6
		46.91	108.46	24.9976		
219	none	46.91	108.46	24.9976	.0254	6
		47.09	108.16	31.0876		
220	none	47.09	108.16	31.0876	.0254	6
		47.26	107.85	37.1876		
221	none	47.26	107.85	37.1876	.0254	6
		47.44	107.55	43.2776		
222	none	47.44	107.55	43.2776	.0254	6
		47.62	107.24	49.3776		
223	none	47.62	107.24	49.3776	.0254	6
		47.79	106.94	55.4776		
224	none	47.79	106.94	55.4776	.0254	6
		47.97	106.63	61.5676		
225	none	47.97	106.63	61.5676	.0254	6
		48.14	106.33	67.6676		
226	none	48.14	106.33	67.6676	.0254	6
		48.32	106.02	73.7576		
227	none	48.32	106.02	73.7576	.0254	6
		48.5	105.72	79.8576		
228	none	48.5	105.72	79.8576	.0254	6
		48.67	105.41	85.9576		

GEOMETRY - TOWER 2 (Continued)

229	none	48.67	105.41	85.9576	.0254	6
		48.85	105.11	92.0476		
230	none	48.85	105.11	92.0476	.0254	6
		48.85	105.11	98.1476		
231	none	48.85	105.11	98.1476	.0254	6
		48.85	105.11	104.238		
232	none	48.85	105.11	104.238	.0254	6
		48.85	105.11	110.338		
233	none	48.85	105.11	110.338	.0254	6
		48.94	104.96	116.438		
234	none	48.94	104.96	116.438	.0254	6
		48.94	104.96	122.528		
235	none	48.94	104.96	122.528	.0254	6
		48.94	104.96	128.628		
236	none	48.94	104.96	128.628	.0254	6
		48.94	104.96	134.718		
237	none	48.94	104.96	134.718	.0254	6
		48.98	104.88	140.818		
238	none	48.98	104.88	140.818	.0254	6
		48.98	104.88	146.918		
239	none	48.98	104.88	146.918	.0254	9
		48.98	104.88	164.13		
240	none	46.56	99.93	0	.0254	4
		46.56	99.93	3.6576		
241	none	46.56	99.93	3.6576	.0254	9
		46.56	99.93	12.7976		
242	none	46.56	99.93	12.7976	.0254	6
		46.74	100.23	18.8976		
243	none	46.74	100.23	18.8976	.0254	6
		46.91	100.54	24.9976		
244	none	46.91	100.54	24.9976	.0254	6
		47.09	100.84	31.0876		
245	none	47.09	100.84	31.0876	.0254	6
		47.26	101.15	37.1876		
246	none	47.26	101.15	37.1876	.0254	6
		47.44	101.45	43.2776		
247	none	47.44	101.45	43.2776	.0254	6
		47.62	101.76	49.3776		
248	none	47.62	101.76	49.3776	.0254	6
		47.79	102.06	55.4776		
249	none	47.79	102.06	55.4776	.0254	6
		47.97	102.37	61.5676		
250	none	47.97	102.37	61.5676	.0254	6
		48.14	102.67	67.6676		
251	none	48.14	102.67	67.6676	.0254	6
		48.32	102.98	73.7576		
252	none	48.32	102.98	73.7576	.0254	6
		48.5	103.28	79.8576		
253	none	48.5	103.28	79.8576	.0254	6
		48.67	103.59	85.9576		
254	none	48.67	103.59	85.9576	.0254	6
		48.85	103.89	92.0476		
255	none	48.85	103.89	92.0476	.0254	6
		48.85	103.89	98.1476		

GEOMETRY - TOWER 2 (Continued)

256	none	48.85	103.89	98.1476	.0254	6
		48.85	103.89	104.238		
257	none	48.85	103.89	104.238	.0254	6
		48.85	103.89	110.338		
258	none	48.85	103.89	110.338	.0254	6
		48.94	104.04	116.438		
259	none	48.94	104.04	116.438	.0254	6
		48.94	104.04	122.528		
260	none	48.94	104.04	122.528	.0254	6
		48.94	104.04	128.628		
261	none	48.94	104.04	128.628	.0254	6
		48.94	104.04	134.718		
262	none	48.94	104.04	134.718	.0254	6
		48.98	104.12	140.818		
263	none	48.98	104.12	140.818	.0254	6
		48.98	104.12	146.918		
264	none	48.98	104.12	146.918	.0254	9
		48.98	104.12	164.13		
265	none	54.48	104.5	12.7976	.0254	5
		46.56	109.07	12.7976		
266	none	46.56	109.07	12.7976	.0254	5
		46.56	99.93	12.7976		
267	none	46.56	99.93	12.7976	.0254	5
		54.48	104.5	12.7976		
268	none	49.9	104.5	92.0476	.0254	1
		48.85	105.11	92.0476		
269	none	48.85	105.11	92.0476	.0254	1
		48.85	103.89	92.0476		
270	none	48.85	103.89	92.0476	.0254	1
		49.9	104.5	92.0476		
271	none	49.73	104.5	116.438	.0254	1
		48.94	104.96	116.438		
272	none	48.94	104.96	116.438	.0254	1
		48.94	104.04	116.438		
273	none	48.94	104.04	116.438	.0254	1
		49.73	104.5	116.438		
274	none	49.64	104.5	164.13	.0254	1
		48.98	104.88	164.13		
275	none	48.98	104.88	164.13	.0254	1
		48.98	104.12	164.13		
276	none	48.98	104.12	164.13	.0254	1
		49.64	104.5	164.13		

Number of wires = 276
current nodes = 1593

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	275	.759995	30	1.95775
segment/radius ratio	275	29.921	2	406.
radius	1	2.5E-03	6	.0254

ELECTRICAL DESCRIPTION - TOWER 2

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.05	0	1	2.66E-03	6.86E-03

Sources

source	node	sector	magnitude	phase	type
1	527	1	1.	0	voltage

Lumped loads

passive load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	circuit
1	1	0	0	.0018	0	0
2	32	1.E+06	0	0	0	0
3	186	1.E+06	0	0	0	0
4	340	1.E+06	0	0	0	0
5	527	0	0	0	0	0
6	558	1.E+06	0	0	0	0
7	716	1.E+06	0	0	0	0
8	874	1.E+06	0	0	0	0
9	1065	0	0	1.E-04	0	0
10	1096	1.E+06	0	0	0	0
11	1251	1.E+06	0	0	0	0
12	1406	1.E+06	0	0	0	0

IMPEDANCE - TOWER 3

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1065, sector 1							
1.05	46.696	-101.73	111.94	294.7	6.2779	-2.7909	-3.2414

GEOMETRY - TOWER 3

Dimensions in meters

Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.0025	4
		0	0	3.6576		
2	none	0	0	3.6576	.0025	6
		0	0	9.7476		
3	none	0	0	9.7476	.005	6
		5.28	0	3.6576		
4	none	0	0	9.7476	.005	6
		-2.64	4.57	3.6576		
5	none	0	0	9.7476	.005	6
		-2.64	-4.57	3.6576		
6	none	5.28	0	0	.0254	4
		5.28	0	3.6576		
7	none	5.28	0	3.6576	.0254	9
		5.28	0	12.7976		
8	none	5.28	0	12.7976	.0254	6
		4.93	0	18.8976		

GEOMETRY - TOWER 3 (Continued)

9	none	4.93	0	18.8976	.0254	6
		4.58	0	24.9976		
10	none	4.58	0	24.9976	.0254	6
		4.22	0	31.0876		
11	none	4.22	0	31.0876	.0254	6
		3.87	0	37.1876		
12	none	3.87	0	37.1876	.0254	6
		3.52	0	43.2776		
13	none	3.52	0	43.2776	.0254	6
		3.17	0	49.3776		
14	none	3.17	0	49.3776	.0254	6
		2.82	0	55.4776		
15	none	2.82	0	55.4776	.0254	6
		2.46	0	61.5676		
16	none	2.46	0	61.5676	.0254	6
		2.11	0	67.6676		
17	none	2.11	0	67.6676	.0254	6
		1.76	0	73.7576		
18	none	1.76	0	73.7576	.0254	6
		1.41	0	79.8576		
19	none	1.41	0	79.8576	.0254	6
		1.06	0	85.9576		
20	none	1.06	0	85.9576	.0254	6
		.7	0	92.0476		
21	none	.7	0	92.0476	.0254	6
		.7	0	98.1476		
22	none	.7	0	98.1476	.0254	6
		.7	0	104.238		
23	none	.7	0	104.238	.0254	6
		.7	0	110.338		
24	none	.7	0	110.338	.0254	6
		.53	0	116.438		
25	none	.53	0	116.438	.0254	6
		.53	0	122.528		
26	none	.53	0	122.528	.0254	6
		.53	0	128.628		
27	none	.53	0	128.628	.0254	6
		.53	0	134.718		
28	none	.53	0	134.718	.0254	6
		.44	0	140.818		
29	none	.44	0	140.818	.0254	6
		.44	0	146.918		
30	none	.44	0	146.918	.0254	8
		.44	0	162.58		
31	none	-2.64	4.57	0	.0254	4
		-2.64	4.57	3.6576		
32	none	-2.64	4.57	3.6576	.0254	9
		-2.64	4.57	12.7976		
33	none	-2.64	4.57	12.7976	.0254	6
		-2.46	4.27	18.8976		
34	none	-2.46	4.27	18.8976	.0254	6
		-2.29	3.96	24.9976		
35	none	-2.29	3.96	24.9976	.0254	6
		-2.11	3.66	31.0876		

GEOMETRY - TOWER 3 (Continued)

36	none	-2.11	3.66	31.0876	.0254	6
		-1.94	3.35	37.1876		
37	none	-1.94	3.35	37.1876	.0254	6
		-1.76	3.05	43.2776		
38	none	-1.76	3.05	43.2776	.0254	6
		-1.58	2.74	49.3776		
39	none	-1.58	2.74	49.3776	.0254	6
		-1.41	2.44	55.4776		
40	none	-1.41	2.44	55.4776	.0254	6
		-1.23	2.13	61.5676		
41	none	-1.23	2.13	61.5676	.0254	6
		-1.06	1.83	67.6676		
42	none	-1.06	1.83	67.6676	.0254	6
		-.88	1.52	73.7576		
43	none	-.88	1.52	73.7576	.0254	6
		-.7	1.22	79.8576		
44	none	-.7	1.22	79.8576	.0254	6
		-.53	.91	85.9576		
45	none	-.53	.91	85.9576	.0254	6
		-.35	.61	92.0476		
46	none	-.35	.61	92.0476	.0254	6
		-.35	.61	98.1476		
47	none	-.35	.61	98.1476	.0254	6
		-.35	.61	104.238		
48	none	-.35	.61	104.238	.0254	6
		-.35	.61	110.338		
49	none	-.35	.61	110.338	.0254	6
		-.26	.46	116.438		
50	none	-.26	.46	116.438	.0254	6
		-.26	.46	122.528		
51	none	-.26	.46	122.528	.0254	6
		-.26	.46	128.628		
52	none	-.26	.46	128.628	.0254	6
		-.26	.46	134.718		
53	none	-.26	.46	134.718	.0254	6
		-.22	.38	140.818		
54	none	-.22	.38	140.818	.0254	6
		-.22	.38	146.918		
55	none	-.22	.38	146.918	.0254	8
		-.22	.38	162.58		
56	none	-2.64	-4.57	0	.0254	4
		-2.64	-4.57	3.6576		
57	none	-2.64	-4.57	3.6576	.0254	9
		-2.64	-4.57	12.7976		
58	none	-2.64	-4.57	12.7976	.0254	6
		-2.46	-4.27	18.8976		
59	none	-2.46	-4.27	18.8976	.0254	6
		-2.29	-3.96	24.9976		
60	none	-2.29	-3.96	24.9976	.0254	6
		-2.11	-3.66	31.0876		
61	none	-2.11	-3.66	31.0876	.0254	6
		-1.94	-3.35	37.1876		
62	none	-1.94	-3.35	37.1876	.0254	6
		-1.76	-3.05	43.2776		

GEOMETRY - TOWER 3 (Continued)

63	none	-1.76	-3.05	43.2776	.0254	6
		-1.58	-2.74	49.3776		
64	none	-1.58	-2.74	49.3776	.0254	6
		-1.41	-2.44	55.4776		
65	none	-1.41	-2.44	55.4776	.0254	6
		-1.23	-2.13	61.5676		
66	none	-1.23	-2.13	61.5676	.0254	6
		-1.06	-1.83	67.6676		
67	none	-1.06	-1.83	67.6676	.0254	6
		-.88	-1.52	73.7576		
68	none	-.88	-1.52	73.7576	.0254	6
		-.7	-1.22	79.8576		
69	none	-.7	-1.22	79.8576	.0254	6
		-.53	-.91	85.9576		
70	none	-.53	-.91	85.9576	.0254	6
		-.35	-.61	92.0476		
71	none	-.35	-.61	92.0476	.0254	6
		-.35	-.61	98.1476		
72	none	-.35	-.61	98.1476	.0254	6
		-.35	-.61	104.238		
73	none	-.35	-.61	104.238	.0254	6
		-.35	-.61	110.338		
74	none	-.35	-.61	110.338	.0254	6
		-.26	-.46	116.438		
75	none	-.26	-.46	116.438	.0254	6
		-.26	-.46	122.528		
76	none	-.26	-.46	122.528	.0254	6
		-.26	-.46	128.628		
77	none	-.26	-.46	128.628	.0254	6
		-.26	-.46	134.718		
78	none	-.26	-.46	134.718	.0254	6
		-.22	-.38	140.818		
79	none	-.22	-.38	140.818	.0254	6
		-.22	-.38	146.918		
80	none	-.22	-.38	146.918	.0254	8
		-.22	-.38	162.58		
81	none	5.28	0	12.7976	.0254	5
		-2.64	4.57	12.7976		
82	none	-2.64	4.57	12.7976	.0254	5
		-2.64	-4.57	12.7976		
83	none	-2.64	-4.57	12.7976	.0254	5
		5.28	0	12.7976		
84	none	.7	0	92.0476	.0254	1
		-.35	.61	92.0476		
85	none	-.35	.61	92.0476	.0254	1
		-.35	-.61	92.0476		
86	none	-.35	-.61	92.0476	.0254	1
		.7	0	92.0476		
87	none	.53	0	116.438	.0254	1
		-.26	.46	116.438		
88	none	-.26	.46	116.438	.0254	1
		-.26	-.46	116.438		
89	none	-.26	-.46	116.438	.0254	1
		.53	0	116.438		

GEOMETRY - TOWER 3 (Continued)

90	none	.44	0	162.58	.0254	1
		-.22	.38	162.58		
91	none	-.22	.38	162.58	.0254	1
		-.22	-.38	162.58		
92	none	-.22	-.38	162.58	.0254	1
		.44	0	162.58		
93	none	-14.5	-82.8	0	.0025	4
		-14.5	-82.8	3.6576		
94	none	-14.5	-82.8	3.6576	.0025	6
		-14.5	-82.8	9.7476		
95	none	-14.5	-82.8	9.7476	.005	6
		-9.22	-82.8	3.6576		
96	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-78.23	3.6576		
97	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-87.37	3.6576		
98	none	-9.22	-82.8	0	.0254	4
		-9.22	-82.8	3.6576		
99	none	-9.22	-82.8	3.6576	.0254	9
		-9.22	-82.8	12.7976		
100	none	-9.22	-82.8	12.7976	.0254	6
		-9.57	-82.8	18.8976		
101	none	-9.57	-82.8	18.8976	.0254	6
		-9.92	-82.8	24.9976		
102	none	-9.92	-82.8	24.9976	.0254	6
		-10.28	-82.8	31.0876		
103	none	-10.28	-82.8	31.0876	.0254	6
		-10.63	-82.8	37.1876		
104	none	-10.63	-82.8	37.1876	.0254	6
		-10.98	-82.8	43.2776		
105	none	-10.98	-82.8	43.2776	.0254	6
		-11.33	-82.8	49.3776		
106	none	-11.33	-82.8	49.3776	.0254	6
		-11.68	-82.8	55.4776		
107	none	-11.68	-82.8	55.4776	.0254	6
		-12.04	-82.8	61.5676		
108	none	-12.04	-82.8	61.5676	.0254	6
		-12.39	-82.8	67.6676		
109	none	-12.39	-82.8	67.6676	.0254	6
		-12.74	-82.8	73.7576		
110	none	-12.74	-82.8	73.7576	.0254	6
		-13.09	-82.8	79.8576		
111	none	-13.09	-82.8	79.8576	.0254	6
		-13.44	-82.8	85.9576		
112	none	-13.44	-82.8	85.9576	.0254	6
		-13.8	-82.8	92.0476		
113	none	-13.8	-82.8	92.0476	.0254	6
		-13.8	-82.8	98.1476		
114	none	-13.8	-82.8	98.1476	.0254	6
		-13.8	-82.8	104.238		
115	none	-13.8	-82.8	104.238	.0254	6
		-13.8	-82.8	110.338		
116	none	-13.8	-82.8	110.338	.0254	6
		-13.97	-82.8	116.438		

GEOMETRY - TOWER 3 (Continued)

117	none	-13.97	-82.8	116.438	.0254	6
		-13.97	-82.8	122.528		
118	none	-13.97	-82.8	122.528	.0254	6
		-13.97	-82.8	128.628		
119	none	-13.97	-82.8	128.628	.0254	6
		-13.97	-82.8	134.718		
120	none	-13.97	-82.8	134.718	.0254	6
		-14.06	-82.8	140.818		
121	none	-14.06	-82.8	140.818	.0254	6
		-14.06	-82.8	146.918		
122	none	-14.06	-82.8	146.918	.0254	12
		-14.06	-82.8	170.3		
123	none	-17.14	-78.23	0	.0254	4
		-17.14	-78.23	3.6576		
124	none	-17.14	-78.23	3.6576	.0254	9
		-17.14	-78.23	12.7976		
125	none	-17.14	-78.23	12.7976	.0254	6
		-16.96	-78.53	18.8976		
126	none	-16.96	-78.53	18.8976	.0254	6
		-16.79	-78.84	24.9976		
127	none	-16.79	-78.84	24.9976	.0254	6
		-16.61	-79.14	31.0876		
128	none	-16.61	-79.14	31.0876	.0254	6
		-16.44	-79.45	37.1876		
129	none	-16.44	-79.45	37.1876	.0254	6
		-16.26	-79.75	43.2776		
130	none	-16.26	-79.75	43.2776	.0254	6
		-16.08	-80.06	49.3776		
131	none	-16.08	-80.06	49.3776	.0254	6
		-15.91	-80.36	55.4776		
132	none	-15.91	-80.36	55.4776	.0254	6
		-15.73	-80.67	61.5676		
133	none	-15.73	-80.67	61.5676	.0254	6
		-15.56	-80.97	67.6676		
134	none	-15.56	-80.97	67.6676	.0254	6
		-15.38	-81.28	73.7576		
135	none	-15.38	-81.28	73.7576	.0254	6
		-15.2	-81.58	79.8576		
136	none	-15.2	-81.58	79.8576	.0254	6
		-15.03	-81.89	85.9576		
137	none	-15.03	-81.89	85.9576	.0254	6
		-14.85	-82.19	92.0476		
138	none	-14.85	-82.19	92.0476	.0254	6
		-14.85	-82.19	98.1476		
139	none	-14.85	-82.19	98.1476	.0254	6
		-14.85	-82.19	104.238		
140	none	-14.85	-82.19	104.238	.0254	6
		-14.85	-82.19	110.338		
141	none	-14.85	-82.19	110.338	.0254	6
		-14.76	-82.34	116.438		
142	none	-14.76	-82.34	116.438	.0254	6
		-14.76	-82.34	122.528		
143	none	-14.76	-82.34	122.528	.0254	6
		-14.76	-82.34	128.628		

GEOMETRY - TOWER 3 (Continued)

144	none	-14.76	-82.34	128.628	.0254	6
		-14.76	-82.34	134.718		
145	none	-14.76	-82.34	134.718	.0254	6
		-14.72	-82.42	140.818		
146	none	-14.72	-82.42	140.818	.0254	6
		-14.72	-82.42	146.918		
147	none	-14.72	-82.42	146.918	.0254	12
		-14.72	-82.42	170.3		
148	none	-17.14	-87.37	0	.0254	4
		-17.14	-87.37	3.6576		
149	none	-17.14	-87.37	3.6576	.0254	9
		-17.14	-87.37	12.7976		
150	none	-17.14	-87.37	12.7976	.0254	6
		-16.96	-87.07	18.8976		
151	none	-16.96	-87.07	18.8976	.0254	6
		-16.79	-86.76	24.9976		
152	none	-16.79	-86.76	24.9976	.0254	6
		-16.61	-86.46	31.0876		
153	none	-16.61	-86.46	31.0876	.0254	6
		-16.44	-86.15	37.1876		
154	none	-16.44	-86.15	37.1876	.0254	6
		-16.26	-85.85	43.2776		
155	none	-16.26	-85.85	43.2776	.0254	6
		-16.08	-85.54	49.3776		
156	none	-16.08	-85.54	49.3776	.0254	6
		-15.91	-85.24	55.4776		
157	none	-15.91	-85.24	55.4776	.0254	6
		-15.73	-84.93	61.5676		
158	none	-15.73	-84.93	61.5676	.0254	6
		-15.56	-84.63	67.6676		
159	none	-15.56	-84.63	67.6676	.0254	6
		-15.38	-84.32	73.7576		
160	none	-15.38	-84.32	73.7576	.0254	6
		-15.2	-84.02	79.8576		
161	none	-15.2	-84.02	79.8576	.0254	6
		-15.03	-83.71	85.9576		
162	none	-15.03	-83.71	85.9576	.0254	6
		-14.85	-83.41	92.0476		
163	none	-14.85	-83.41	92.0476	.0254	6
		-14.85	-83.41	98.1476		
164	none	-14.85	-83.41	98.1476	.0254	6
		-14.85	-83.41	104.238		
165	none	-14.85	-83.41	104.238	.0254	6
		-14.85	-83.41	110.338		
166	none	-14.85	-83.41	110.338	.0254	6
		-14.76	-83.26	116.438		
167	none	-14.76	-83.26	116.438	.0254	6
		-14.76	-83.26	122.528		
168	none	-14.76	-83.26	122.528	.0254	6
		-14.76	-83.26	128.628		
169	none	-14.76	-83.26	128.628	.0254	6
		-14.76	-83.26	134.718		
170	none	-14.76	-83.26	134.718	.0254	6
		-14.72	-83.18	140.818		

GEOMETRY - TOWER 3 (Continued)

171	none	-14.72	-83.18	140.818	.0254	6
		-14.72	-83.18	146.918		
172	none	-14.72	-83.18	146.918	.0254	12
		-14.72	-83.18	170.3		
173	none	-9.22	-82.8	12.7976	.0254	5
		-17.14	-78.23	12.7976		
174	none	-17.14	-78.23	12.7976	.0254	5
		-17.14	-87.37	12.7976		
175	none	-17.14	-87.37	12.7976	.0254	5
		-9.22	-82.8	12.7976		
176	none	-13.8	-82.8	92.0476	.0254	1
		-14.85	-82.19	92.0476		
177	none	-14.85	-82.19	92.0476	.0254	1
		-14.85	-83.41	92.0476		
178	none	-14.85	-83.41	92.0476	.0254	1
		-13.8	-82.8	92.0476		
179	none	-13.97	-82.8	116.438	.0254	1
		-14.76	-82.34	116.438		
180	none	-14.76	-82.34	116.438	.0254	1
		-14.76	-83.26	116.438		
181	none	-14.76	-83.26	116.438	.0254	1
		-13.97	-82.8	116.438		
182	none	-14.06	-82.8	170.3	.0254	1
		-14.72	-82.42	170.3		
183	none	-14.72	-82.42	170.3	.0254	1
		-14.72	-83.18	170.3		
184	none	-14.72	-83.18	170.3	.0254	1
		-14.06	-82.8	170.3		
185	none	49.2	104.5	0	.0025	4
		49.2	104.5	3.6576		
186	none	49.2	104.5	3.6576	.0025	6
		49.2	104.5	9.7476		
187	none	49.2	104.5	9.7476	.005	6
		54.48	104.5	3.6576		
188	none	49.2	104.5	9.7476	.005	6
		46.56	109.07	3.6576		
189	none	49.2	104.5	9.7476	.005	6
		46.56	99.93	3.6576		
190	none	54.48	104.5	0	.0254	4
		54.48	104.5	3.6576		
191	none	54.48	104.5	3.6576	.0254	9
		54.48	104.5	12.7976		
192	none	54.48	104.5	12.7976	.0254	6
		54.13	104.5	18.8976		
193	none	54.13	104.5	18.8976	.0254	6
		53.78	104.5	24.9976		
194	none	53.78	104.5	24.9976	.0254	6
		53.42	104.5	31.0876		
195	none	53.42	104.5	31.0876	.0254	6
		53.07	104.5	37.1876		
196	none	53.07	104.5	37.1876	.0254	6
		52.72	104.5	43.2776		
197	none	52.72	104.5	43.2776	.0254	6
		52.37	104.5	49.3776		

GEOMETRY - TOWER 3 (Continued)

198	none	52.37	104.5	49.3776	.0254	6
		52.02	104.5	55.4776		
199	none	52.02	104.5	55.4776	.0254	6
		51.66	104.5	61.5676		
200	none	51.66	104.5	61.5676	.0254	6
		51.31	104.5	67.6676		
201	none	51.31	104.5	67.6676	.0254	6
		50.96	104.5	73.7576		
202	none	50.96	104.5	73.7576	.0254	6
		50.61	104.5	79.8576		
203	none	50.61	104.5	79.8576	.0254	6
		50.26	104.5	85.9576		
204	none	50.26	104.5	85.9576	.0254	6
		49.9	104.5	92.0476		
205	none	49.9	104.5	92.0476	.0254	6
		49.9	104.5	98.1476		
206	none	49.9	104.5	98.1476	.0254	6
		49.9	104.5	104.238		
207	none	49.9	104.5	104.238	.0254	6
		49.9	104.5	110.338		
208	none	49.9	104.5	110.338	.0254	6
		49.73	104.5	116.438		
209	none	49.73	104.5	116.438	.0254	6
		49.73	104.5	122.528		
210	none	49.73	104.5	122.528	.0254	6
		49.73	104.5	128.628		
211	none	49.73	104.5	128.628	.0254	6
		49.73	104.5	134.718		
212	none	49.73	104.5	134.718	.0254	6
		49.64	104.5	140.818		
213	none	49.64	104.5	140.818	.0254	6
		49.64	104.5	146.918		
214	none	49.64	104.5	146.918	.0254	9
		49.64	104.5	164.13		
215	none	46.56	109.07	0	.0254	4
		46.56	109.07	3.6576		
216	none	46.56	109.07	3.6576	.0254	9
		46.56	109.07	12.7976		
217	none	46.56	109.07	12.7976	.0254	6
		46.74	108.77	18.8976		
218	none	46.74	108.77	18.8976	.0254	6
		46.91	108.46	24.9976		
219	none	46.91	108.46	24.9976	.0254	6
		47.09	108.16	31.0876		
220	none	47.09	108.16	31.0876	.0254	6
		47.26	107.85	37.1876		
221	none	47.26	107.85	37.1876	.0254	6
		47.44	107.55	43.2776		
222	none	47.44	107.55	43.2776	.0254	6
		47.62	107.24	49.3776		
223	none	47.62	107.24	49.3776	.0254	6
		47.79	106.94	55.4776		
224	none	47.79	106.94	55.4776	.0254	6
		47.97	106.63	61.5676		

GEOMETRY - TOWER 3 (Continued)

225	none	47.97	106.63	61.5676	.0254	6
		48.14	106.33	67.6676		
226	none	48.14	106.33	67.6676	.0254	6
		48.32	106.02	73.7576		
227	none	48.32	106.02	73.7576	.0254	6
		48.5	105.72	79.8576		
228	none	48.5	105.72	79.8576	.0254	6
		48.67	105.41	85.9576		
229	none	48.67	105.41	85.9576	.0254	6
		48.85	105.11	92.0476		
230	none	48.85	105.11	92.0476	.0254	6
		48.85	105.11	98.1476		
231	none	48.85	105.11	98.1476	.0254	6
		48.85	105.11	104.238		
232	none	48.85	105.11	104.238	.0254	6
		48.85	105.11	110.338		
233	none	48.85	105.11	110.338	.0254	6
		48.94	104.96	116.438		
234	none	48.94	104.96	116.438	.0254	6
		48.94	104.96	122.528		
235	none	48.94	104.96	122.528	.0254	6
		48.94	104.96	128.628		
236	none	48.94	104.96	128.628	.0254	6
		48.94	104.96	134.718		
237	none	48.94	104.96	134.718	.0254	6
		48.98	104.88	140.818		
238	none	48.98	104.88	140.818	.0254	6
		48.98	104.88	146.918		
239	none	48.98	104.88	146.918	.0254	9
		48.98	104.88	164.13		
240	none	46.56	99.93	0	.0254	4
		46.56	99.93	3.6576		
241	none	46.56	99.93	3.6576	.0254	9
		46.56	99.93	12.7976		
242	none	46.56	99.93	12.7976	.0254	6
		46.74	100.23	18.8976		
243	none	46.74	100.23	18.8976	.0254	6
		46.91	100.54	24.9976		
244	none	46.91	100.54	24.9976	.0254	6
		47.09	100.84	31.0876		
245	none	47.09	100.84	31.0876	.0254	6
		47.26	101.15	37.1876		
246	none	47.26	101.15	37.1876	.0254	6
		47.44	101.45	43.2776		
247	none	47.44	101.45	43.2776	.0254	6
		47.62	101.76	49.3776		
248	none	47.62	101.76	49.3776	.0254	6
		47.79	102.06	55.4776		
249	none	47.79	102.06	55.4776	.0254	6
		47.97	102.37	61.5676		
250	none	47.97	102.37	61.5676	.0254	6
		48.14	102.67	67.6676		
251	none	48.14	102.67	67.6676	.0254	6
		48.32	102.98	73.7576		

GEOMETRY - TOWER 3 (Continued)

252	none	48.32	102.98	73.7576	.0254	6
		48.5	103.28	79.8576		
253	none	48.5	103.28	79.8576	.0254	6
		48.67	103.59	85.9576		
254	none	48.67	103.59	85.9576	.0254	6
		48.85	103.89	92.0476		
255	none	48.85	103.89	92.0476	.0254	6
		48.85	103.89	98.1476		
256	none	48.85	103.89	98.1476	.0254	6
		48.85	103.89	104.238		
257	none	48.85	103.89	104.238	.0254	6
		48.85	103.89	110.338		
258	none	48.85	103.89	110.338	.0254	6
		48.94	104.04	116.438		
259	none	48.94	104.04	116.438	.0254	6
		48.94	104.04	122.528		
260	none	48.94	104.04	122.528	.0254	6
		48.94	104.04	128.628		
261	none	48.94	104.04	128.628	.0254	6
		48.94	104.04	134.718		
262	none	48.94	104.04	134.718	.0254	6
		48.98	104.12	140.818		
263	none	48.98	104.12	140.818	.0254	6
		48.98	104.12	146.918		
264	none	48.98	104.12	146.918	.0254	9
		48.98	104.12	164.13		
265	none	54.48	104.5	12.7976	.0254	5
		46.56	109.07	12.7976		
266	none	46.56	109.07	12.7976	.0254	5
		46.56	99.93	12.7976		
267	none	46.56	99.93	12.7976	.0254	5
		54.48	104.5	12.7976		
268	none	49.9	104.5	92.0476	.0254	1
		48.85	105.11	92.0476		
269	none	48.85	105.11	92.0476	.0254	1
		48.85	103.89	92.0476		
270	none	48.85	103.89	92.0476	.0254	1
		49.9	104.5	92.0476		
271	none	49.73	104.5	116.438	.0254	1
		48.94	104.96	116.438		
272	none	48.94	104.96	116.438	.0254	1
		48.94	104.04	116.438		
273	none	48.94	104.04	116.438	.0254	1
		49.73	104.5	116.438		
274	none	49.64	104.5	164.13	.0254	1
		48.98	104.88	164.13		
275	none	48.98	104.88	164.13	.0254	1
		48.98	104.12	164.13		
276	none	48.98	104.12	164.13	.0254	1
		49.64	104.5	164.13		

```
Number of wires          =  276
          current nodes  =  1593

                        minimum                       maximum
Individual wires      wire     value                wire   value
segment length         275     .759995               30    1.95775
segment/radius ratio   275     29.921                2     406.
radius                 1       2.5E-03               6     .0254
```

ELECTRICAL DESCRIPTION - TOWER 3

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.05	0	1	2.66E-03	6.86E-03

Sources

source	node	sector	magnitude	phase	type
1	1065	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	0	.0018	0	0
2	32	1.E+06	0	0	0	0
3	186	1.E+06	0	0	0	0
4	340	1.E+06	0	0	0	0
5	527	0	0	.0035	0	0
6	558	1.E+06	0	0	0	0
7	716	1.E+06	0	0	0	0
8	874	1.E+06	0	0	0	0
9	1065	0	0	0	0	0
10	1096	1.E+06	0	0	0	0
11	1251	1.E+06	0	0	0	0
12	1406	1.E+06	0	0	0	0

APPENDIX B

Directional Array Modeling

IMPEDANCE - DAYTIME/NIGHTTIME
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.05	48.196	-107.57	117.88	294.1	6.653	-2.631	-3.4259
source = 2; node 527, sector 1							
1.05	5.2551	-108.28	108.4	272.8	54.221	-.32043	-11.48
source = 3; node 1065, sector 1							
1.05	74.118	-55.623	92.668	323.1	2.6085	-7.0182	-.962

GEOMETRY - DAYTIME/NIGHTTIME
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.0025	4
		0	0	3.6576		
2	none	0	0	3.6576	.0025	6
		0	0	9.7476		
3	none	0	0	9.7476	.005	6
		5.28	0	3.6576		
4	none	0	0	9.7476	.005	6
		-2.64	4.57	3.6576		
5	none	0	0	9.7476	.005	6
		-2.64	-4.57	3.6576		
6	none	5.28	0	0	.0254	4
		5.28	0	3.6576		
7	none	5.28	0	3.6576	.0254	9
		5.28	0	12.7976		
8	none	5.28	0	12.7976	.0254	6
		4.93	0	18.8976		
9	none	4.93	0	18.8976	.0254	6
		4.58	0	24.9976		
10	none	4.58	0	24.9976	.0254	6
		4.22	0	31.0876		
11	none	4.22	0	31.0876	.0254	6
		3.87	0	37.1876		
12	none	3.87	0	37.1876	.0254	6
		3.52	0	43.2776		
13	none	3.52	0	43.2776	.0254	6
		3.17	0	49.3776		
14	none	3.17	0	49.3776	.0254	6
		2.82	0	55.4776		
15	none	2.82	0	55.4776	.0254	6
		2.46	0	61.5676		
16	none	2.46	0	61.5676	.0254	6
		2.11	0	67.6676		
17	none	2.11	0	67.6676	.0254	6
		1.76	0	73.7576		
18	none	1.76	0	73.7576	.0254	6
		1.41	0	79.8576		
19	none	1.41	0	79.8576	.0254	6
		1.06	0	85.9576		
20	none	1.06	0	85.9576	.0254	6
		.7	0	92.0476		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

21	none	.7	0	92.0476	.0254	6
		.7	0	98.1476		
22	none	.7	0	98.1476	.0254	6
		.7	0	104.238		
23	none	.7	0	104.238	.0254	6
		.7	0	110.338		
24	none	.7	0	110.338	.0254	6
		.53	0	116.438		
25	none	.53	0	116.438	.0254	6
		.53	0	122.528		
26	none	.53	0	122.528	.0254	6
		.53	0	128.628		
27	none	.53	0	128.628	.0254	6
		.53	0	134.718		
28	none	.53	0	134.718	.0254	6
		.44	0	140.818		
29	none	.44	0	140.818	.0254	6
		.44	0	146.918		
30	none	.44	0	146.918	.0254	8
		.44	0	162.58		
31	none	-2.64	4.57	0	.0254	4
		-2.64	4.57	3.6576		
32	none	-2.64	4.57	3.6576	.0254	9
		-2.64	4.57	12.7976		
33	none	-2.64	4.57	12.7976	.0254	6
		-2.46	4.27	18.8976		
34	none	-2.46	4.27	18.8976	.0254	6
		-2.29	3.96	24.9976		
35	none	-2.29	3.96	24.9976	.0254	6
		-2.11	3.66	31.0876		
36	none	-2.11	3.66	31.0876	.0254	6
		-1.94	3.35	37.1876		
37	none	-1.94	3.35	37.1876	.0254	6
		-1.76	3.05	43.2776		
38	none	-1.76	3.05	43.2776	.0254	6
		-1.58	2.74	49.3776		
39	none	-1.58	2.74	49.3776	.0254	6
		-1.41	2.44	55.4776		
40	none	-1.41	2.44	55.4776	.0254	6
		-1.23	2.13	61.5676		
41	none	-1.23	2.13	61.5676	.0254	6
		-1.06	1.83	67.6676		
42	none	-1.06	1.83	67.6676	.0254	6
		-.88	1.52	73.7576		
43	none	-.88	1.52	73.7576	.0254	6
		-.7	1.22	79.8576		
44	none	-.7	1.22	79.8576	.0254	6
		-.53	.91	85.9576		
45	none	-.53	.91	85.9576	.0254	6
		-.35	.61	92.0476		
46	none	-.35	.61	92.0476	.0254	6
		-.35	.61	98.1476		
47	none	-.35	.61	98.1476	.0254	6
		-.35	.61	104.238		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

48	none	-.35	.61	104.238	.0254	6
		-.35	.61	110.338		
49	none	-.35	.61	110.338	.0254	6
		-.26	.46	116.438		
50	none	-.26	.46	116.438	.0254	6
		-.26	.46	122.528		
51	none	-.26	.46	122.528	.0254	6
		-.26	.46	128.628		
52	none	-.26	.46	128.628	.0254	6
		-.26	.46	134.718		
53	none	-.26	.46	134.718	.0254	6
		-.22	.38	140.818		
54	none	-.22	.38	140.818	.0254	6
		-.22	.38	146.918		
55	none	-.22	.38	146.918	.0254	8
		-.22	.38	162.58		
56	none	-2.64	-4.57	0	.0254	4
		-2.64	-4.57	3.6576		
57	none	-2.64	-4.57	3.6576	.0254	9
		-2.64	-4.57	12.7976		
58	none	-2.64	-4.57	12.7976	.0254	6
		-2.46	-4.27	18.8976		
59	none	-2.46	-4.27	18.8976	.0254	6
		-2.29	-3.96	24.9976		
60	none	-2.29	-3.96	24.9976	.0254	6
		-2.11	-3.66	31.0876		
61	none	-2.11	-3.66	31.0876	.0254	6
		-1.94	-3.35	37.1876		
62	none	-1.94	-3.35	37.1876	.0254	6
		-1.76	-3.05	43.2776		
63	none	-1.76	-3.05	43.2776	.0254	6
		-1.58	-2.74	49.3776		
64	none	-1.58	-2.74	49.3776	.0254	6
		-1.41	-2.44	55.4776		
65	none	-1.41	-2.44	55.4776	.0254	6
		-1.23	-2.13	61.5676		
66	none	-1.23	-2.13	61.5676	.0254	6
		-1.06	-1.83	67.6676		
67	none	-1.06	-1.83	67.6676	.0254	6
		-.88	-1.52	73.7576		
68	none	-.88	-1.52	73.7576	.0254	6
		-.7	-1.22	79.8576		
69	none	-.7	-1.22	79.8576	.0254	6
		-.53	-.91	85.9576		
70	none	-.53	-.91	85.9576	.0254	6
		-.35	-.61	92.0476		
71	none	-.35	-.61	92.0476	.0254	6
		-.35	-.61	98.1476		
72	none	-.35	-.61	98.1476	.0254	6
		-.35	-.61	104.238		
73	none	-.35	-.61	104.238	.0254	6
		-.35	-.61	110.338		
74	none	-.35	-.61	110.338	.0254	6
		-.26	-.46	116.438		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

75	none	-.26	-.46	116.438	.0254	6
		-.26	-.46	122.528		
76	none	-.26	-.46	122.528	.0254	6
		-.26	-.46	128.628		
77	none	-.26	-.46	128.628	.0254	6
		-.26	-.46	134.718		
78	none	-.26	-.46	134.718	.0254	6
		-.22	-.38	140.818		
79	none	-.22	-.38	140.818	.0254	6
		-.22	-.38	146.918		
80	none	-.22	-.38	146.918	.0254	8
		-.22	-.38	162.58		
81	none	5.28	0	12.7976	.0254	5
		-2.64	4.57	12.7976		
82	none	-2.64	4.57	12.7976	.0254	5
		-2.64	-4.57	12.7976		
83	none	-2.64	-4.57	12.7976	.0254	5
		5.28	0	12.7976		
84	none	.7	0	92.0476	.0254	1
		-.35	.61	92.0476		
85	none	-.35	.61	92.0476	.0254	1
		-.35	-.61	92.0476		
86	none	-.35	-.61	92.0476	.0254	1
		.7	0	92.0476		
87	none	.53	0	116.438	.0254	1
		-.26	.46	116.438		
88	none	-.26	.46	116.438	.0254	1
		-.26	-.46	116.438		
89	none	-.26	-.46	116.438	.0254	1
		.53	0	116.438		
90	none	.44	0	162.58	.0254	1
		-.22	.38	162.58		
91	none	-.22	.38	162.58	.0254	1
		-.22	-.38	162.58		
92	none	-.22	-.38	162.58	.0254	1
		.44	0	162.58		
93	none	-14.5	-82.8	0	.0025	4
		-14.5	-82.8	3.6576		
94	none	-14.5	-82.8	3.6576	.0025	6
		-14.5	-82.8	9.7476		
95	none	-14.5	-82.8	9.7476	.005	6
		-9.22	-82.8	3.6576		
96	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-78.23	3.6576		
97	none	-14.5	-82.8	9.7476	.005	6
		-17.14	-87.37	3.6576		
98	none	-9.22	-82.8	0	.0254	4
		-9.22	-82.8	3.6576		
99	none	-9.22	-82.8	3.6576	.0254	9
		-9.22	-82.8	12.7976		
100	none	-9.22	-82.8	12.7976	.0254	6
		-9.57	-82.8	18.8976		
101	none	-9.57	-82.8	18.8976	.0254	6
		-9.92	-82.8	24.9976		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

102	none	-9.92	-82.8	24.9976	.0254	6
		-10.28	-82.8	31.0876		
103	none	-10.28	-82.8	31.0876	.0254	6
		-10.63	-82.8	37.1876		
104	none	-10.63	-82.8	37.1876	.0254	6
		-10.98	-82.8	43.2776		
105	none	-10.98	-82.8	43.2776	.0254	6
		-11.33	-82.8	49.3776		
106	none	-11.33	-82.8	49.3776	.0254	6
		-11.68	-82.8	55.4776		
107	none	-11.68	-82.8	55.4776	.0254	6
		-12.04	-82.8	61.5676		
108	none	-12.04	-82.8	61.5676	.0254	6
		-12.39	-82.8	67.6676		
109	none	-12.39	-82.8	67.6676	.0254	6
		-12.74	-82.8	73.7576		
110	none	-12.74	-82.8	73.7576	.0254	6
		-13.09	-82.8	79.8576		
111	none	-13.09	-82.8	79.8576	.0254	6
		-13.44	-82.8	85.9576		
112	none	-13.44	-82.8	85.9576	.0254	6
		-13.8	-82.8	92.0476		
113	none	-13.8	-82.8	92.0476	.0254	6
		-13.8	-82.8	98.1476		
114	none	-13.8	-82.8	98.1476	.0254	6
		-13.8	-82.8	104.238		
115	none	-13.8	-82.8	104.238	.0254	6
		-13.8	-82.8	110.338		
116	none	-13.8	-82.8	110.338	.0254	6
		-13.97	-82.8	116.438		
117	none	-13.97	-82.8	116.438	.0254	6
		-13.97	-82.8	122.528		
118	none	-13.97	-82.8	122.528	.0254	6
		-13.97	-82.8	128.628		
119	none	-13.97	-82.8	128.628	.0254	6
		-13.97	-82.8	134.718		
120	none	-13.97	-82.8	134.718	.0254	6
		-14.06	-82.8	140.818		
121	none	-14.06	-82.8	140.818	.0254	6
		-14.06	-82.8	146.918		
122	none	-14.06	-82.8	146.918	.0254	12
		-14.06	-82.8	170.3		
123	none	-17.14	-78.23	0	.0254	4
		-17.14	-78.23	3.6576		
124	none	-17.14	-78.23	3.6576	.0254	9
		-17.14	-78.23	12.7976		
125	none	-17.14	-78.23	12.7976	.0254	6
		-16.96	-78.53	18.8976		
126	none	-16.96	-78.53	18.8976	.0254	6
		-16.79	-78.84	24.9976		
127	none	-16.79	-78.84	24.9976	.0254	6
		-16.61	-79.14	31.0876		
128	none	-16.61	-79.14	31.0876	.0254	6
		-16.44	-79.45	37.1876		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

129	none	-16.44	-79.45	37.1876	.0254	6
		-16.26	-79.75	43.2776		
130	none	-16.26	-79.75	43.2776	.0254	6
		-16.08	-80.06	49.3776		
131	none	-16.08	-80.06	49.3776	.0254	6
		-15.91	-80.36	55.4776		
132	none	-15.91	-80.36	55.4776	.0254	6
		-15.73	-80.67	61.5676		
133	none	-15.73	-80.67	61.5676	.0254	6
		-15.56	-80.97	67.6676		
134	none	-15.56	-80.97	67.6676	.0254	6
		-15.38	-81.28	73.7576		
135	none	-15.38	-81.28	73.7576	.0254	6
		-15.2	-81.58	79.8576		
136	none	-15.2	-81.58	79.8576	.0254	6
		-15.03	-81.89	85.9576		
137	none	-15.03	-81.89	85.9576	.0254	6
		-14.85	-82.19	92.0476		
138	none	-14.85	-82.19	92.0476	.0254	6
		-14.85	-82.19	98.1476		
139	none	-14.85	-82.19	98.1476	.0254	6
		-14.85	-82.19	104.238		
140	none	-14.85	-82.19	104.238	.0254	6
		-14.85	-82.19	110.338		
141	none	-14.85	-82.19	110.338	.0254	6
		-14.76	-82.34	116.438		
142	none	-14.76	-82.34	116.438	.0254	6
		-14.76	-82.34	122.528		
143	none	-14.76	-82.34	122.528	.0254	6
		-14.76	-82.34	128.628		
144	none	-14.76	-82.34	128.628	.0254	6
		-14.76	-82.34	134.718		
145	none	-14.76	-82.34	134.718	.0254	6
		-14.72	-82.42	140.818		
146	none	-14.72	-82.42	140.818	.0254	6
		-14.72	-82.42	146.918		
147	none	-14.72	-82.42	146.918	.0254	12
		-14.72	-82.42	170.3		
148	none	-17.14	-87.37	0	.0254	4
		-17.14	-87.37	3.6576		
149	none	-17.14	-87.37	3.6576	.0254	9
		-17.14	-87.37	12.7976		
150	none	-17.14	-87.37	12.7976	.0254	6
		-16.96	-87.07	18.8976		
151	none	-16.96	-87.07	18.8976	.0254	6
		-16.79	-86.76	24.9976		
152	none	-16.79	-86.76	24.9976	.0254	6
		-16.61	-86.46	31.0876		
153	none	-16.61	-86.46	31.0876	.0254	6
		-16.44	-86.15	37.1876		
154	none	-16.44	-86.15	37.1876	.0254	6
		-16.26	-85.85	43.2776		
155	none	-16.26	-85.85	43.2776	.0254	6
		-16.08	-85.54	49.3776		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

156	none	-16.08	-85.54	49.3776	.0254	6
		-15.91	-85.24	55.4776		
157	none	-15.91	-85.24	55.4776	.0254	6
		-15.73	-84.93	61.5676		
158	none	-15.73	-84.93	61.5676	.0254	6
		-15.56	-84.63	67.6676		
159	none	-15.56	-84.63	67.6676	.0254	6
		-15.38	-84.32	73.7576		
160	none	-15.38	-84.32	73.7576	.0254	6
		-15.2	-84.02	79.8576		
161	none	-15.2	-84.02	79.8576	.0254	6
		-15.03	-83.71	85.9576		
162	none	-15.03	-83.71	85.9576	.0254	6
		-14.85	-83.41	92.0476		
163	none	-14.85	-83.41	92.0476	.0254	6
		-14.85	-83.41	98.1476		
164	none	-14.85	-83.41	98.1476	.0254	6
		-14.85	-83.41	104.238		
165	none	-14.85	-83.41	104.238	.0254	6
		-14.85	-83.41	110.338		
166	none	-14.85	-83.41	110.338	.0254	6
		-14.76	-83.26	116.438		
167	none	-14.76	-83.26	116.438	.0254	6
		-14.76	-83.26	122.528		
168	none	-14.76	-83.26	122.528	.0254	6
		-14.76	-83.26	128.628		
169	none	-14.76	-83.26	128.628	.0254	6
		-14.76	-83.26	134.718		
170	none	-14.76	-83.26	134.718	.0254	6
		-14.72	-83.18	140.818		
171	none	-14.72	-83.18	140.818	.0254	6
		-14.72	-83.18	146.918		
172	none	-14.72	-83.18	146.918	.0254	12
		-14.72	-83.18	170.3		
173	none	-9.22	-82.8	12.7976	.0254	5
		-17.14	-78.23	12.7976		
174	none	-17.14	-78.23	12.7976	.0254	5
		-17.14	-87.37	12.7976		
175	none	-17.14	-87.37	12.7976	.0254	5
		-9.22	-82.8	12.7976		
176	none	-13.8	-82.8	92.0476	.0254	1
		-14.85	-82.19	92.0476		
177	none	-14.85	-82.19	92.0476	.0254	1
		-14.85	-83.41	92.0476		
178	none	-14.85	-83.41	92.0476	.0254	1
		-13.8	-82.8	92.0476		
179	none	-13.97	-82.8	116.438	.0254	1
		-14.76	-82.34	116.438		
180	none	-14.76	-82.34	116.438	.0254	1
		-14.76	-83.26	116.438		
181	none	-14.76	-83.26	116.438	.0254	1
		-13.97	-82.8	116.438		
182	none	-14.06	-82.8	170.3	.0254	1
		-14.72	-82.42	170.3		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

183	none	-14.72	-82.42	170.3	.0254	1
		-14.72	-83.18	170.3		
184	none	-14.72	-83.18	170.3	.0254	1
		-14.06	-82.8	170.3		
185	none	49.2	104.5	0	.0025	4
		49.2	104.5	3.6576		
186	none	49.2	104.5	3.6576	.0025	6
		49.2	104.5	9.7476		
187	none	49.2	104.5	9.7476	.005	6
		54.48	104.5	3.6576		
188	none	49.2	104.5	9.7476	.005	6
		46.56	109.07	3.6576		
189	none	49.2	104.5	9.7476	.005	6
		46.56	99.93	3.6576		
190	none	54.48	104.5	0	.0254	4
		54.48	104.5	3.6576		
191	none	54.48	104.5	3.6576	.0254	9
		54.48	104.5	12.7976		
192	none	54.48	104.5	12.7976	.0254	6
		54.13	104.5	18.8976		
193	none	54.13	104.5	18.8976	.0254	6
		53.78	104.5	24.9976		
194	none	53.78	104.5	24.9976	.0254	6
		53.42	104.5	31.0876		
195	none	53.42	104.5	31.0876	.0254	6
		53.07	104.5	37.1876		
196	none	53.07	104.5	37.1876	.0254	6
		52.72	104.5	43.2776		
197	none	52.72	104.5	43.2776	.0254	6
		52.37	104.5	49.3776		
198	none	52.37	104.5	49.3776	.0254	6
		52.02	104.5	55.4776		
199	none	52.02	104.5	55.4776	.0254	6
		51.66	104.5	61.5676		
200	none	51.66	104.5	61.5676	.0254	6
		51.31	104.5	67.6676		
201	none	51.31	104.5	67.6676	.0254	6
		50.96	104.5	73.7576		
202	none	50.96	104.5	73.7576	.0254	6
		50.61	104.5	79.8576		
203	none	50.61	104.5	79.8576	.0254	6
		50.26	104.5	85.9576		
204	none	50.26	104.5	85.9576	.0254	6
		49.9	104.5	92.0476		
205	none	49.9	104.5	92.0476	.0254	6
		49.9	104.5	98.1476		
206	none	49.9	104.5	98.1476	.0254	6
		49.9	104.5	104.238		
207	none	49.9	104.5	104.238	.0254	6
		49.9	104.5	110.338		
208	none	49.9	104.5	110.338	.0254	6
		49.73	104.5	116.438		
209	none	49.73	104.5	116.438	.0254	6
		49.73	104.5	122.528		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

210	none	49.73	104.5	122.528	.0254	6
		49.73	104.5	128.628		
211	none	49.73	104.5	128.628	.0254	6
		49.73	104.5	134.718		
212	none	49.73	104.5	134.718	.0254	6
		49.64	104.5	140.818		
213	none	49.64	104.5	140.818	.0254	6
		49.64	104.5	146.918		
214	none	49.64	104.5	146.918	.0254	9
		49.64	104.5	164.13		
215	none	46.56	109.07	0	.0254	4
		46.56	109.07	3.6576		
216	none	46.56	109.07	3.6576	.0254	9
		46.56	109.07	12.7976		
217	none	46.56	109.07	12.7976	.0254	6
		46.74	108.77	18.8976		
218	none	46.74	108.77	18.8976	.0254	6
		46.91	108.46	24.9976		
219	none	46.91	108.46	24.9976	.0254	6
		47.09	108.16	31.0876		
220	none	47.09	108.16	31.0876	.0254	6
		47.26	107.85	37.1876		
221	none	47.26	107.85	37.1876	.0254	6
		47.44	107.55	43.2776		
222	none	47.44	107.55	43.2776	.0254	6
		47.62	107.24	49.3776		
223	none	47.62	107.24	49.3776	.0254	6
		47.79	106.94	55.4776		
224	none	47.79	106.94	55.4776	.0254	6
		47.97	106.63	61.5676		
225	none	47.97	106.63	61.5676	.0254	6
		48.14	106.33	67.6676		
226	none	48.14	106.33	67.6676	.0254	6
		48.32	106.02	73.7576		
227	none	48.32	106.02	73.7576	.0254	6
		48.5	105.72	79.8576		
228	none	48.5	105.72	79.8576	.0254	6
		48.67	105.41	85.9576		
229	none	48.67	105.41	85.9576	.0254	6
		48.85	105.11	92.0476		
230	none	48.85	105.11	92.0476	.0254	6
		48.85	105.11	98.1476		
231	none	48.85	105.11	98.1476	.0254	6
		48.85	105.11	104.238		
232	none	48.85	105.11	104.238	.0254	6
		48.85	105.11	110.338		
233	none	48.85	105.11	110.338	.0254	6
		48.94	104.96	116.438		
234	none	48.94	104.96	116.438	.0254	6
		48.94	104.96	122.528		
235	none	48.94	104.96	122.528	.0254	6
		48.94	104.96	128.628		
236	none	48.94	104.96	128.628	.0254	6
		48.94	104.96	134.718		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

237	none	48.94	104.96	134.718	.0254	6
		48.98	104.88	140.818		
238	none	48.98	104.88	140.818	.0254	6
		48.98	104.88	146.918		
239	none	48.98	104.88	146.918	.0254	9
		48.98	104.88	164.13		
240	none	46.56	99.93	0	.0254	4
		46.56	99.93	3.6576		
241	none	46.56	99.93	3.6576	.0254	9
		46.56	99.93	12.7976		
242	none	46.56	99.93	12.7976	.0254	6
		46.74	100.23	18.8976		
243	none	46.74	100.23	18.8976	.0254	6
		46.91	100.54	24.9976		
244	none	46.91	100.54	24.9976	.0254	6
		47.09	100.84	31.0876		
245	none	47.09	100.84	31.0876	.0254	6
		47.26	101.15	37.1876		
246	none	47.26	101.15	37.1876	.0254	6
		47.44	101.45	43.2776		
247	none	47.44	101.45	43.2776	.0254	6
		47.62	101.76	49.3776		
248	none	47.62	101.76	49.3776	.0254	6
		47.79	102.06	55.4776		
249	none	47.79	102.06	55.4776	.0254	6
		47.97	102.37	61.5676		
250	none	47.97	102.37	61.5676	.0254	6
		48.14	102.67	67.6676		
251	none	48.14	102.67	67.6676	.0254	6
		48.32	102.98	73.7576		
252	none	48.32	102.98	73.7576	.0254	6
		48.5	103.28	79.8576		
253	none	48.5	103.28	79.8576	.0254	6
		48.67	103.59	85.9576		
254	none	48.67	103.59	85.9576	.0254	6
		48.85	103.89	92.0476		
255	none	48.85	103.89	92.0476	.0254	6
		48.85	103.89	98.1476		
256	none	48.85	103.89	98.1476	.0254	6
		48.85	103.89	104.238		
257	none	48.85	103.89	104.238	.0254	6
		48.85	103.89	110.338		
258	none	48.85	103.89	110.338	.0254	6
		48.94	104.04	116.438		
259	none	48.94	104.04	116.438	.0254	6
		48.94	104.04	122.528		
260	none	48.94	104.04	122.528	.0254	6
		48.94	104.04	128.628		
261	none	48.94	104.04	128.628	.0254	6
		48.94	104.04	134.718		
262	none	48.94	104.04	134.718	.0254	6
		48.98	104.12	140.818		
263	none	48.98	104.12	140.818	.0254	6
		48.98	104.12	146.918		

GEOMETRY - DAYTIME/NIGHTTIME (Continued)

264	none	48.98	104.12	146.918	.0254	9
		48.98	104.12	164.13		
265	none	54.48	104.5	12.7976	.0254	5
		46.56	109.07	12.7976		
266	none	46.56	109.07	12.7976	.0254	5
		46.56	99.93	12.7976		
267	none	46.56	99.93	12.7976	.0254	5
		54.48	104.5	12.7976		
268	none	49.9	104.5	92.0476	.0254	1
		48.85	105.11	92.0476		
269	none	48.85	105.11	92.0476	.0254	1
		48.85	103.89	92.0476		
270	none	48.85	103.89	92.0476	.0254	1
		49.9	104.5	92.0476		
271	none	49.73	104.5	116.438	.0254	1
		48.94	104.96	116.438		
272	none	48.94	104.96	116.438	.0254	1
		48.94	104.04	116.438		
273	none	48.94	104.04	116.438	.0254	1
		49.73	104.5	116.438		
274	none	49.64	104.5	164.13	.0254	1
		48.98	104.88	164.13		
275	none	48.98	104.88	164.13	.0254	1
		48.98	104.12	164.13		
276	none	48.98	104.12	164.13	.0254	1
		49.64	104.5	164.13		

Number of wires = 276
current nodes = 1593

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	275	.759995	30	1.95775
segment/radius ratio	275	29.921	2	406.
radius	1	2.5E-03	6	.0254

ELECTRICAL DESCRIPTION - DAYTIME/NIGHTTIME

Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.05	0	1	2.66E-03	6.86E-03

Sources

source	node	sector	magnitude	phase	type
1	1	1	4,233.81	84.1	voltage
2	527	1	1,460.26	183.1	voltage
3	1065	1	2,066.85	21.6	voltage

ELECTRICAL DESCRIPTION - DAYTIME/NIGHTTIME (Continued)

Lumped loads

passive load circuit	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	
1	1	.01	0	0	0	0
2	32	1.E+06	0	0	0	0
3	186	1.E+06	0	0	0	0
4	340	1.E+06	0	0	0	0
5	527	.01	0	0	0	0
6	558	1.E+06	0	0	0	0
7	716	1.E+06	0	0	0	0
8	874	1.E+06	0	0	0	0
9	1065	.01	0	0	0	0
10	1096	1.E+06	0	0	0	0
11	1251	1.E+06	0	0	0	0
12	1406	1.E+06	0	0	0	0

APPENDIX C

Detuned Tower Model

ELECTRICAL DESCRIPTION - PLANE WAVE SOURCE

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.05	0	1	2.66E-03	6.41E-03

Plane wave source

zenith angle (deg)	=	90
increment (deg)	=	0
number of angles	=	1
azimuth angle (deg)	=	0
increment (deg)	=	0
number of angles	=	1
polarization angle (deg)	=	0
magnitude (v/m)	=	1

GEOMETRY - UNMODIFIED TOWER STRUCTURE

Dimensions in meters

Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	none	0	0	0	.0025	4
		0	0	3.6576		
2	none	0	0	3.6576	.0025	6
		0	0	9.7476		
3	none	0	0	9.7476	.005	6
		5.28	0	3.6576		
4	none	0	0	9.7476	.005	6
		-2.64	4.57	3.6576		
5	none	0	0	9.7476	.005	6
		-2.64	-4.57	3.6576		
6	none	5.28	0	0	.0254	4
		5.28	0	3.6576		
7	none	5.28	0	3.6576	.0254	9
		5.28	0	12.7976		
8	none	5.28	0	12.7976	.0254	6
		4.93	0	18.8976		
9	none	4.93	0	18.8976	.0254	6
		4.58	0	24.9976		
10	none	4.58	0	24.9976	.0254	6
		4.22	0	31.0876		
11	none	4.22	0	31.0876	.0254	6
		3.87	0	37.1876		
12	none	3.87	0	37.1876	.0254	6
		3.52	0	43.2776		
13	none	3.52	0	43.2776	.0254	6
		3.17	0	49.3776		
14	none	3.17	0	49.3776	.0254	6
		2.82	0	55.4776		
15	none	2.82	0	55.4776	.0254	6
		2.46	0	61.5676		
16	none	2.46	0	61.5676	.0254	6
		2.11	0	67.6676		
17	none	2.11	0	67.6676	.0254	6
		1.76	0	73.7576		

GEOMETRY - UNMODIFIED TOWER STRUCTURE (Continued)

18	none	1.76	0	73.7576	.0254	6
		1.41	0	79.8576		
19	none	1.41	0	79.8576	.0254	6
		1.06	0	85.9576		
20	none	1.06	0	85.9576	.0254	6
		.7	0	92.0476		
21	none	.7	0	92.0476	.0254	6
		.7	0	98.1476		
22	none	.7	0	98.1476	.0254	6
		.7	0	104.238		
23	none	.7	0	104.238	.0254	6
		.7	0	110.338		
24	none	.7	0	110.338	.0254	6
		.53	0	116.438		
25	none	.53	0	116.438	.0254	6
		.53	0	122.528		
26	none	.53	0	122.528	.0254	6
		.53	0	128.628		
27	none	.53	0	128.628	.0254	6
		.53	0	134.718		
28	none	.53	0	134.718	.0254	6
		.44	0	140.818		
29	none	.44	0	140.818	.0254	6
		.44	0	146.918		
30	none	.44	0	146.918	.0254	3
		.44	0	150.266		
31	none	-2.64	4.57	0	.0254	4
		-2.64	4.57	3.6576		
32	none	-2.64	4.57	3.6576	.0254	9
		-2.64	4.57	12.7976		
33	none	-2.64	4.57	12.7976	.0254	6
		-2.46	4.27	18.8976		
34	none	-2.46	4.27	18.8976	.0254	6
		-2.29	3.96	24.9976		
35	none	-2.29	3.96	24.9976	.0254	6
		-2.11	3.66	31.0876		
36	none	-2.11	3.66	31.0876	.0254	6
		-1.94	3.35	37.1876		
37	none	-1.94	3.35	37.1876	.0254	6
		-1.76	3.05	43.2776		
38	none	-1.76	3.05	43.2776	.0254	6
		-1.58	2.74	49.3776		
39	none	-1.58	2.74	49.3776	.0254	6
		-1.41	2.44	55.4776		
40	none	-1.41	2.44	55.4776	.0254	6
		-1.23	2.13	61.5676		
41	none	-1.23	2.13	61.5676	.0254	6
		-1.06	1.83	67.6676		
42	none	-1.06	1.83	67.6676	.0254	6
		-.88	1.52	73.7576		
43	none	-.88	1.52	73.7576	.0254	6
		-.7	1.22	79.8576		
44	none	-.7	1.22	79.8576	.0254	6
		-.53	.91	85.9576		

GEOMETRY - UNMODIFIED TOWER STRUCTURE (Continued)

45	none	-.53	.91	85.9576	.0254	6
		-.35	.61	92.0476		
46	none	-.35	.61	92.0476	.0254	6
		-.35	.61	98.1476		
47	none	-.35	.61	98.1476	.0254	6
		-.35	.61	104.238		
48	none	-.35	.61	104.238	.0254	6
		-.35	.61	110.338		
49	none	-.35	.61	110.338	.0254	6
		-.26	.46	116.438		
50	none	-.26	.46	116.438	.0254	6
		-.26	.46	122.528		
51	none	-.26	.46	122.528	.0254	6
		-.26	.46	128.628		
52	none	-.26	.46	128.628	.0254	6
		-.26	.46	134.718		
53	none	-.26	.46	134.718	.0254	6
		-.22	.38	140.818		
54	none	-.22	.38	140.818	.0254	6
		-.22	.38	146.918		
55	none	-.22	.38	146.918	.0254	3
		-.22	.38	150.266		
56	none	-2.64	-4.57	0	.0254	4
		-2.64	-4.57	3.6576		
57	none	-2.64	-4.57	3.6576	.0254	9
		-2.64	-4.57	12.7976		
58	none	-2.64	-4.57	12.7976	.0254	6
		-2.46	-4.27	18.8976		
59	none	-2.46	-4.27	18.8976	.0254	6
		-2.29	-3.96	24.9976		
60	none	-2.29	-3.96	24.9976	.0254	6
		-2.11	-3.66	31.0876		
61	none	-2.11	-3.66	31.0876	.0254	6
		-1.94	-3.35	37.1876		
62	none	-1.94	-3.35	37.1876	.0254	6
		-1.76	-3.05	43.2776		
63	none	-1.76	-3.05	43.2776	.0254	6
		-1.58	-2.74	49.3776		
64	none	-1.58	-2.74	49.3776	.0254	6
		-1.41	-2.44	55.4776		
65	none	-1.41	-2.44	55.4776	.0254	6
		-1.23	-2.13	61.5676		
66	none	-1.23	-2.13	61.5676	.0254	6
		-1.06	-1.83	67.6676		
67	none	-1.06	-1.83	67.6676	.0254	6
		-.88	-1.52	73.7576		
68	none	-.88	-1.52	73.7576	.0254	6
		-.7	-1.22	79.8576		
69	none	-.7	-1.22	79.8576	.0254	6
		-.53	-.91	85.9576		
70	none	-.53	-.91	85.9576	.0254	6
		-.35	-.61	92.0476		
71	none	-.35	-.61	92.0476	.0254	6
		-.35	-.61	98.1476		

GEOMETRY - UNMODIFIED TOWER STRUCTURE (Continued)

72	none	-.35	-.61	98.1476	.0254	6
		-.35	-.61	104.238		
73	none	-.35	-.61	104.238	.0254	6
		-.35	-.61	110.338		
74	none	-.35	-.61	110.338	.0254	6
		-.26	-.46	116.438		
75	none	-.26	-.46	116.438	.0254	6
		-.26	-.46	122.528		
76	none	-.26	-.46	122.528	.0254	6
		-.26	-.46	128.628		
77	none	-.26	-.46	128.628	.0254	6
		-.26	-.46	134.718		
78	none	-.26	-.46	134.718	.0254	6
		-.22	-.38	140.818		
79	none	-.22	-.38	140.818	.0254	6
		-.22	-.38	146.918		
80	none	-.22	-.38	146.918	.0254	3
		-.22	-.38	150.266		
81	none	5.28	0	12.7976	.0254	5
		-2.64	4.57	12.7976		
82	none	-2.64	4.57	12.7976	.0254	5
		-2.64	-4.57	12.7976		
83	none	-2.64	-4.57	12.7976	.0254	5
		5.28	0	12.7976		
84	none	.7	0	92.0476	.0254	1
		-.35	.61	92.0476		
85	none	-.35	.61	92.0476	.0254	1
		-.35	-.61	92.0476		
86	none	-.35	-.61	92.0476	.0254	1
		.7	0	92.0476		
87	none	.53	0	116.438	.0254	1
		-.26	.46	116.438		
88	none	-.26	.46	116.438	.0254	1
		-.26	-.46	116.438		
89	none	-.26	-.46	116.438	.0254	1
		.53	0	116.438		
90	none	.44	0	150.266	.0254	1
		-.22	.38	150.266		
91	none	-.22	.38	150.266	.0254	1
		-.22	-.38	150.266		
92	none	-.22	-.38	150.266	.0254	1
		.44	0	150.266		

Lumped loads - DETUNING

passive load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	circuit
1	1	0	0	.005	0	0
2	32	1.E+06	0	0	0	0
3	181	1.E+06	0	0	0	0
4	330	1.E+06	0	0	0	0

PEAK CURRENTS - DETUNING
Frequency = 1.05 MHz
Plane wave zenith (deg) = 90
Plane wave azimuth (deg) = 0
Polarization angle (deg) = 0
coordinates in meters

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	1.10779	274.	.0772695	-1.10509
2	0	0	.9144	1.10543	274.	.0771064	-1.10274
3	0	0	1.8288	1.10361	274.	.0769814	-1.10092
4	0	0	2.7432	1.10201	274.	.0768743	-1.09933
END	0	0	3.6576	1.1006	274.	.0767812	-1.09792
2J1	0	0	3.6576	1.1006	274.	.0767812	-1.09792
6	0	0	4.6726	1.0992	274.	.0766908	-1.09652
7	0	0	5.6876	1.098	274.	.0766155	-1.09532
8	0	0	6.7026	1.09693	274.	.0765513	-1.09426
9	0	0	7.7176	1.09601	274.	.0764965	-1.09334
10	0	0	8.7326	1.09521	274.	.0764506	-1.09254
END	0	0	9.7476	1.0947	274.	.0764229	-1.09203
2J2	0	0	9.7476	.365452	275.9	.0375953	-.363513
12	.88	0	8.7326	.363573	275.9	.0374747	-.361636
13	1.76	0	7.7176	.360442	275.9	.0372586	-.358511
14	2.64	0	6.7026	.356221	276.	.0369532	-.354299
15	3.52	0	5.6876	.351037	276.	.0365639	-.349128
16	4.4	0	4.6726	.345072	276.	.0361007	-.343178
END	5.28	0	3.6576	.339043	276.	.0356175	-.337166
2J2	0	0	9.7476	.364787	273.	.0189494	-.364294
18	-.44	.761667	8.7326	.362908	273.	.0188374	-.362419
19	-.88	1.52333	7.7176	.359777	273.	.0186456	-.359294
20	-1.32	2.285	6.7026	.355558	273.	.0183846	-.355082
21	-1.76	3.04667	5.6876	.350376	273.	.0180631	-.34991
22	-2.2	3.80833	4.6726	.344414	272.9	.0176934	-.343959
END	-2.64	4.57	3.6576	.338392	272.9	.0173223	-.337948
2J2	0	0	9.7476	.364767	273.1	.0198782	-.364225
24	-.44	-.761667	8.7326	.362888	273.1	.0197661	-.362349
25	-.88	-1.52333	7.7176	.359757	273.1	.019574	-.359224
26	-1.32	-2.285	6.7026	.355538	273.1	.0193122	-.355013
27	-1.76	-3.04667	5.6876	.350356	273.1	.0189892	-.349841
28	-2.2	-3.80833	4.6726	.344394	273.1	.0186175	-.34389
END	-2.64	-4.57	3.6576	.338371	273.1	.0182442	-.337879
GND	5.28	0	0	6.01E-03	93.9	-4.11E-04	5.99E-03
30	5.28	0	.9144	5.53E-03	93.8	-3.66E-04	5.52E-03
31	5.28	0	1.8288	3.98E-03	93.2	-2.21E-04	3.98E-03
32	5.28	0	2.7432	1.4E-04	4.9	1.4E-04	1.2E-05
END	5.28	0	3.6576	9.2E-03	93.8	-6.13E-04	9.18E-03
2J3	5.28	0	3.6576	.329851	276.1	.035004	-.327988
35	5.28	0	4.67316	.323062	276.1	.0344578	-.321219
36	5.28	0	5.68871	.31624	276.2	.0339228	-.314415
37	5.28	0	6.70427	.309655	276.2	.0334194	-.307846
38	5.28	0	7.71982	.303294	276.2	.032946	-.301499
39	5.28	0	8.73538	.297157	276.3	.0325021	-.295374
40	5.28	0	9.75093	.291259	276.3	.0320884	-.289486
41	5.28	0	10.7665	.285654	276.4	.0317078	-.283889
42	5.28	0	11.782	.280478	276.4	.0313687	-.278718
END	5.28	0	12.7976	.276495	276.5	.0311185	-.274739

PEAK CURRENTS - DETUNING (Continued)

2J7	5.28	0	12.7976	.239055	277.9	.0328942	-.236781
44	5.22167	0	13.8143	.235156	278.	.0326625	-.232877
45	5.16333	0	14.8309	.230116	278.1	.0323721	-.227828
46	5.105	0	15.8476	.224713	278.2	.032071	-.222413
47	5.04667	0	16.8643	.219098	278.3	.0317684	-.216783
48	4.98833	0	17.8809	.213342	278.5	.0314683	-.211008
END	4.93	0	18.8976	.207489	278.6	.0311733	-.205134
2J8	4.93	0	18.8976	.207489	278.6	.0311733	-.205134
50	4.87167	0	19.9143	.201567	278.8	.0308847	-.199187
51	4.81333	0	20.9309	.195598	279.	.0306035	-.193189
52	4.755	0	21.9476	.189598	279.2	.0303304	-.187156
53	4.69667	0	22.9643	.183578	279.4	.030066	-.181099
54	4.63833	0	23.9809	.177549	279.7	.0298104	-.175029
END	4.58	0	24.9976	.171521	279.9	.0295639	-.168954
2J9	4.58	0	24.9976	.171521	279.9	.0295639	-.168954
56	4.52	0	26.0126	.165508	280.2	.0293269	-.162889
57	4.46	0	27.0276	.159511	280.5	.0290995	-.156834
58	4.4	0	28.0426	.15353	280.8	.0288813	-.150789
59	4.34	0	29.0576	.147572	281.2	.0286723	-.14476
60	4.28	0	30.0726	.14164	281.6	.0284722	-.138749
END	4.22	0	31.0876	.135742	282.	.0282816	-.132763
2J10	4.22	0	31.0876	.135742	282.	.0282816	-.132763
62	4.16167	0	32.1043	.129867	282.5	.0280995	-.126791
63	4.10333	0	33.1209	.124028	283.	.0279253	-.120843
64	4.045	0	34.1376	.118229	283.6	.0277597	-.114924
65	3.98667	0	35.1543	.112477	284.2	.0276024	-.109038
66	3.92833	0	36.1709	.106776	284.9	.0274534	-.103186
END	3.87	0	37.1876	.101128	285.7	.0273125	-.097370
2J11	3.87	0	37.1876	.101128	285.7	.0273125	-.097370
68	3.81167	0	38.2026	.0955502	286.5	.0271795	-.091603
69	3.75333	0	39.2176	.0900371	287.5	.0270542	-.085876
70	3.695	0	40.2326	.0845955	288.6	.0269364	-.080193
71	3.63667	0	41.2476	.0792329	289.8	.0268257	-.074554
72	3.57833	0	42.2626	.073958	291.2	.0267221	-.068962
END	3.52	0	43.2776	.0687811	292.8	.0266252	-.063419
2J12	3.52	0	43.2776	.0687811	292.8	.0266252	-.063419
74	3.46167	0	44.2943	.0637064	294.6	.0265346	-.057917
75	3.40333	0	45.3109	.0587636	296.8	.0264521	-.052473
76	3.345	0	46.3276	.0539682	299.3	.0263755	-.047084
77	3.28667	0	47.3443	.0493476	302.2	.0263049	-.041752
78	3.22833	0	48.3609	.0449363	305.7	.0262398	-.036479
END	3.17	0	49.3776	.0407837	309.9	.026182	-.03127
2J13	3.17	0	49.3776	.0407837	309.9	.026182	-.03127
80	3.11167	0	50.3943	.036949	315.	.0261294	-.026124
81	3.05333	0	51.4109	.0335106	321.1	.0260804	-.021042
82	2.995	0	52.4276	.0305741	328.4	.0260364	-.016028
83	2.93667	0	53.4443	.0282605	336.9	.025997	-.011082
84	2.87833	0	54.4609	.026694	346.6	.0259621	-6.21E-03
END	2.82	0	55.4776	.0259696	356.9	.0259315	-1.41E-03

PEAK CURRENTS - DETUNING (Continued)

2J14	2.82	0	55.4776	.0259696	356.9	.0259315	-1.41E-03
86	2.76	0	56.4926	.0261156	7.3	.0259048	3.31E-03
87	2.7	0	57.5076	.0270758	17.1	.0258818	7.95E-03
88	2.64	0	58.5226	.0287303	25.8	.0258623	.0125129
89	2.58	0	59.5376	.0309318	33.3	.025846	.0169929
90	2.52	0	60.5526	.0335388	39.6	.0258327	.0213898
END	2.46	0	61.5676	.036433	44.9	.0258221	.0257018
2J15	2.46	0	61.5676	.036433	44.9	.0258221	.0257018
92	2.40167	0	62.5843	.0395272	49.2	.0258138	.029934
93	2.34333	0	63.6009	.0427501	52.9	.0258092	.0340801
94	2.285	0	64.6176	.0460473	55.9	.0258063	.0381365
95	2.22667	0	65.6343	.0493807	58.5	.025805	.0421017
96	2.16833	0	66.6509	.0527206	60.7	.0258049	.0459736
END	2.11	0	67.6676	.0560511	62.6	.0258084	.0497559
2J16	2.11	0	67.6676	.0560511	62.6	.0258084	.0497559
98	2.05167	0	68.6826	.0593432	64.2	.0258125	.0534353
99	1.99333	0	69.6976	.0625901	65.6	.0258172	.0570175
100	1.935	0	70.7126	.065781	66.9	.0258223	.0605008
101	1.87667	0	71.7276	.0689073	68.	.0258276	.0638839
102	1.81833	0	72.7426	.071962	69.	.0258328	.0671654
END	1.76	0	73.7576	.0749389	69.8	.0258376	.0703439
2J17	1.76	0	73.7576	.0749389	69.8	.0258376	.0703439
104	1.70167	0	74.7743	.0778377	70.6	.0258416	.0734229
105	1.64333	0	75.7909	.0806537	71.3	.0258462	.0764002
106	1.585	0	76.8076	.0833782	71.9	.0258494	.07927
107	1.52667	0	77.8243	.0860089	72.5	.0258512	.082032
108	1.46833	0	78.8409	.0885427	73.	.0258512	.0846849
END	1.41	0	79.8576	.0909773	73.5	.0258492	.0872278
2J18	1.41	0	79.8576	.0909773	73.5	.0258492	.0872278
110	1.35167	0	80.8743	.09331	73.9	.0258448	.0896594
111	1.29333	0	81.8909	.0955454	74.3	.0258396	.091985
112	1.235	0	82.9076	.0976749	74.7	.0258314	.0941973
113	1.17667	0	83.9243	.0996979	75.	.0258202	.0962964
114	1.11833	0	84.9409	.101614	75.3	.0258057	.0982822
END	1.06	0	85.9576	.103414	75.6	.0257861	.100148
2J19	1.06	0	85.9576	.103414	75.6	.0257861	.100148
116	1.	0	86.9726	.105101	75.8	.0257628	.101895
117	.94	0	87.9876	.106676	76.	.0257354	.103525
118	.88	0	89.0026	.108133	76.2	.0257036	.105034
119	.82	0	90.0176	.10947	76.4	.0256674	.106418
120	.76	0	91.0326	.110663	76.6	.0256273	.107655
END	.7	0	92.0476	.111569	76.7	.0255893	.108595
2J20	.7	0	92.0476	.109028	85.8	7.95E-03	.108738
122	.7	0	93.0643	.109851	85.9	7.91E-03	.109566
123	.7	0	94.0809	.110774	85.9	7.86E-03	.110495
124	.7	0	95.0976	.11163	86.	7.82E-03	.111356
125	.7	0	96.1143	.112398	86.	7.77E-03	.112129
126	.7	0	97.1309	.113073	86.1	7.73E-03	.112808
END	.7	0	98.1476	.113649	86.1	7.69E-03	.113389

PEAK CURRENTS - DETUNING (Continued)

2J21	.7	0	98.1476	.113649	86.1	7.69E-03	.113389
128	.7	0	99.1627	.114126	86.2	7.65E-03	.113869
129	.7	0	100.178	.114514	86.2	7.61E-03	.114261
130	.7	0	101.193	.114799	86.2	7.57E-03	.114549
131	.7	0	102.208	.114982	86.2	7.54E-03	.114735
132	.7	0	103.223	.11506	86.3	7.5E-03	.114815
END	.7	0	104.238	.115047	86.3	7.47E-03	.114804
2J22	.7	0	104.238	.115047	86.3	7.47E-03	.114804
134	.7	0	105.255	.114925	86.3	7.44E-03	.114684
135	.7	0	106.271	.114707	86.3	7.41E-03	.114467
136	.7	0	107.288	.114381	86.3	7.39E-03	.114142
137	.7	0	108.305	.113949	86.3	7.36E-03	.113711
138	.7	0	109.321	.11341	86.3	7.33E-03	.113173
END	.7	0	110.338	.112764	86.3	7.31E-03	.112527
2J23	.7	0	110.338	.112764	86.3	7.31E-03	.112527
140	.671667	0	111.355	.112016	86.3	7.29E-03	.111779
141	.643333	0	112.371	.111165	86.3	7.26E-03	.110928
142	.615	0	113.388	.110223	86.2	7.24E-03	.109985
143	.586667	0	114.405	.109191	86.2	7.22E-03	.108952
144	.558333	0	115.421	.10809	86.2	7.2E-03	.10785
END	.53	0	116.438	.106947	86.1	7.18E-03	.106705
2J24	.53	0	116.438	.106384	87.1	5.32E-03	.106251
146	.53	0	117.453	.10523	87.1	5.31E-03	.105096
147	.53	0	118.468	.103835	87.1	5.29E-03	.1037
148	.53	0	119.483	.102322	87.	5.27E-03	.102186
149	.53	0	120.498	.100699	87.	5.26E-03	.100562
150	.53	0	121.513	.0989715	87.	5.24E-03	.0988326
END	.53	0	122.528	.097139	86.9	5.23E-03	.0969983
2J25	.53	0	122.528	.097139	86.9	5.23E-03	.0969983
152	.53	0	123.545	.0952	86.9	5.21E-03	.0950572
153	.53	0	124.561	.0931523	86.8	5.2E-03	.0930071
154	.53	0	125.578	.0910014	86.7	5.18E-03	.0908536
155	.53	0	126.595	.0887468	86.7	5.17E-03	.088596
156	.53	0	127.611	.0863876	86.6	5.16E-03	.0862335
END	.53	0	128.628	.08393	86.5	5.15E-03	.0837721
2J26	.53	0	128.628	.08393	86.5	5.15E-03	.0837721
158	.53	0	129.643	.0813755	86.4	5.13E-03	.0812134
159	.53	0	130.658	.0786987	86.3	5.12E-03	.0785319
160	.53	0	131.673	.0759206	86.1	5.11E-03	.0757486
161	.53	0	132.688	.073037	86.	5.09E-03	.0728591
162	.53	0	133.703	.0700459	85.8	5.08E-03	.0698614
END	.53	0	134.718	.0669431	85.7	5.07E-03	.066751
2J27	.53	0	134.718	.0669431	85.7	5.07E-03	.066751
164	.515	0	135.735	.0637366	85.5	5.05E-03	.0635358
165	.5	0	136.751	.0604463	85.2	5.04E-03	.0602357
166	.485	0	137.768	.05707	84.9	5.03E-03	.0568481
167	.47	0	138.785	.0536071	84.6	5.01E-03	.0533721
168	.455	0	139.801	.0500579	84.3	5.E-03	.0498077
END	.44	0	140.818	.0464258	83.8	4.98E-03	.0461575

PEAK CURRENTS - DETUNING (Continued)

2J28	.44	0	140.818	.0464258	83.8	4.98E-03	.0461575
170	.44	0	141.835	.0426881	83.3	4.97E-03	.0423981
171	.44	0	142.851	.0388241	82.7	4.95E-03	.0385071
172	.44	0	143.868	.0348257	81.9	4.93E-03	.0344745
173	.44	0	144.885	.0306854	80.8	4.91E-03	.0302894
174	.44	0	145.901	.026391	79.3	4.89E-03	.0259334
END	.44	0	146.918	.021929	77.2	4.87E-03	.0213812
2J29	.44	0	146.918	.021929	77.2	4.87E-03	.0213812
176	.44	0	148.034	.0167975	73.2	4.84E-03	.0160839
177	.44	0	149.15	.0113958	65.	4.81E-03	.0103296
END	.44	0	150.266	6.16E-03	39.2	4.78E-03	3.89E-03
GND	-2.64	4.57	0	6.E-03	92.2	-2.34E-04	5.99E-03
179	-2.64	4.57	.9144	5.53E-03	92.1	-2.05E-04	5.52E-03
180	-2.64	4.57	1.8288	3.98E-03	91.6	-1.09E-04	3.98E-03
181	-2.64	4.57	2.7432	1.4E-04	3.6	1.4E-04	8.89E-06
END	-2.64	4.57	3.6576	9.19E-03	92.8	-4.51E-04	9.18E-03
2J4	-2.64	4.57	3.6576	.329202	272.9	.0168716	-.328769
184	-2.64	4.57	4.67316	.322416	272.9	.0164559	-.321996
185	-2.64	4.57	5.68871	.315599	272.9	.0160369	-.315191
186	-2.64	4.57	6.70427	.309016	272.9	.0156331	-.30862
187	-2.64	4.57	7.71982	.302657	272.9	.0152434	-.302273
188	-2.64	4.57	8.73538	.29652	272.9	.0148679	-.296147
189	-2.64	4.57	9.75093	.290622	272.9	.0145071	-.29026
190	-2.64	4.57	10.7665	.285015	272.8	.0141642	-.284663
191	-2.64	4.57	11.782	.279836	272.8	.0138469	-.279493
END	-2.64	4.57	12.7976	.275849	272.8	.0136001	-.275514
2J32	-2.64	4.57	12.7976	.237369	272.3	9.65E-03	-.237173
193	-2.61	4.52	13.8143	.23346	272.3	9.41E-03	-.23327
194	-2.58	4.47	14.8309	.228404	272.3	9.1E-03	-.228223
195	-2.55	4.42	15.8476	.222983	272.3	8.77E-03	-.22281
196	-2.52	4.37	16.8643	.217347	272.2	8.43E-03	-.217183
197	-2.49	4.32	17.8809	.211566	272.2	8.08E-03	-.211411
END	-2.46	4.27	18.8976	.205684	272.2	7.73E-03	-.205539
2J33	-2.46	4.27	18.8976	.205684	272.2	7.73E-03	-.205539
199	-2.43167	4.21833	19.9143	.199732	272.1	7.37E-03	-.199596
200	-2.40333	4.16667	20.9309	.193729	272.1	7.02E-03	-.193602
201	-2.375	4.115	21.9476	.187691	272.	6.66E-03	-.187573
202	-2.34667	4.06333	22.9643	.181631	272.	6.29E-03	-.181522
203	-2.31833	4.01167	23.9809	.175558	271.9	5.93E-03	-.175458
END	-2.29	3.96	24.9976	.169481	271.9	5.57E-03	-.169389
2J34	-2.29	3.96	24.9976	.169481	271.9	5.57E-03	-.169389
205	-2.26	3.91	26.0126	.163414	271.8	5.21E-03	-.163331
206	-2.23	3.86	27.0276	.157358	271.8	4.86E-03	-.157283
207	-2.2	3.81	28.0426	.151312	271.7	4.5E-03	-.151245
208	-2.17	3.76	29.0576	.145281	271.6	4.14E-03	-.145222
209	-2.14	3.71	30.0726	.13927	271.6	3.79E-03	-.139218
END	-2.11	3.66	31.0876	.133282	271.5	3.44E-03	-.133238
2J35	-2.11	3.66	31.0876	.133282	271.5	3.44E-03	-.133238
211	-2.08167	3.60833	32.1043	.12731	271.4	3.09E-03	-.127272
212	-2.05333	3.55667	33.1209	.121361	271.3	2.74E-03	-.12133
213	-2.025	3.505	34.1376	.115443	271.2	2.4E-03	-.115418
214	-1.99667	3.45333	35.1543	.109557	271.1	2.06E-03	-.109538
215	-1.96833	3.40167	36.1709	.103708	270.9	1.72E-03	-.103694
END	-1.94	3.35	37.1876	.0978952	270.8	1.38E-03	-.0978855

PEAK CURRENTS - DETUNING (Continued)

2J36	-1.94	3.35	37.1876	.0978952	270.8	1.38E-03	-.0978855
217	-1.91	3.3	38.2026	.0921322	270.6	1.04E-03	-.0921263
218	-1.88	3.25	39.2176	.0864108	270.5	7.13E-04	-.0864079
219	-1.85	3.2	40.2326	.0807332	270.3	3.85E-04	-.0807323
220	-1.82	3.15	41.2476	.0751015	270.	5.96E-05	-.0751015
221	-1.79	3.1	42.2626	.0695183	269.8	-2.62E-04	-.0695178
END	-1.76	3.05	43.2776	.0639856	269.5	-5.81E-04	-.063983
2J37	-1.76	3.05	43.2776	.0639856	269.5	-5.81E-04	-.063983
223	-1.73	2.99833	44.2943	.0584962	269.1	-8.96E-04	-.0584893
224	-1.7	2.94667	45.3109	.0530672	268.7	-1.21E-03	-.0530534
225	-1.67	2.895	46.3276	.0476969	268.2	-1.52E-03	-.0476728
226	-1.64	2.84333	47.3443	.042389	267.5	-1.82E-03	-.0423499
227	-1.61	2.79167	48.3609	.0371473	266.7	-2.12E-03	-.0370867
END	-1.58	2.74	49.3776	.0319789	265.7	-2.42E-03	-.0318873
2J38	-1.58	2.74	49.3776	.0319789	265.7	-2.42E-03	-.0318873
229	-1.55167	2.69	50.3943	.0268896	264.2	-2.71E-03	-.0267525
230	-1.52333	2.64	51.4109	.0218872	262.1	-3.E-03	-.0216806
231	-1.495	2.59	52.4276	.0169962	258.9	-3.28E-03	-.0166759
232	-1.46667	2.54	53.4443	.0122695	253.1	-3.56E-03	-.0117404
233	-1.43833	2.49	54.4609	7.88E-03	240.8	-3.84E-03	-6.88E-03
END	-1.41	2.44	55.4776	4.61E-03	206.9	-4.11E-03	-2.08E-03
2J39	-1.41	2.44	55.4776	4.61E-03	206.9	-4.11E-03	-2.08E-03
235	-1.38	2.38833	56.4926	5.1E-03	149.	-4.38E-03	2.63E-03
236	-1.35	2.33667	57.5076	8.61E-03	122.6	-4.64E-03	7.26E-03
237	-1.32	2.285	58.5226	.0127838	112.5	-4.9E-03	.0118095
238	-1.29	2.23333	59.5376	.017075	107.5	-5.15E-03	.0162808
239	-1.26	2.18167	60.5526	.0213614	104.6	-5.39E-03	.0206692
END	-1.23	2.13	61.5676	.0256008	102.7	-5.64E-03	.0249728
2J40	-1.23	2.13	61.5676	.0256008	102.7	-5.64E-03	.0249728
241	-1.20167	2.08	62.5843	.0297816	101.4	-5.87E-03	.0291968
242	-1.17333	2.03	63.6009	.0338892	100.4	-6.1E-03	.0333348
243	-1.145	1.98	64.6176	.037916	99.6	-6.33E-03	.0373836
244	-1.11667	1.93	65.6343	.0418576	99.	-6.55E-03	.0413414
245	-1.08833	1.88	66.6509	.0457105	98.5	-6.77E-03	.0452064
END	-1.06	1.83	67.6676	.0494772	98.1	-6.98E-03	.0489822
2J41	-1.06	1.83	67.6676	.0494772	98.1	-6.98E-03	.0489822
247	-1.03	1.77833	68.6826	.0531441	97.8	-7.19E-03	.0526559
248	-1.	1.72667	69.6976	.056715	97.5	-7.39E-03	.0562319
249	-.97	1.675	70.7126	.0601881	97.2	-7.58E-03	.0597088
250	-.94	1.62333	71.7276	.063562	97.	-7.77E-03	.0630854
251	-.91	1.57167	72.7426	.0668351	96.8	-7.95E-03	.0663603
END	-.88	1.52	73.7576	.0700057	96.7	-8.13E-03	.0695321
2J42	-.88	1.52	73.7576	.0700057	96.7	-8.13E-03	.0695321
253	-.85	1.47	74.7743	.0730773	96.5	-8.3E-03	.0726044
254	-.82	1.42	75.7909	.0760482	96.4	-8.47E-03	.0755755
255	-.79	1.37	76.8076	.0789127	96.3	-8.63E-03	.0784399
256	-.76	1.32	77.8243	.0816701	96.2	-8.78E-03	.0811969
257	-.73	1.27	78.8409	.0843198	96.1	-8.93E-03	.083846
END	-.7	1.22	79.8576	.0868536	96.	-9.07E-03	.0863791

PEAK CURRENTS - DETUNING (Continued)

2J43	-.7	1.22	79.8576	.0868536	96.	-9.07E-03	.0863791
259	-.671667	1.16833	80.8743	.0892827	95.9	-9.2E-03	.0888073
260	-.643333	1.11667	81.8909	.0916053	95.8	-9.33E-03	.0911289
261	-.615	1.065	82.9076	.0938144	95.8	-9.45E-03	.093337
262	-.586667	1.01333	83.9243	.0959102	95.7	-9.57E-03	.0954317
263	-.558333	.961667	84.9409	.0978924	95.7	-9.68E-03	.0974128
END	-.53	.91	85.9576	.099754	95.6	-9.78E-03	.0992734
2J44	-.53	.91	85.9576	.099754	95.6	-9.78E-03	.0992734
265	-.5	.86	86.9726	.101498	95.6	-9.88E-03	.101016
266	-.47	.81	87.9876	.103124	95.5	-9.96E-03	.102642
267	-.44	.76	89.0026	.104632	95.5	-.0100452	.104149
268	-.41	.71	90.0176	.106014	95.5	-.0101194	.10553
269	-.38	.66	91.0326	.107252	95.4	-.0101853	.106767
END	-.35	.61	92.0476	.108192	95.4	-.0102364	.107707
2J45	-.35	.61	92.0476	.108847	90.9	-1.64E-03	.108835
271	-.35	.61	93.0643	.109677	90.9	-1.68E-03	.109664
272	-.35	.61	94.0809	.110607	90.9	-1.74E-03	.110593
273	-.35	.61	95.0976	.111469	90.9	-1.79E-03	.111455
274	-.35	.61	96.1143	.112244	90.9	-1.84E-03	.112229
275	-.35	.61	97.1309	.112925	91.	-1.89E-03	.112909
END	-.35	.61	98.1476	.113507	91.	-1.94E-03	.11349
2J46	-.35	.61	98.1476	.113507	91.	-1.94E-03	.11349
277	-.35	.61	99.1627	.113987	91.	-1.98E-03	.11397
278	-.35	.61	100.178	.114381	91.	-2.03E-03	.114363
279	-.35	.61	101.193	.11467	91.	-2.07E-03	.114651
280	-.35	.61	102.208	.114855	91.1	-2.11E-03	.114836
281	-.35	.61	103.223	.114936	91.1	-2.15E-03	.114916
END	-.35	.61	104.238	.114926	91.1	-2.19E-03	.114905
2J47	-.35	.61	104.238	.114926	91.1	-2.19E-03	.114905
283	-.35	.61	105.255	.114808	91.1	-2.23E-03	.114786
284	-.35	.61	106.271	.114589	91.1	-2.26E-03	.114567
285	-.35	.61	107.288	.114265	91.2	-2.3E-03	.114242
286	-.35	.61	108.305	.113834	91.2	-2.33E-03	.11381
287	-.35	.61	109.321	.113296	91.2	-2.36E-03	.113271
END	-.35	.61	110.338	.11265	91.2	-2.39E-03	.112625
2J48	-.35	.61	110.338	.11265	91.2	-2.39E-03	.112625
289	-.335	.585	111.355	.111901	91.2	-2.42E-03	.111875
290	-.32	.56	112.371	.11105	91.3	-2.45E-03	.111023
291	-.305	.535	113.388	.110105	91.3	-2.47E-03	.110077
292	-.29	.51	114.405	.109072	91.3	-2.5E-03	.109043
293	-.275	.485	115.421	.107968	91.3	-2.52E-03	.107939
END	-.26	.46	116.438	.106821	91.4	-2.54E-03	.106791
2J49	-.26	.46	116.438	.106365	90.9	-1.66E-03	.106352
295	-.26	.46	117.453	.105207	90.9	-1.68E-03	.105194
296	-.26	.46	118.468	.10381	90.9	-1.7E-03	.103796
297	-.26	.46	119.483	.102293	91.	-1.72E-03	.102279
298	-.26	.46	120.498	.100667	91.	-1.73E-03	.100652
299	-.26	.46	121.513	.0989353	91.	-1.75E-03	.0989198
END	-.26	.46	122.528	.0970984	91.	-1.77E-03	.0970822

PEAK CURRENTS - DETUNING (Continued)

2J50	-.26	.46	122.528	.0970984	91.	-1.77E-03	.0970822
301	-.26	.46	123.545	.0951544	91.1	-1.79E-03	.0951376
302	-.26	.46	124.561	.0931013	91.1	-1.81E-03	.0930838
303	-.26	.46	125.578	.0909448	91.1	-1.82E-03	.0909265
304	-.26	.46	126.595	.088684	91.2	-1.84E-03	.0886649
305	-.26	.46	127.611	.0863183	91.2	-1.86E-03	.0862983
END	-.26	.46	128.628	.0838536	91.3	-1.87E-03	.0838326
2J51	-.26	.46	128.628	.0838536	91.3	-1.87E-03	.0838326
307	-.26	.46	129.643	.0812913	91.3	-1.89E-03	.0812693
308	-.26	.46	130.658	.0786063	91.4	-1.91E-03	.0785831
309	-.26	.46	131.673	.0758193	91.5	-1.92E-03	.0757949
310	-.26	.46	132.688	.0729263	91.5	-1.94E-03	.0729004
311	-.26	.46	133.703	.069925	91.6	-1.96E-03	.0698976
END	-.26	.46	134.718	.0668114	91.7	-1.98E-03	.0667822
2J52	-.26	.46	134.718	.0668114	91.7	-1.98E-03	.0667822
313	-.253333	.446667	135.735	.0635935	91.8	-1.99E-03	.0635622
314	-.246667	.433333	136.751	.0602919	91.9	-2.01E-03	.0602583
315	-.24	.42	137.768	.0569042	92.	-2.03E-03	.0568679
316	-.233333	.406667	138.785	.0534297	92.2	-2.05E-03	.0533904
317	-.226667	.393333	139.801	.0498688	92.4	-2.07E-03	.0498259
END	-.22	.38	140.818	.0462242	92.6	-2.09E-03	.046177
2J53	-.22	.38	140.818	.0462242	92.6	-2.09E-03	.046177
319	-.22	.38	141.835	.0424724	92.8	-2.11E-03	.04242
320	-.22	.38	142.851	.0385905	93.2	-2.13E-03	.0385316
321	-.22	.38	143.868	.0345688	93.6	-2.15E-03	.0345016
322	-.22	.38	144.885	.0303975	94.1	-2.18E-03	.0303194
323	-.22	.38	145.901	.0260595	94.8	-2.2E-03	.0259663
END	-.22	.38	146.918	.0215327	95.9	-2.23E-03	.021417
2J54	-.22	.38	146.918	.0215327	95.9	-2.23E-03	.021417
325	-.22	.38	148.034	.0162808	98.	-2.26E-03	.0161231
326	-.22	.38	149.15	.0106234	102.5	-2.3E-03	.0103724
END	-.22	.38	150.266	4.58E-03	120.7	-2.34E-03	3.94E-03
GND	-2.64	-4.57	0	6.E-03	92.3	-2.36E-04	5.99E-03
328	-2.64	-4.57	.9144	5.53E-03	92.1	-2.06E-04	5.52E-03
329	-2.64	-4.57	1.8288	3.98E-03	91.6	-1.1E-04	3.98E-03
330	-2.64	-4.57	2.7432	1.4E-04	3.7	1.4E-04	8.94E-06
END	-2.64	-4.57	3.6576	9.19E-03	92.8	-4.54E-04	9.18E-03
2J5	-2.64	-4.57	3.6576	.329181	273.1	.0177897	-.3287
333	-2.64	-4.57	4.67316	.322396	273.1	.017371	-.321928
334	-2.64	-4.57	5.68871	.315578	273.1	.0169485	-.315123
335	-2.64	-4.57	6.70427	.308996	273.1	.0165408	-.308553
336	-2.64	-4.57	7.71982	.302637	273.1	.016147	-.302206
337	-2.64	-4.57	8.73538	.2965	273.	.015767	-.29608
338	-2.64	-4.57	9.75093	.2906	273.	.0154015	-.290192
339	-2.64	-4.57	10.7665	.284993	273.	.0150538	-.284595
340	-2.64	-4.57	11.782	.279813	273.	.0147318	-.279425
END	-2.64	-4.57	12.7976	.275826	273.	.0144811	-.275446
2J57	-2.64	-4.57	12.7976	.237398	272.3	9.72E-03	-.237199
342	-2.61	-4.52	13.8143	.233488	272.3	9.47E-03	-.233296
343	-2.58	-4.47	14.8309	.228433	272.3	9.16E-03	-.228249
344	-2.55	-4.42	15.8476	.223012	272.3	8.82E-03	-.222837
345	-2.52	-4.37	16.8643	.217374	272.2	8.48E-03	-.217209
346	-2.49	-4.32	17.8809	.211593	272.2	8.12E-03	-.211437
END	-2.46	-4.27	18.8976	.205712	272.2	7.76E-03	-.205566

PEAK CURRENTS - DETUNING (Continued)

2J58	-2.46	-4.27	18.8976	.205712	272.2	7.76E-03	-.205566
348	-2.43167	-4.21833	19.9143	.199759	272.1	7.4E-03	-.199622
349	-2.40333	-4.16667	20.9309	.193757	272.1	7.03E-03	-.193629
350	-2.375	-4.115	21.9476	.187718	272.	6.67E-03	-.1876
351	-2.34667	-4.06333	22.9643	.181658	272.	6.3E-03	-.181549
352	-2.31833	-4.01167	23.9809	.175585	271.9	5.93E-03	-.175485
END	-2.29	-3.96	24.9976	.169508	271.9	5.56E-03	-.169417
2J59	-2.29	-3.96	24.9976	.169508	271.9	5.56E-03	-.169417
354	-2.26	-3.91	26.0126	.163442	271.8	5.2E-03	-.163359
355	-2.23	-3.86	27.0276	.157385	271.8	4.83E-03	-.157311
356	-2.2	-3.81	28.0426	.15134	271.7	4.47E-03	-.151274
357	-2.17	-3.76	29.0576	.145309	271.6	4.11E-03	-.145251
358	-2.14	-3.71	30.0726	.139297	271.5	3.75E-03	-.139247
END	-2.11	-3.66	31.0876	.13331	271.5	3.39E-03	-.133267
2J60	-2.11	-3.66	31.0876	.13331	271.5	3.39E-03	-.133267
360	-2.08167	-3.60833	32.1043	.127338	271.4	3.03E-03	-.127302
361	-2.05333	-3.55667	33.1209	.121389	271.3	2.68E-03	-.12136
362	-2.025	-3.505	34.1376	.115471	271.2	2.32E-03	-.115448
363	-1.99667	-3.45333	35.1543	.109587	271.	1.97E-03	-.109569
364	-1.96833	-3.40167	36.1709	.103738	270.9	1.63E-03	-.103725
END	-1.94	-3.35	37.1876	.0979253	270.7	1.28E-03	-.0979169
2J61	-1.94	-3.35	37.1876	.0979253	270.7	1.28E-03	-.0979169
366	-1.91	-3.3	38.2026	.0921628	270.6	9.41E-04	-.092158
367	-1.88	-3.25	39.2176	.0864419	270.4	6.03E-04	-.0864398
368	-1.85	-3.2	40.2326	.0807647	270.2	2.68E-04	-.0807643
369	-1.82	-3.15	41.2476	.0751338	270.	-6.42E-05	-.0751338
370	-1.79	-3.1	42.2626	.0695513	269.7	-3.93E-04	-.0695502
END	-1.76	-3.05	43.2776	.0640194	269.4	-7.18E-04	-.0640154
2J62	-1.76	-3.05	43.2776	.0640194	269.4	-7.18E-04	-.0640154
372	-1.73	-2.99833	44.2943	.058531	269.	-1.04E-03	-.0585218
373	-1.7	-2.94667	45.3109	.0531033	268.5	-1.36E-03	-.0530859
374	-1.67	-2.895	46.3276	.0477347	268.	-1.67E-03	-.0477053
375	-1.64	-2.84333	47.3443	.0424289	267.3	-1.99E-03	-.0423824
376	-1.61	-2.79167	48.3609	.0371898	266.5	-2.29E-03	-.0371191
END	-1.58	-2.74	49.3776	.0320251	265.4	-2.6E-03	-.0319197
2J63	-1.58	-2.74	49.3776	.0320251	265.4	-2.6E-03	-.0319197
378	-1.55167	-2.69	50.3943	.0269408	263.8	-2.89E-03	-.0267848
379	-1.52333	-2.64	51.4109	.0219459	261.6	-3.19E-03	-.0217129
380	-1.495	-2.59	52.4276	.0170668	258.2	-3.48E-03	-.0167082
381	-1.46667	-2.54	53.4443	.0123605	252.3	-3.77E-03	-.0117726
382	-1.43833	-2.49	54.4609	8.01E-03	239.6	-4.05E-03	-6.91E-03
END	-1.41	-2.44	55.4776	4.82E-03	206.1	-4.33E-03	-2.12E-03
2J64	-1.41	-2.44	55.4776	4.82E-03	206.1	-4.33E-03	-2.12E-03
384	-1.38	-2.38833	56.4926	5.28E-03	150.6	-4.6E-03	2.59E-03
385	-1.35	-2.33667	57.5076	8.71E-03	124.	-4.86E-03	7.23E-03
386	-1.32	-2.285	58.5226	.0128454	113.5	-5.13E-03	.0117778
387	-1.29	-2.23333	59.5376	.0171182	108.3	-5.38E-03	.0162493
388	-1.26	-2.18167	60.5526	.0213939	105.3	-5.64E-03	.0206379
END	-1.23	-2.13	61.5676	.0256263	103.3	-5.88E-03	.0249416

PEAK CURRENTS - DETUNING (Continued)

2J65	-1.23	-2.13	61.5676	.0256263	103.3	-5.88E-03	.0249416
390	-1.20167	-2.08	62.5843	.0298024	101.9	-6.13E-03	.0291658
391	-1.17333	-2.03	63.6009	.0339068	100.8	-6.36E-03	.0333041
392	-1.145	-1.98	64.6176	.0379311	100.	-6.6E-03	.0373531
393	-1.11667	-1.93	65.6343	.041871	99.4	-6.82E-03	.0413113
394	-1.08833	-1.88	66.6509	.0457225	98.9	-7.04E-03	.0451766
END	-1.06	-1.83	67.6676	.0494883	98.4	-7.26E-03	.0489527
2J66	-1.06	-1.83	67.6676	.0494883	98.4	-7.26E-03	.0489527
396	-1.03	-1.77833	68.6826	.0531544	98.1	-7.47E-03	.0526267
397	-1.	-1.72667	69.6976	.0567247	97.8	-7.68E-03	.056203
398	-.97	-1.675	70.7126	.0601976	97.5	-7.87E-03	.0596803
399	-.94	-1.62333	71.7276	.0635713	97.3	-8.07E-03	.0630573
400	-.91	-1.57167	72.7426	.0668442	97.1	-8.25E-03	.0663326
END	-.88	-1.52	73.7576	.0700148	96.9	-8.44E-03	.0695048
2J67	-.88	-1.52	73.7576	.0700148	96.9	-8.44E-03	.0695048
402	-.85	-1.47	74.7743	.0730864	96.8	-8.61E-03	.0725774
403	-.82	-1.42	75.7909	.0760575	96.6	-8.78E-03	.075549
404	-.79	-1.37	76.8076	.0789221	96.5	-8.94E-03	.0784137
405	-.76	-1.32	77.8243	.0816798	96.4	-9.1E-03	.0811712
406	-.73	-1.27	78.8409	.0843297	96.3	-9.25E-03	.0838207
END	-.7	-1.22	79.8576	.0868637	96.2	-9.4E-03	.0863541
2J68	-.7	-1.22	79.8576	.0868637	96.2	-9.4E-03	.0863541
408	-.671667	-1.16833	80.8743	.0892931	96.1	-9.53E-03	.0887827
409	-.643333	-1.11667	81.8909	.091616	96.1	-9.67E-03	.0911047
410	-.615	-1.065	82.9076	.0938257	96.	-9.79E-03	.0933134
411	-.586667	-1.01333	83.9243	.0959217	95.9	-9.91E-03	.0954084
412	-.558333	-.961667	84.9409	.0979042	95.9	-.0100218	.0973899
END	-.53	-.91	85.9576	.0997662	95.8	-.0101265	.0992509
2J69	-.53	-.91	85.9576	.0997662	95.8	-.0101265	.0992509
414	-.5	-.86	86.9726	.10151	95.8	-.0102243	.100994
415	-.47	-.81	87.9876	.103137	95.7	-.0103151	.10262
416	-.44	-.76	89.0026	.104646	95.7	-.0103988	.104128
417	-.41	-.71	90.0176	.106029	95.7	-.010475	.10551
418	-.38	-.66	91.0326	.107266	95.6	-.0105428	.106747
END	-.35	-.61	92.0476	.108208	95.6	-.0105952	.107688
2J70	-.35	-.61	92.0476	.108856	90.9	-1.66E-03	.108843
420	-.35	-.61	93.0643	.109685	90.9	-1.71E-03	.109672
421	-.35	-.61	94.0809	.110616	90.9	-1.76E-03	.110602
422	-.35	-.61	95.0976	.11148	90.9	-1.82E-03	.111465
423	-.35	-.61	96.1143	.112255	91.	-1.87E-03	.112239
424	-.35	-.61	97.1309	.112935	91.	-1.92E-03	.112919
END	-.35	-.61	98.1476	.113519	91.	-1.97E-03	.113502
2J71	-.35	-.61	98.1476	.113519	91.	-1.97E-03	.113502
426	-.35	-.61	99.1627	.114	91.	-2.01E-03	.113982
427	-.35	-.61	100.178	.114394	91.	-2.06E-03	.114375
428	-.35	-.61	101.193	.114683	91.1	-2.11E-03	.114664
429	-.35	-.61	102.208	.11487	91.1	-2.15E-03	.11485
430	-.35	-.61	103.223	.114951	91.1	-2.19E-03	.11493
END	-.35	-.61	104.238	.114941	91.1	-2.23E-03	.114919

PEAK CURRENTS - DETUNING (Continued)

2J72	-.35	-.61	104.238	.114941	91.1	-2.23E-03	.114919
432	-.35	-.61	105.255	.114822	91.1	-2.27E-03	.1148
433	-.35	-.61	106.271	.114605	91.2	-2.3E-03	.114582
434	-.35	-.61	107.288	.114281	91.2	-2.34E-03	.114257
435	-.35	-.61	108.305	.113851	91.2	-2.37E-03	.113826
436	-.35	-.61	109.321	.113314	91.2	-2.41E-03	.113288
END	-.35	-.61	110.338	.112667	91.2	-2.44E-03	.112641
2J73	-.35	-.61	110.338	.112667	91.2	-2.44E-03	.112641
438	-.335	-.585	111.355	.111919	91.3	-2.47E-03	.111892
439	-.32	-.56	112.371	.111069	91.3	-2.5E-03	.111041
440	-.305	-.535	113.388	.110125	91.3	-2.53E-03	.110096
441	-.29	-.51	114.405	.109092	91.3	-2.55E-03	.109062
442	-.275	-.485	115.421	.107989	91.4	-2.58E-03	.107958
END	-.26	-.46	116.438	.106844	91.4	-2.6E-03	.106812
2J74	-.26	-.46	116.438	.106358	90.9	-1.65E-03	.106345
444	-.26	-.46	117.453	.105201	90.9	-1.66E-03	.105188
445	-.26	-.46	118.468	.103805	90.9	-1.69E-03	.103791
446	-.26	-.46	119.483	.102288	91.	-1.71E-03	.102274
447	-.26	-.46	120.498	.100663	91.	-1.73E-03	.100648
448	-.26	-.46	121.513	.098932	91.	-1.75E-03	.0989166
END	-.26	-.46	122.528	.0970959	91.	-1.77E-03	.0970798
2J75	-.26	-.46	122.528	.0970959	91.	-1.77E-03	.0970798
450	-.26	-.46	123.545	.0951528	91.1	-1.79E-03	.095136
451	-.26	-.46	124.561	.0931007	91.1	-1.8E-03	.0930832
452	-.26	-.46	125.578	.090945	91.1	-1.82E-03	.0909267
453	-.26	-.46	126.595	.0886851	91.2	-1.84E-03	.088666
454	-.26	-.46	127.611	.0863203	91.2	-1.86E-03	.0863003
END	-.26	-.46	128.628	.0838565	91.3	-1.88E-03	.0838355
2J76	-.26	-.46	128.628	.0838565	91.3	-1.88E-03	.0838355
456	-.26	-.46	129.643	.0812953	91.3	-1.9E-03	.0812732
457	-.26	-.46	130.658	.0786111	91.4	-1.91E-03	.0785878
458	-.26	-.46	131.673	.0758251	91.5	-1.93E-03	.0758005
459	-.26	-.46	132.688	.0729329	91.5	-1.95E-03	.0729068
460	-.26	-.46	133.703	.0699325	91.6	-1.97E-03	.0699048
END	-.26	-.46	134.718	.0668197	91.7	-1.99E-03	.0667901
2J77	-.26	-.46	134.718	.0668197	91.7	-1.99E-03	.0667901
462	-.253333	-.446667	135.735	.0636026	91.8	-2.01E-03	.063571
463	-.246667	-.433333	136.751	.0603018	91.9	-2.03E-03	.0602678
464	-.24	-.42	137.768	.056915	92.1	-2.05E-03	.0568782
465	-.233333	-.406667	138.785	.0534414	92.2	-2.07E-03	.0534015
466	-.226667	-.393333	139.801	.0498815	92.4	-2.09E-03	.0498378
END	-.22	-.38	140.818	.0462378	92.6	-2.11E-03	.0461897
2J78	-.22	-.38	140.818	.0462378	92.6	-2.11E-03	.0461897
468	-.22	-.38	141.835	.0424868	92.9	-2.13E-03	.0424334
469	-.22	-.38	142.851	.0386059	93.2	-2.15E-03	.0385458
470	-.22	-.38	143.868	.0345851	93.6	-2.18E-03	.0345166
471	-.22	-.38	144.885	.0304149	94.2	-2.2E-03	.0303351
472	-.22	-.38	145.901	.026078	94.9	-2.23E-03	.0259827
END	-.22	-.38	146.918	.0215526	96.	-2.26E-03	.0214342
2J79	-.22	-.38	146.918	.0215526	96.	-2.26E-03	.0214342
474	-.22	-.38	148.034	.0163025	98.1	-2.29E-03	.016141
475	-.22	-.38	149.15	.0106481	102.6	-2.32E-03	.0103912
END	-.22	-.38	150.266	4.61E-03	120.9	-2.37E-03	3.96E-03

PEAK CURRENTS - DETUNING (Continued)

2J7	5.28	0	12.7976	.0562234	269.2	-8.11E-04	-.0562176
477	3.696	.914	12.7976	.0496421	268.6	-1.21E-03	-.0496274
478	2.112	1.828	12.7976	.0415726	267.7	-1.69E-03	-.0415381
479	.528	2.742	12.7976	.0332553	266.2	-2.19E-03	-.0331831
480	-1.056	3.656	12.7976	.0250976	263.9	-2.67E-03	-.0249552
END	-2.64	4.57	12.7976	.0182857	260.4	-3.06E-03	-.0180285
2J32	-2.64	4.57	12.7976	.0563765	270.9	8.92E-04	-.0563694
483	-2.64	2.742	12.7976	.0497851	270.6	4.85E-04	-.0497827
484	-2.64	.914	12.7976	.0416972	270.	-5.29E-06	-.0416972
485	-2.64	-.914	12.7976	.0333497	269.1	-5.05E-04	-.0333459
486	-2.64	-2.742	12.7976	.0251409	267.7	-9.9E-04	-.0251214
END	-2.64	-4.57	12.7976	.01825	265.7	-1.38E-03	-.0181976
2J57	-2.64	-4.57	12.7976	.0565458	273.4	3.38E-03	-.0564446
489	-1.056	-3.656	12.7976	.0499435	273.4	2.96E-03	-.0498555
490	.528	-2.742	12.7976	.0418392	273.4	2.46E-03	-.0417671
491	2.112	-1.828	12.7976	.0334684	273.3	1.93E-03	-.0334128
492	3.696	-.914	12.7976	.025225	273.2	1.41E-03	-.0251856
END	5.28	0	12.7976	.0182855	273.	9.65E-04	-.01826
2J20	.7	0	92.0476	.440883	271.1	8.76E-03	-.440796
END	-.35	.61	92.0476	.440076	271.1	8.73E-03	-.439989
2J45	-.35	.61	92.0476	.441117	270.	1.33E-04	-.441117
END	-.35	-.61	92.0476	.440305	270.	9.58E-05	-.440305
2J70	-.35	-.61	92.0476	.441548	268.9	-8.84E-03	-.44146
END	.7	0	92.0476	.440742	268.8	-8.88E-03	-.440653
2J24	.53	0	116.438	.645414	270.1	9.61E-04	-.645413
END	-.26	.46	116.438	.645866	270.1	9.53E-04	-.645865
2J49	-.26	.46	116.438	.645426	270.	7.23E-05	-.645426
END	-.26	-.46	116.438	.645882	270.	6.32E-05	-.645882
2J74	-.26	-.46	116.438	.645416	269.9	-8.87E-04	-.645415
END	.53	0	116.438	.645868	269.9	-8.97E-04	-.645867
2J30	.44	0	150.266	.910635	270.1	2.38E-03	-.910632
END	-.22	.38	150.266	.914565	270.1	2.36E-03	-.914562
2J55	-.22	.38	150.266	.910626	270.	2.34E-05	-.910626
END	-.22	-.38	150.266	.914546	270.	-1.64E-06	-.914546
2J80	-.22	-.38	150.266	.910594	269.9	-2.37E-03	-.910591
END	.44	0	150.266	.914524	269.9	-2.39E-03	-.914521

APPENDIX D

WWRL Letter
Supporting Grant of PTA and Station License

RADIO THAT LISTENS

AM 1600 WWRL

NEW YORK'S PROGRESSIVE TALK

July 14, 2009

Mr. Kevin Plumb
Senior Director of Engineering
ESPN Radio
ESPN Plaza
Bristol, CT 06010

Dear Mr. Plumb:

This letter is in reference to FCC Construction Permit File No. BP-20070403ABM, issued to New York Radio, LLC ("New York Radio"), licensee of Station WEPN(AM), New York, New York. The above referenced FCC Construction Permit authorizes New York Radio to relocate its transmission facilities and modify its directional antenna pattern. A special condition contained in the WEPN construction permit requires that certain actions be taken by New York Radio to insure that construction of the new WEPN towers does not adversely impact the directional patterns of Station WWRL(AM) located approximately 2.1kM from the WEPN construction permit site.

After completion of all construction at the new WEPN site, field strength measurements were performed by the WWRL technical staff that confirmed that there has been no adverse impact to the WWRL directional patterns as a result of the WEPN tower construction. This result verifies earlier computer studies which predicted that there would be no material adverse impact as a result of the WEPN tower construction.

Based on the finding of no adverse impact, Access.1 New York License Company LLC ("Access.1"), licensee of Station WWRL(AM), believes that New York Radio has fully satisfied the Construction Permit special condition with respect to the WWRL directional antenna patterns and therefore, Access.1 supports Commission grant of program test authority and grant of a license for the new WEPN facilities.

Sincerely,

Adriane T. Gaines

Adriane T. Gaines
General Manager

333 Seventh Avenue, New York, NY 10001-5094 • 212.631.0800 • 212.239.7423 fax

APPENDIX E

Radio Frequency Exposure Measurement Report

RF Safety Solutions LLC

5 Marblestone Lane • So. Setauket, NY 11720
tel: 631-698-6765 • fax: 631-732-2919
e-mail: RStrick@RFSafetySolutions.com
www.RFSafetySolutions.com

RF Safety Compliance Report

An Analysis of RF Field Levels and Safety Concerns
for WEPN-AM ESPN Radio
North Bergen, New Jersey

Prepared for

ESPN
((RADIO))

July 6, 2009

Executive Summary

Overview

The engineering department of ESPN Radio, which operates WEPN-AM (WEPN), commissioned this RF Safety Report. The station is owned by New York AM Radio LLC, a Disney corporation. The primary objective of the analysis and report is to determine whether the company's broadcast operations located in Secaucus and North Bergen, New Jersey, are in compliance with Federal Communications Commission (FCC) and Occupational Safety and Health (OSHA) Regulations regarding RF radiation safety and to determine which measures, if any, may be necessary to achieve compliance and/or improve the level of RF safety.

Current Status of WEPN

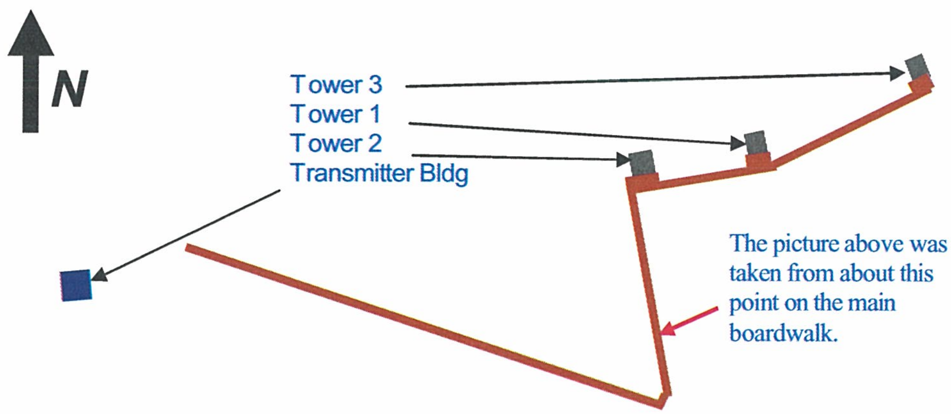
Existing Broadcast Facility

WEPN's current broadcast transmission facility is located in East Rutherford, New Jersey, on the grounds of the Meadowlands Sports Complex. The Meadowlands area of New Jersey is home to approximately 11 AM radio broadcast sites due to the availability of relatively inexpensive land and the close proximity to New York City. Much of the land in the Meadowlands area is wetlands and generally not suitable for building. The performance of WEPN's current facility has been severely compromised over the last four years due to the construction of the very large Xanadu sports and entertainment complex. Some of the Xanadu buildings are less than 100 yards from WEPN's three transmission towers.

New Broadcast Facility

The new facility is built in the middle of wetlands near an unnavigable river in North Bergen, New Jersey. The only way to access the transmission towers is via a very long wooden boardwalk. ESPN has installed redundant locked gates to make access impossible for anyone short of them destroying locks and/or gates. Since there is a serious risk of drowning from being caught in the mud and water, the only places where RF field levels need to be considered are on the boardwalk and on the three tower structures. The transmitter building, which is located about 60 feet from the beginning of the boardwalk, is in the town of Secaucus, New Jersey.

The station is designed to operate as a full-time directional station with an output power level of 50,000 Watts via a three-tower array. It has the capability to operate in omnidirectional mode at 12, 500 Watts for use during maintenance operations.



Electrostimulation Hazard

The main RF safety concern at any AM radio station is the potential for RF shocks and burns (electrostimulation). The goal is to minimize the potential for anyone to make contact with a tower, a feed line, or the tuning circuits. ESPN has used industry-best practices to ensure that the only people who could ever come close to touching the tower or tuning circuits are personnel authorized to work at the site who have consciously chosen to get close to the tower or have opened equipment cabinets to access tuning circuits. Access to the tower leg closest to the porch in front of the tuning hut at each of the towers is made via a short ladder down to the concrete base supporting the tower leg. One must remove a chain that has an appropriate warning sign to access the ladder. Locked gates prevent access to the elevated porch in front of each tuning hut. In addition, access to the boardwalk is controlled by a fence and locked gate. Once on the boardwalk, there is another locked gate. All the tuning circuits are fully protected to prevent accidental contact. Therefore, to get to the leg of any of the towers, one must pass through three locked gates and then remove a chain with an appropriate warning sign. In addition, each of the gates also has an RF hazard sign.

The other RF safety concern is the induced currents that can be experienced by anyone who climbs an energized AM tower. Climbers should not be allowed to climb a tower with an input power level greater than 500 Watts to ensure the induced currents do not result in excessive heating of ankles and wrists.

RF Field Levels

WEPN operates at 1,050 MHz. At this frequency, the Federal Communications Commission's (FCC's) Maximum Permissible Exposure (MPE) limits are the same for both Occupational/Controlled exposure and General Population/ Uncontrolled exposure. The RF field levels very close to the towers exceed FCC MPE limits. Although exposure to significant RF field levels at AM radio frequencies is not an RF safety concern because the human body is a very ineffective antenna, there are the regulatory compliance concerns. The small areas on the porches that have RF fields that exceed the MPE limit have restricted access and are identified by appropriate signage.

Compliance

WEPN is fully compliant with the FCC's RF safety regulations.

The consultant's opinion is based on the extremely low RF field levels on accessible land, the modest RF field levels on the boardwalk even in the area near the towers, the extensive use of gates and locks to restrict access, and the extensive signage.

Statement of Richard R. Strickland, RF Safety Consultant

Richard R. Strickland of RF Safety Solutions LLC certifies that the statements in this report accurately describe, to the best of his knowledge, the conditions at WEPN when surveyed June 15, 2009. The findings within this report are based on the observations from that survey and sound engineering practice. Changes in operating practices and/or hardware or property reconfigurations should be followed by another survey and report modification as appropriate.

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Section

1

Overview of Findings

Results of Site Measurements and an Investigation of Operations

Overview

WEPN's transmission facility is built in the middle of wetlands near an unnavigable river in North Bergen, New Jersey. The transmitter building is in the town of Secaucus, New Jersey. The only way to access the transmission towers is via a very long wooden boardwalk. The boardwalk starts about 60 feet from the transmitter building. A person leaving the transmitter building must past through a locked gate in a chain-link fence. The boardwalk roughly follows the river. Once on the boardwalk you soon come to the first wooden gate with an RF hazard sign. Outrigger fencing is about to be added to make it extremely difficult to climb around the gate. The boardwalk extends approximately 1,900 feet (~580 meters) to the first of the three towers.

Top: The site in winter.
Above: Towers 1 and 3, the center and eastern tower, viewed from the main boardwalk.
Left: This gate is located about 60 feet from the beginning of the boardwalk. Outriggers are about to be added to prevent climbing around the gate.

The station is designed to operate as a full-time directional station with an output power level of 50,000 Watts via the three-tower array. It has the capability to operate in omnidirectional mode at 12, 500 Watts for use during maintenance operations using either tower 2 or tower 1.

Antenna Towers

There are three self-supporting towers. The top of each of the three-sided towers is 499 feet (152) meters above ground level (AGL). The three towers are used to form a directional antenna pattern with the main lobe directed towards New York City.

The design of the site was heavily influenced by the need to have a minimum impact on the wetlands. Even the boards that form the walkway on the boardwalk had to be spaced far enough apart to allow sunlight to penetrate to the marsh grasses below, as evidenced by the plant life growing between the planks in the photos. Each tower leg rests on a very large insulator that is bolted to a concrete pad that rests on steel piles. The concrete pad is several feet above the average water level to allow for seasonal changes in water level. The base of the fully shielded tuning shelter is slightly higher than these concrete pads and has a large wooden porch in front of it. The porch for each tower is accessed via several stairs from the boardwalk after passing through a locked gate that has an RF hazard sign.

This view of Tower 2 looking towards the west shows the basic configuration of all three towers. The major difference is that Tower 2 has the larger shelter to accommodate the phasor.

Left Above The base of Tower 2 from the main boardwalk. Note the heavy growth of marsh grass between the planks.

Left Center: The gate used to access Tower 2. There are stairs to the porch just beyond the gate. Each tower has a similar gate. All gates have appropriate RF safety signs. Tower 2 has the larger shelter to accommodate the phasor.

Below: The porch in front of Tower 2 looking westward.

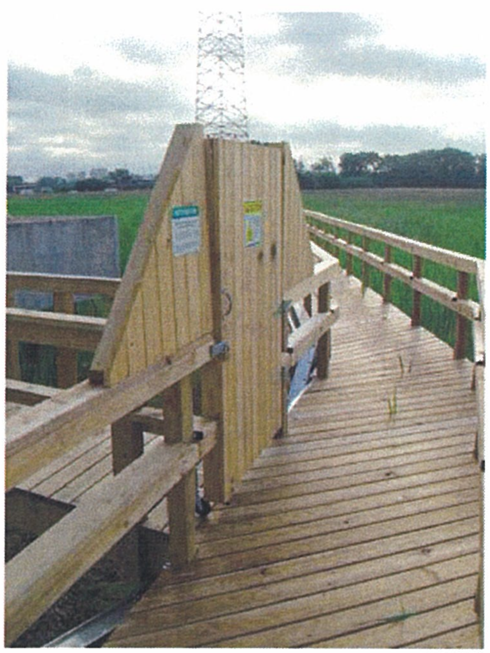
Above: The base of Tower 1, the center tower, as seen from Tower 2

Below: A view of Tower 2 (left) and Tower 1 (right) from the main boardwalk.

Above: The view looking westward from the boardwalk near Tower 3. Tower 1 is on the lef, and Tower 2 is on the right.

Below Left: The entrance to Tower 1, the center tower.

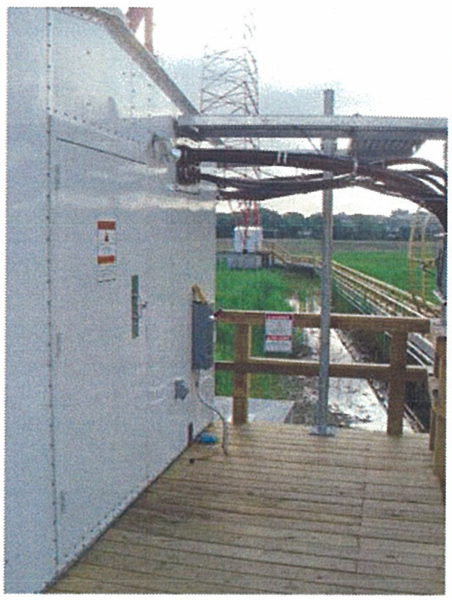
Bottom Right: The entrance to Tower 3, the easternmost tower. This is the end of the boardwalk.



Tuning Shelters

All three tuning shelters are fully shielded steel buildings. Care has been used to filter all the wiring going into the building. This results in the lowest RF field levels this consultant has ever seen inside a tuning shelter [1]. The first tower that one reaches when traveling down the boardwalk is Tower 2, which is the westernmost tower. The shelter at this tower is larger (16 feet wide by 18 feet, 6 inches deep) than the shelters at the other two towers because it contains the phasor. The tuning shelters for the middle tower, Tower 1, and the easternmost tower, Tower 3, are 8 feet wide by 11 feet, 3 inches deep.

The wooden porches in front of each tower are 7 feet deep and extend to the left (west) of each shelter to provide access to the tower leg where the feed line is attached.

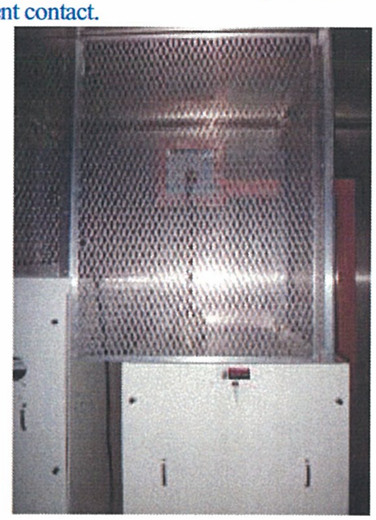


Above: Tower 2 porch and shelter entrance looking east toward Tower 1.

Above: Tower 2 porch looking westward. Access to the tower leg with the feed line is made from this point. An additional chain and RF hazard sign is about to be added to restrict access to this end of the porch.

Below: The phasor cabinet, which is located in the shelter at Tower 2.

Below: All energized circuits are shielded to reduce RF field levels to a minimum and to prevent inadvertent contact.



[1] A band-reject filter was added next to the phasor at Tower 2 after the survey completed. Subsequent measurements revealed high magnetic fields in the back corner behind the cabinets. Chains and suitable signs have been added to restrict access to this area.

Transmitter Building

WEPN broadcasts at the 50,000-Watt level—the maximum power allowed for AM radio stations.

The one-story building houses all the transmitter equipment, except the phasor, which is located at the tower closest to the transmitter building (Tower 2). This design approach was taken due to the very long distance between the transmitters located inside the transmitter building and the towers. The boardwalk is 1,900 feet long from the entrance to the first tower!

There are three 50,000 Watt solid-state transmitters. One is used routinely, and two are backup systems.

RF Field Level Measurements

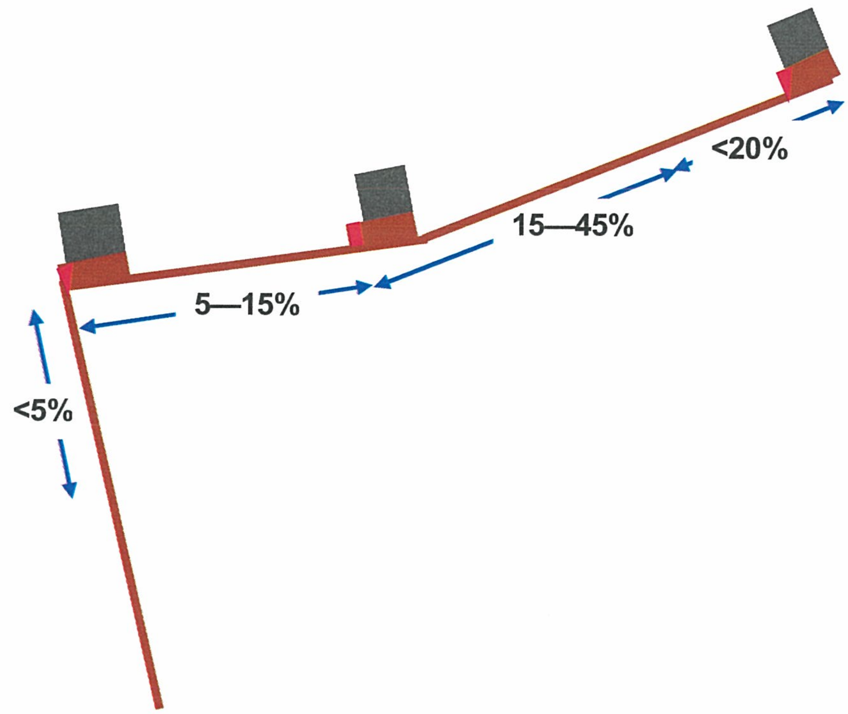
Spatially averaged RF field level measurements were made in the following locations:

- The main boardwalk, starting about 300 feet from Tower 2
- The entire boardwalk, from Tower 2 past Tower 1 to Tower 3
- The porches at all three towers
- Inside all three tuning shelters

The RF field levels in close proximity to AM radio towers are highly variable both in time and space. It is fruitless to try to "map" the RF field levels with precision. The following points are certain:

- The highest spatially averaged RF field levels are found on the west side (left side facing the shelter) of each porch very close to the tower leg. In these areas, the RF field levels can easily exceed the MPE limit. These are not dangerous levels as the human body absorbs very little energy at these frequencies. The real safety concern is the burn hazard associated with making contact with the towers, the feed lines from each tuning house to its associated tower, and the tuning circuits inside the tuning shelters.
- Other than the very small areas on each of the porches, the RF field levels are below 50 percent of the MPE limit. This includes the entire boardwalk and the remainder of the porches.
- The RF field levels inside the tuning shelters were typically about 1 percent of the MPE limit. The shields around the tuning circuits and the fact that most of the circuitry is behind doors made the levels inside these shelters lower than this consultant has ever seen at an AM radio station.

The diagram below shows the approximate spatially averaged RF field levels on the boardwalk. The RF field levels on decks were less than 70 percent of the MPE limit except for the small areas shown in red. The access to these small areas is now restricted by chains and signs.



Section

2

Standards and Measurements

Measurements Compared to FCC Regulations

Standards and Regulations

Federal Communications Commission (FCC) Regulations

The FCC updated its RF safety regulations in 1997. The regulations require that all transmitting sites in the United States must meet all aspects of these regulations as of September 1, 2000.

The FCC Regulations are based on setting limits for human exposure. The FCC limits are similar to, but not identical, to the limits of several other major standards. There are two sets of exposure limits.

- Occupational/Controlled
- General Population/Uncontrolled

These are Maximum Permissible Exposure (MPE) limits averaged over the body and averaged over time. The Occupational/Controlled limits are five times higher than the General Population/Uncontrolled limits at all frequencies above 3 MHz. The averaging period for Occupational/Controlled exposure is six minutes for exposure to frequencies below 15 GHz. The averaging time decreases as the frequency increases from 15 GHz to 300 GHz. The FCC does not allow time averaging for General Population/Uncontrolled exposure. The MPE limits are the same for both the electric field and the magnetic field.

The FCC provides definitions for the two types of exposure and attempts to define when they apply. A simplified view, endorsed by the Occupational Safety and Health Administration (OSHA), is that the more restrictive General Population/Uncontrolled limits apply unless

- the organization is operating under a written RF safety program, and
- the individuals who may be exposed to levels above the General Population/Uncontrolled limits have received RF safety training.

A planned Notice of Proposed Rulemaking is aimed at further defining when an organization is allowed to use the higher MPE limits for Occupational/Controlled exposure. The terms *fully aware* and *exercise control* are referred to in the current FCC Regulations when defining the requirements for establishing an Occupational/Controlled Environment. The Notice further defines these two important terms.

The phrase *fully aware* refers to workers who

- have received both written and verbal information regarding RF radiation.
- have received training that includes how to control or mitigate RF radiation exposure.

The phrase *exercise control* refers to workers who

- understand how to use administrative controls to reduce their exposure level. Administrative controls include time averaging.
- understand how to use engineering controls to reduce their exposure level. Engineering controls include Personal Protective Equipment (PPE), specifically RF personal monitors and RF protective clothing.

The FCC's MPE limits for the two classes of exposure are shown in the tables below. Limits are spatially averaged over the whole body. The Occupational/ Controlled limits are time averaged.

Table 1: FCC Maximum Permissible Exposure Limits

Table 1A: Occupational/Controlled Exposure

Frequency (MHz)	Power Density (S) (mW/cm^2)
0.03–3	100
3–30	$900/f^2$
30–300	1.0
300–1,500	f/300
1,500–100,000	5.0

Table 1B: General Population/Uncontrolled Exposure

Frequency (MHz)	Power Density (S) (mW/cm^2)
0.03–1.34	100
1.34–30	$180/f^2$
30–300	0.2
300–1,500	f/1500
1,500–100,000	1.0

Occupational Safety and Health Administration (OSHA) Regulations

OSHA still has an outdated standard on its books that is based on the first American National Standards Institute (ANSI) standard developed in the 1960s. This is a single-tier standard that suggests limiting exposure to 10.0 mW/cm² at all frequencies. The FCC limits are far more restrictive. Under the "General Duty" clause of its regulations, OSHA has been using modern, "consensus" standards, such as the FCC's, as a model for enforcement. OSHA defined its position relative to the FCC Regulations in a reply to an official request from the Personal Communications Industry Association (PCIA) in October 1998. In essence, OSHA went on record stating that, while it was not relinquishing its role as the agency responsible for worker health, organizations that satisfy FCC requirements would also satisfy OSHA requirements.

This may be the official position of OSHA, but the evaluator could not identify the corresponding compliance directive. Therefore, local OSHA offices may not be aware of it. For this reason, only FCC MPE limits are considered in this RF Safety Report.

MPE Limits for WEPN

The FCC's MPE limits for General Population/Uncontrolled exposure are one-fifth of the limits for Occupational/Controlled exposure above 3 MHz. The exposure limits are the same at 1,340 kHz and lower. Since WEPN broadcasts at 1,050 MHz, the MPE limits are the same for both exposure situations. The real impact is that six-minute time averaging is allowed for Occupational/Controlled exposure and no time averaging is allowed when General Population/ Uncontrolled exposure limits are applied.

If the personnel are properly trained in RF safety and meet the FCC's criteria for ***fully aware*** personnel who ***are able to exercise control*** over their exposure, then a six-minute time averaging period can be used in accordance with the MPE limit for Occupational/Controlled exposure. All of WEPN's engineering personnel recently completed a thorough RF safety training program and meet the FCC criteria for personnel who are fully aware and able to exercise control over RF exposure. This training focused on the issue of electrostimulation and safe work practices at AM stations.

Untrained personnel who may visit the site in the future will always be accompanied by a trained member of the ESPN Radio engineering staff.

RF Survey Equipment and Measurement Techniques

RF Survey Equipment

The RF survey equipment used to make the measurements in this report was manufactured by Narda Safety Test Solutions, an L-3 Communications Corporation company located in Hauppauge, New York. The equipment was in excellent operating condition. The meter and probes were both within the factory-recommended calibration interval. The consultant is very familiar with this equipment and its operation. A survey instrument is comprised of a probe (the sensor), a meter, a cable, and a shielded bag used as a "zero field" reference.

DESCRIPTION	MODEL	SER. NO.
Electric Field Probe, 300 kHz to 3 GHz, 600% full scale	B8742D	08004
RF Survey Meter	8715	12009

The Narda Safety Test Solutions Model 8715 Survey Meter is used with all 8700 series probes. It has spatial-averaging capability.

These are two Narda Safety Test Solutions 8700 series probes. The larger probe is the Model B8742D that was used to survey the facilities described in this report. It operates over a frequency range of 300 kHz to 3 GHz. The full-scale rating is 600 percent of the FCC's MPE limits for General Population/Uncontrolled exposure.

Model B8742D Probe

Measurements

Measurement Range

The shaped-frequency response Model B8742D probe has frequency-dependent sensitivity that closely conforms to the FCC's MPE limits for General Population/ Uncontrolled exposure. Thus, it is not important to know the operating frequencies of the equipment being measured providing that they operate within the broad frequency limits of the probe—300 kHz to 3 GHz. The only significant emitter at the facility described in this report—WEPN—operates within this frequency range.

The measurement range is approximately 30 dB, or 1,000:1. Therefore, the smallest RF field level that can be measured accurately is about 0.6 percent of the MPE limits for General Population/Uncontrolled exposure.

Measurement Technique

The cable is not used for AM band measurements due to a measurement artifact that can occur—the probe is connected directly to the meter for these measurements. Since the objective was primarily to verify which areas presented potential RF safety hazards or risked violation of FCC Regulations, no attempt was made to accurately "map" the RF field levels throughout the facility. The goal was to identify and quantify the field strength of any areas with significant RF field levels. Spatial averaging was used in areas where the RF field levels were high enough to make a meaningful measurement. A minimum of three spatially averaged measurements were made at each point. Additional measurements were made when the results of the first three measurements were not within a range of 10 percent.

Personnel

A senior member of the ESPN Radio engineering staff accompanied the consultant during all of the measurements and the review of the facilities and the hardware. This representative was:

Name	Title
Kevin Plumb	**Senior Director of Engineering, ESPN Radio**

Appendix: Consultant Qualifications

Richard Strickland founded RF Safety Solutions in 2001 after 10 years as Director of Business Development for Narda Safety Test Solutions, the world's leading supplier of RF safety measurement and monitoring products. As director of the RF safety business at Narda, Mr. Strickland determined which products were developed and their performance characteristics. He frequently functioned as program manager, as he did with the Nardalert XT RF personal monitor. He initiated the development of RF radiation training courses at Narda and has conducted courses ranging from basic employee awareness seminars to in-depth, application-specific courses. Audiences have included environmental health and safety professionals, engineers, technicians, attorneys, communications industry professional consulting engineers (PEs), and senior managers of major corporations, government organizations, and professional groups. Mr. Strickland has taught approximately 200 public and private seminars on RF radiation safety. In-house course clients include the National Association of Broadcasters, National Public Radio, Society of Broadcast Engineers, AT&T Mobility, Sony, Motorola, NYNEX Mobile, ABC, CapRock, the U.S. Army, Bell Atlantic Mobile, Ameritech, Primeco, NORTEL, Texas Instruments, and Northrup-Grumman. He has been both a featured speaker and a member of the radio frequency radiation panel at the National Association of Broadcasters, the Radio Club of America, and the International Wireless Conference and Exposition. He is a member of IEEE SC 28 P1466. The project scope of this group is "Preparation of a guidance document for the development of RF safety programs." Mr. Strickland is the author of numerous articles on RF safety practices and measurement issues.

Customers

Richard Strickland provides advice regarding RF radiation safety to several major companies. Services include RF surveys and RF safety reports, development of RF safety programs, and RF safety training.

Clients include:

- ABC Radio
- ABC Television
- American Tower
- AT&T Mobility
- British Aerospace
- Cornell University
- ESPN
- Hughes Network Systems
- Lockheed Martin Corporation
- NBC
- Raytheon Corporation
- Society of Broadcast Engineers
- Trinity Broadcasting
- U. S. Coast Guard

Education

- MBA, University of Massachusetts, 1980
- BA Physics, Bridgewater College, 1972
- Advanced (radar & IFF) and basic electronics courses, U.S. Coast Guard

Presentations & Publications

- More than 40 articles published in technical publications on RF safety, high-power amplifiers, and radomes
- Organized and conducted approximately 250 public and in-house training courses
- Featured speaker for numerous professional organizations including NATO, National Public Radio, National Association of Broadcasters, Society of Broadcast Engineers, and Radio Club of America

Professional Memberships

- Member of the International Electrotechnical Commission (IEC) Technical Advisory Group (TAG) 106: Methods for the Assessment of Electromagnetic Fields Associated with Human Exposure
- Member of the IEEE CS 28 P1466, guidance document for the development of RF safety programs
- Member of the Association of Federal Communications Consulting Engineers (AFCCE)

Awards

- Winner of the R & D 100 Award for the Nardalert XT RF Personal Monitor. Mr. Strickland was the originator of this product. He functioned as project manager and decided on all of its features and design details. The R & D 100 Awards are given annually to the top 100 scientific and technological achievements in the world. They are frequently referred to as "the Nobel Prizes of Applied Research."