August 2022
KSON(FM) Channel 279B
San Diego
Auxiliary Antenna License Application

The instant application is being filed to cover construction of the KSON auxiliary antenna authorized in FCC File No. BXPH-20190719AAN. The antenna itself has been in place for over thirty years, as the licensed auxiliary antenna for stations KBZT, and then later KWFN and KXSN. Furthermore, this is a frequency-agile system used by only a single station at any given time. Therefore, the implementation of the KSON auxiliary antenna construction permit required no new construction at the site, and consequently the surveyor and engineer certifications provided herein to satisfy conditions #7 and #8 on the construction permit are taken from the 2010 license applications for the KWFN and KXSN auxiliaries.

Also included in this engineering exhibit is a detailed calculation of the RF exposure levels from the auxiliary facility, to demonstrate compliance with the applicable FCC MPE.

SPEAR & ASSOCIATES, INC.

CIVIL ENGINEERING & LAND SURVEYING

475 PRODUCTION STREET
SAN MARCOS, CA 92078
(760) 736-2040 • FAX (760) 736-4866

FEBRUARY 24, 2010

Attn: BILL EISENHAMER
LINCOLN FINANCIAL MEDIA OF CALIFORNIA
KSON/KIFM/KBZT/KSOQ

RE: KSON ANTENNA
MT. MIGUEL
SPRING VALLEY, CA 91977

SUBJECT: ANTENNA BASE AZIMUTH CERTIFICATION

THIS IS TO CERTIFY, THAT BY FIELD SURVEY ON FEBRUARY 11, 2010, MEASUREMENTS WERE TAKEN ON THE SUBJECT FACILITY REFERENCED ABOVE AND OBSERVED THE AZIMUTH OF THE APPARATUS OF INTEREST TO BE 300° 06"48", REFERENCED TO TRUE NORTH.

RESPECTFULLY SUBMITTED,

Ray Spear

RAY SPEAR
PLS 6404

SPEAR & ASSOCIATES, INC.
CIVIL ENGINEERING AND LAND SURVEYING

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SAN MARCOS, CA 92078
(760) 736-2040
FAX (760) 736-4866

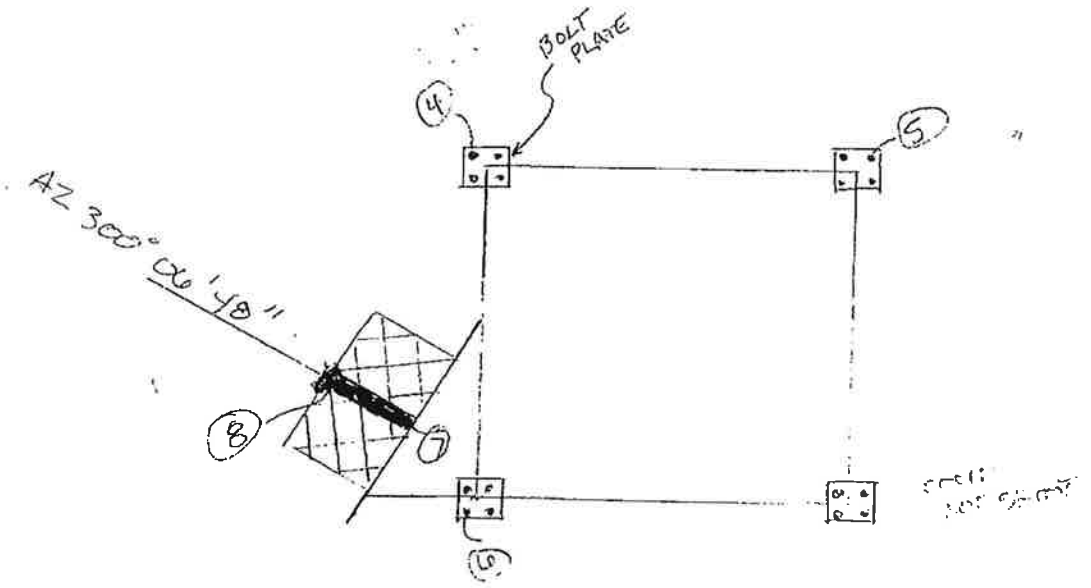
JOB NO. 10-108

CLIENT/JOB NAME KSON - MT MIGUEL ANTENNAS

DATE 2/11/10

CREW CHIEF BOB ADAMS

CREW



KSON • FM 97.3
KBZT • FM 949
KIFM • FM 98.1

March 3, 2010

RE: KiFM, Facility I.D. # 34589, Permit # BXPH-20100112ABW
KSON, Facility I.D. # 30832, Permit # BXPH-20100112ABV
Affidavit Regarding Antenna Installation

The existing directional antenna proposed for use by KiFM and KSON as an auxiliary antenna (see file numbers BXPH-20100112ABW and BXPH-201000112ABV, respectively), is an existing antenna which has been used by radio station KBZT, channel 235, for many years. The existing antenna model and mounting configuration were provided to ERI for Proof of Performance for KIFM and KSON on Channel 251 (98.1 MHz) and Channel 247 (97.3 MHz), respectively. The resulting documentation provided by the antenna manufacturer corresponds with the "as-built" information provided.

Based on the review of the documentation and a physical inspection of the antenna, I certify the antenna was installed as specified in the manufacturer's instructions.

I have been a broadcast engineer for 21 years and a Chief Engineer at Noble Broadcasting, KEDJ/KGME, and Nationwide Communications prior to working for Lincoln Financial Media Company of CA. I have been involved in a couple 10-bay FM antenna installations, and a 4-bay lambda section antenna installation. I have also assisted in a 4-bay directional antenna move to accommodate a DTV antenna installation on a common tower.

R. William Eisenhamer, Jr.
Chief Engineer
Lincoln Financial Media Company of CA

1615 MURRAY CANYON ROAD, SUITE 710 • SAN DIEGO, CALIFORNIA 92108-4321
P.O BOX 889004 • SAN DIEGO, CALIFORNIA 92168-9004
(619) 291-9797 • FAX: (619) 543-1353
LINCOLN FINANCIAL MEDIA COMPANY OF CALIFORNIA

ELECTRONICS RESEARCH, INC. ERI®

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 http://www.eriinc.com/

Directional Antenna System for KSON, San Diego, California

November 24, 2009

Electronics Research Inc. is providing an antenna system that is specially designed to meet the FCC requirements and the general needs of radio station KSON. KSON is to be multiplexed with stations KIFM, KBZT and KYXY.

The antenna is the ERI model 1081-1CP-DA-SP configuration. The circular polarized system consists of one bay using one driven circular polarized radiating element attached to an iris enclosure. The antenna was mounted on the North 270 degrees East tower face with bracketry to provide an antenna orientation of North 300 degrees East. The antenna was tested on a self-support tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 103.7 megahertz, which is the center of the FM broadcast channel assigned to KSON.

Pattern measurements were made on a sixty-acre antenna pattern range that is owned and operated by Electronics Research, Inc. The tests were performed under the direction of Thomas B. Silliman, president of Electronics Research, Inc. Mr. Silliman has the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University and is a registered professional engineer in the states of Indiana, Maryland and Minnesota.

Directional Antenna System
Proposed For
KSON, San Diego, California

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of a full-scale model of the complete circular polarized system. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna.

The power distribution and phase relationship to the antenna elements was adjusted in order to achieve the directional radiation patterns for both horizontal and vertical polarization components.

The proof-of-performance was accomplished using a self support tower with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that are included in the actual aperture at which the antenna will be installed. The structure was erected vertically on a turntable mounted on a non-metallic building with the antenna centered vertically on the structure, making the center of radiation of the test approximately 30 feet above ground. The turntable is equipped with a motor drive and a US Digital angle position indicator. The resolution of this angle position indicator is one-hundredth of a degree.

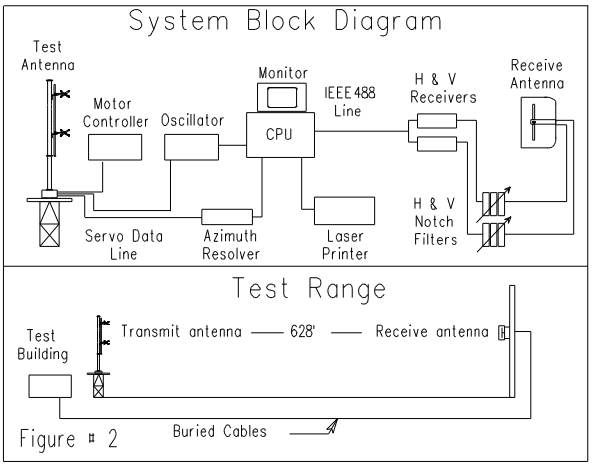


Figure # 2

The antenna under test was operated in the transmitting mode and fed from a HP8657D signal generator. The frequency of the signal source was set at 103.7 MHz and was constantly monitored by a Rohde & Schwarz ESVD measuring receiver.

A broadband horizontal and vertical dipole system, located approximately 628 feet from the test antenna, was used to receive the emitted test signals. The dipole system was mounted at the same height above terrain as the center of the antenna under test. The signals received by the dipole system were fed to the test building by way of two buried Heliax cables to a Rohde & Schwarz measuring receiver.

(Continued)

This data was interfaced to a laser jet printer by means of a computer system. Relative field strength was plotted as a function of azimuth.

The measurements were performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar co-ordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

The circular polarized system consists of one bay using one driven circular polarized radiating element attached to an iris enclosure. The power distribution and phase relationship will be fixed when antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The 1081-1CP-DA-SP array is to be mounted on the North 270 degrees East tower face of the self-support tower at a bearing of North 300 degrees East. Blue prints provided with the antenna will show the proper antenna orientation alignment. The antenna alignment procedure should be directed by a licensed surveyor as prescribed by the FCC.

Figure #1 represents the measured individual horizontal and vertical components, the composite maximum of either the horizontal or vertical component at any azimuth and the FCC filed envelope pattern. The horizontal plane relative field list for the composite pattern and the individual H & V components are shown as Figure #1 & 1A respectively. The actual measured pattern does not exceed the authorized FCC composite pattern at any azimuth. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 1.800 kilowatts (2.553 dBk).

The RMS of the vertically polarized horizontal plane component does not exceed the RMS of the horizontally polarized horizontal plane component.

The composite horizontal and vertical maximum relative field pattern obtained from the measured data as shown on Figure #1 has an RMS that is greater that 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 20 feet.

(Continued)

The directional antenna should not be mounted on the top of an antenna tower that includes a top-mounted platform larger than the cross-sectional area of the tower in the horizontal plane. No obstructions other than those that are specified by the blue prints supplied with the antenna are to be mounted within 75 ft. horizontally of the system. The vertical distance to the nearest obstruction should be a minimum of 10 ft. from the directional antenna. Metallic guy wires should be a minimum distance of forty feet horizontally from the antenna.

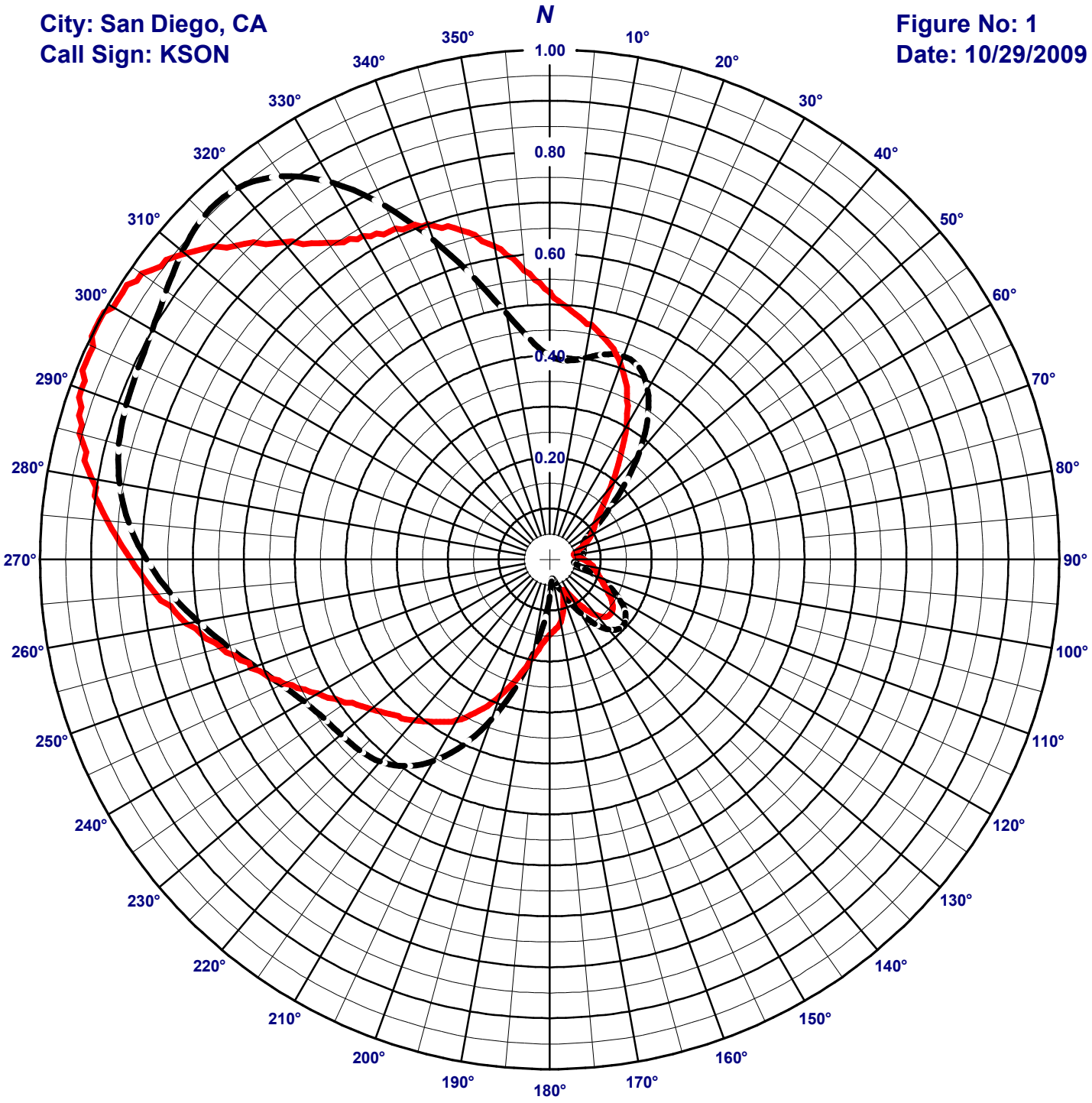
ELECTRONICS RESEARCH, INC.

The Microsoft Word document on file electronically at Electronic Research, Inc. governs the specifications, scope, and configuration of the product described. All other representations whether verbal, printed, or electronic are subordinate to the master copy of this document on file at ERI.

ERI® Horizontal Plane Relative Field Pattern

City: San Diego, CA
Call Sign: KSON

Figure No: 1
Date: 10/29/2009



Frequency: 103.7 MHz
Antenna Type: 1081-1CP-DA-SP
Antenna Orientation: 300° True
Antenna Mounting: Custom
Tower Type Self support tower

VERTICAL	HORIZONTAL
RMS: .504	RMS: .504
Maximum: .957 @ 316°	Maximum: 1 @ 296°
Minimum: .037 @ 172°	Minimum: .048 @ 78°

Measured patterns of the horizontal and vertical components.

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

ERI® Horizontal Plane Relative Field Pattern

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Figure# 1 **Date: 10/29/2009**
Station: KSON **Antenna: 1081-1CP-DA-SP**
Location: San Diego, CA **Antenna Orientation: 300° True**
Frequency: 103.7 MHz **Number of Bays: 1**

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk	Maximum		Field	kW	dBk	Maximum
0°	0.525	0.496	-3.047	Horizontal	180°	0.148	0.039	-14.047	Horizontal
5°	0.490	0.432	-3.647	Horizontal	185°	0.166	0.050	-13.047	Horizontal
10°	0.468	0.394	-4.047	Horizontal	190°	0.197	0.070	-11.547	Horizontal
15°	0.442	0.351	-4.547	Horizontal	195°	0.260	0.122	-9.145	Vertical
20°	0.424	0.324	-4.895	Vertical	200°	0.334	0.201	-6.965	Vertical
25°	0.415	0.310	-5.085	Vertical	205°	0.402	0.291	-5.365	Vertical
30°	0.384	0.266	-5.755	Vertical	210°	0.457	0.375	-4.255	Vertical
35°	0.335	0.202	-6.955	Vertical	215°	0.495	0.441	-3.555	Vertical
40°	0.273	0.134	-8.725	Vertical	220°	0.518	0.482	-3.165	Vertical
45°	0.208	0.078	-11.075	Vertical	225°	0.529	0.503	-2.985	Vertical
50°	0.151	0.041	-13.895	Vertical	230°	0.535	0.515	-2.885	Vertical
55°	0.107	0.021	-16.855	Vertical	235°	0.542	0.529	-2.765	Vertical
60°	0.093	0.016	-18.047	Horizontal	240°	0.557	0.558	-2.535	Vertical
65°	0.079	0.011	-19.447	Horizontal	245°	0.581	0.607	-2.165	Vertical
70°	0.070	0.009	-20.485	Vertical	250°	0.624	0.700	-1.547	Horizontal
75°	0.070	0.009	-20.585	Vertical	255°	0.668	0.804	-0.947	Horizontal
80°	0.067	0.008	-20.865	Vertical	260°	0.724	0.945	-0.247	Horizontal
85°	0.063	0.007	-21.515	Vertical	265°	0.776	1.085	0.353	Horizontal
90°	0.066	0.008	-21.047	Horizontal	270°	0.822	1.217	0.853	Horizontal
95°	0.078	0.011	-19.647	Horizontal	275°	0.871	1.365	1.353	Horizontal
100°	0.087	0.014	-18.647	Horizontal	280°	0.912	1.497	1.753	Horizontal
105°	0.095	0.016	-17.847	Horizontal	285°	0.955	1.642	2.153	Horizontal
110°	0.105	0.020	-17.047	Horizontal	290°	0.977	1.719	2.353	Horizontal
115°	0.132	0.031	-15.035	Vertical	295°	0.989	1.759	2.453	Horizontal
120°	0.160	0.046	-13.365	Vertical	300°	0.989	1.759	2.453	Horizontal
125°	0.181	0.059	-12.285	Vertical	305°	0.977	1.719	2.353	Horizontal
130°	0.193	0.067	-11.755	Vertical	310°	0.941	1.594	2.025	Vertical
135°	0.193	0.067	-11.755	Vertical	315°	0.956	1.646	2.165	Vertical
140°	0.179	0.058	-12.375	Vertical	320°	0.952	1.631	2.125	Vertical
145°	0.154	0.043	-13.675	Vertical	325°	0.918	1.515	1.805	Vertical
150°	0.122	0.027	-15.715	Vertical	330°	0.853	1.311	1.175	Vertical
155°	0.090	0.014	-18.395	Vertical	335°	0.766	1.056	0.235	Vertical
160°	0.079	0.011	-19.547	Horizontal	340°	0.700	0.882	-0.547	Horizontal
165°	0.104	0.019	-17.147	Horizontal	345°	0.668	0.804	-0.947	Horizontal
170°	0.124	0.028	-15.547	Horizontal	350°	0.624	0.700	-1.547	Horizontal
175°	0.136	0.034	-14.747	Horizontal	355°	0.569	0.582	-2.347	Horizontal

Horizontal Polarization:
Maximum: 1.723 (2.364 dB)
Horizontal Plane: 1.723 (2.364 dB)
Maximum ERP: 1.800 kW

Vertical Polarization:
Maximum: 1.580 (1.986 dB)
Horizontal Plane: 1.580 (1.986 dB)
Maximum ERP: 1.650 kW

Total Input Power: 1.044 kW
Reference: KSON1M.FIG

ERI® Horizontal Plane Relative Field Pattern

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Figure# 1A | **Date: 10/29/2009**
Station: KSON | **Antenna: 1081-1CP-DA-SP**
Location: San Diego, CA | **Antenna Orientation: 300° True**
Frequency: 103.7 MHz | **Number of Bays: 1**

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.525	0.496	-3.047	0.400	0.287	-5.415	180°	0.148	0.039	-14.047	0.073	0.010	-20.165
5°	0.490	0.432	-3.647	0.392	0.276	-5.585	185°	0.166	0.050	-13.047	0.124	0.028	-15.605
10°	0.468	0.394	-4.047	0.401	0.290	-5.375	190°	0.197	0.070	-11.547	0.188	0.063	-11.975
15°	0.442	0.351	-4.547	0.416	0.312	-5.055	195°	0.240	0.104	-9.847	0.260	0.122	-9.145
20°	0.407	0.299	-5.247	0.424	0.324	-4.895	200°	0.285	0.146	-8.347	0.334	0.201	-6.965
25°	0.359	0.232	-6.347	0.415	0.310	-5.085	205°	0.327	0.193	-7.147	0.402	0.291	-5.365
30°	0.302	0.164	-7.847	0.384	0.266	-5.755	210°	0.363	0.237	-6.247	0.457	0.375	-4.255
35°	0.240	0.104	-9.847	0.335	0.202	-6.955	215°	0.389	0.272	-5.647	0.495	0.441	-3.555
40°	0.186	0.062	-12.047	0.273	0.134	-8.725	220°	0.412	0.306	-5.147	0.518	0.482	-3.165
45°	0.146	0.038	-14.147	0.208	0.078	-11.075	225°	0.432	0.335	-4.747	0.529	0.503	-2.985
50°	0.120	0.026	-15.847	0.151	0.041	-13.895	230°	0.457	0.376	-4.247	0.535	0.515	-2.885
55°	0.106	0.020	-16.947	0.107	0.021	-16.855	235°	0.490	0.432	-3.647	0.542	0.529	-2.765
60°	0.093	0.016	-18.047	0.082	0.012	-19.155	240°	0.525	0.496	-3.047	0.557	0.558	-2.535
65°	0.079	0.011	-19.447	0.073	0.009	-20.225	245°	0.575	0.596	-2.247	0.581	0.607	-2.165
70°	0.065	0.008	-21.247	0.070	0.009	-20.485	250°	0.624	0.700	-1.547	0.615	0.680	-1.675
75°	0.052	0.005	-23.047	0.070	0.009	-20.585	255°	0.668	0.804	-0.947	0.656	0.774	-1.115
80°	0.048	0.004	-23.747	0.067	0.008	-20.865	260°	0.724	0.945	-0.247	0.701	0.884	-0.535
85°	0.054	0.005	-22.747	0.063	0.007	-21.515	265°	0.776	1.085	0.353	0.747	1.006	0.025
90°	0.066	0.008	-21.047	0.055	0.005	-22.625	270°	0.822	1.217	0.853	0.791	1.126	0.515
95°	0.078	0.011	-19.647	0.049	0.004	-23.715	275°	0.871	1.365	1.353	0.829	1.237	0.925
100°	0.087	0.014	-18.647	0.052	0.005	-23.065	280°	0.912	1.497	1.753	0.857	1.323	1.215
105°	0.095	0.016	-17.847	0.072	0.009	-20.315	285°	0.955	1.642	2.153	0.875	1.379	1.395
110°	0.105	0.020	-17.047	0.101	0.018	-17.375	290°	0.977	1.719	2.353	0.884	1.408	1.485
115°	0.117	0.025	-16.047	0.132	0.031	-15.035	295°	0.989	1.759	2.453	0.890	1.427	1.545
120°	0.133	0.032	-14.947	0.160	0.046	-13.365	300°	0.989	1.759	2.453	0.901	1.460	1.645
125°	0.150	0.040	-13.947	0.181	0.059	-12.285	305°	0.977	1.719	2.353	0.919	1.519	1.815
130°	0.160	0.046	-13.347	0.193	0.067	-11.755	310°	0.933	1.568	1.953	0.941	1.594	2.025
135°	0.158	0.045	-13.447	0.193	0.067	-11.755	315°	0.871	1.365	1.353	0.956	1.646	2.165
140°	0.143	0.037	-14.347	0.179	0.058	-12.375	320°	0.813	1.189	0.753	0.952	1.631	2.125
145°	0.115	0.024	-16.247	0.154	0.043	-13.675	325°	0.759	1.036	0.153	0.918	1.515	1.805
150°	0.083	0.012	-19.047	0.122	0.027	-15.715	330°	0.733	0.967	-0.147	0.853	1.311	1.175
155°	0.066	0.008	-21.047	0.090	0.014	-18.395	335°	0.716	0.923	-0.347	0.766	1.056	0.235
160°	0.079	0.011	-19.547	0.064	0.007	-21.275	340°	0.700	0.882	-0.547	0.667	0.801	-0.965
165°	0.104	0.019	-17.147	0.048	0.004	-23.785	345°	0.668	0.804	-0.947	0.572	0.588	-2.305
170°	0.124	0.028	-15.547	0.038	0.003	-25.775	350°	0.624	0.700	-1.547	0.491	0.434	-3.625
175°	0.136	0.034	-14.747	0.043	0.003	-24.825	355°	0.569	0.582	-2.347	0.433	0.337	-4.725

Horizontal Polarization:
Maximum: 1.723 (2.364 dB)
Horizontal Plane: 1.723 (2.364 dB)
Maximum ERP: 1.800 kW

Vertical Polarization:
Maximum: 1.580 (1.986 dB)
Horizontal Plane: 1.580 (1.986 dB)
Maximum ERP: 1.650 kW

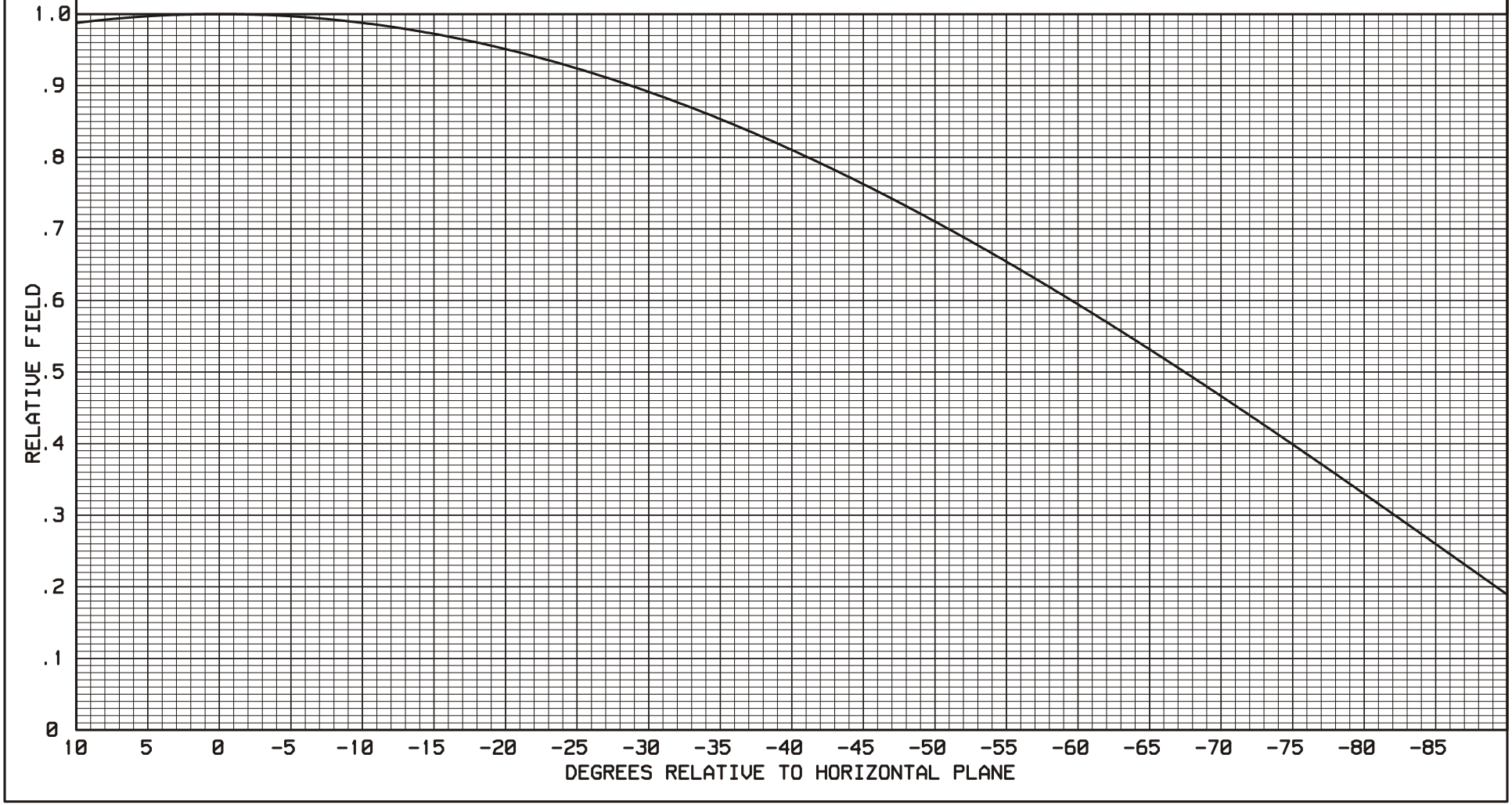
Total Input Power: 1.044 kW
Reference: KSON1M.FIG
This list shows the azimuth values for the horizontal and vertical components.

ELECTRONICS RESEARCH,INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 3

----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD

ERI TYPE 1081-1CP-DA
FM BROADCAST ANTENNA



Directional Antenna System
for
KSON, San Diego, California

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	1081-1CP-DA-SP
Frequency:	103.7 MHz
Number of Bays:	One

MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	6 ft
Aperture length required:	20 ft
Orientation:	300° true

Input flange to the antenna 1 5/8 “ female.

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	1.800 kW (2.553 dBk)
Horizontal maximum power gain:	1.723 (2.364 dB)
Maximum vertical ERP:	1.650 kW (2.175 dBk)
Vertical maximum power gain:	1.580 (1.986 dB)
Total input power:	1.044 kW (0.187 dBk)

August 2022
KSON(FM) Channel 279B
San Diego
Auxiliary Antenna RF Exposure Study

Background

The construction permit for the KSON auxiliary antenna (FCC File No. BXPH-20190719AAN) bears a condition requiring the performance of radiofrequency electromagnetic field strength measurements throughout the transmitter site area to determine if there are any areas that exceed the FCC guidelines for human exposure. In lieu of measurements, this report presents a set of detailed calculations which demonstrate compliance with the FCC guidelines.

The construction permit authorizes KSON to utilize, as an auxiliary facility, an existing ERI model 1081-1CP-DA-SP broadband panel antenna (single panel) which is installed on a tower at the San Miguel Mountain transmitter site. This antenna is or will be used as a frequency-agile[1] auxiliary facility by the following stations:

KWFN	247B	0.65 kW	BXLH-20100325ABH
KBZT	235B	2.6 kW	BXLH-19881011KB
KXSN	251B	1.5 kW	BXLH-20100325ABF
KSON	279B	1.8 kW	BXPH-20190719AAN
KYXY	243B	2.5 kW	BXPH-20190719AAM

Previous authorization of the auxiliary facilities already licensed to operate from this antenna system has relied on detailed calculations to demonstrate compliance with the FCC guidelines for human exposure.[2] Those calculations were performed using the equation shown below from OET Bulletin No. 65, and have taken into account both the manufacturer's azimuth and elevation patterns for the antenna, as well as the height of the antenna above the actual terrain elevations surrounding the tower. The following study repeats those calculations for the KSON auxiliary facility.

[1]Since no combiner is installed, the antenna system can be used by only one station at any given time.

[2]See, for example, the Consolidated Engineering Statement in the KXSN auxiliary facility application for construction permit, FCC File No. BXPH-20100112ABW, granted January 21, 2010.

Controlled/Occupational Site

The transmitter site is located on a remote peak of San Miguel Mountain. According to information provided by the applicant, access to the transmitter site is controlled by a large, locked gate with warning signs posted more than two miles down the road from the transmitter site. This road is the only road which accesses the transmitter site, which rises 1600 feet above the location of the gate. Additionally, a fence surrounds the transmitter site itself, with additional warning signs posted. Based on this information, it is believed that this site qualifies as a controlled access site, and the following calculations are therefore based on the controlled/occupational Maximum Permissible Exposure (MPE) limits.

Calculations

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Generally speaking, the terrain falls steeply away from the tower site in all directions, with the exception of a small rise immediately east of the tower, beyond which the terrain again falls away. Calculations were made at incremental distances from the tower along each of eighteen radials (every 20 degrees of arc), out to a distance of 100 meters. Beyond this point, the terrain continues to slope away and the calculated exposure levels from the subject antenna have fallen below (and remain below) 5% of the applicable MPE. Terrain elevations were read from the USGS 7.5 minute topographic map, and entered into a spreadsheet which uses the OET 65 equation above, along with the relative field values from the manufacturer's azimuth and elevation patterns, to calculate the ground-level power density for an individual standing at the recorded point elevation.

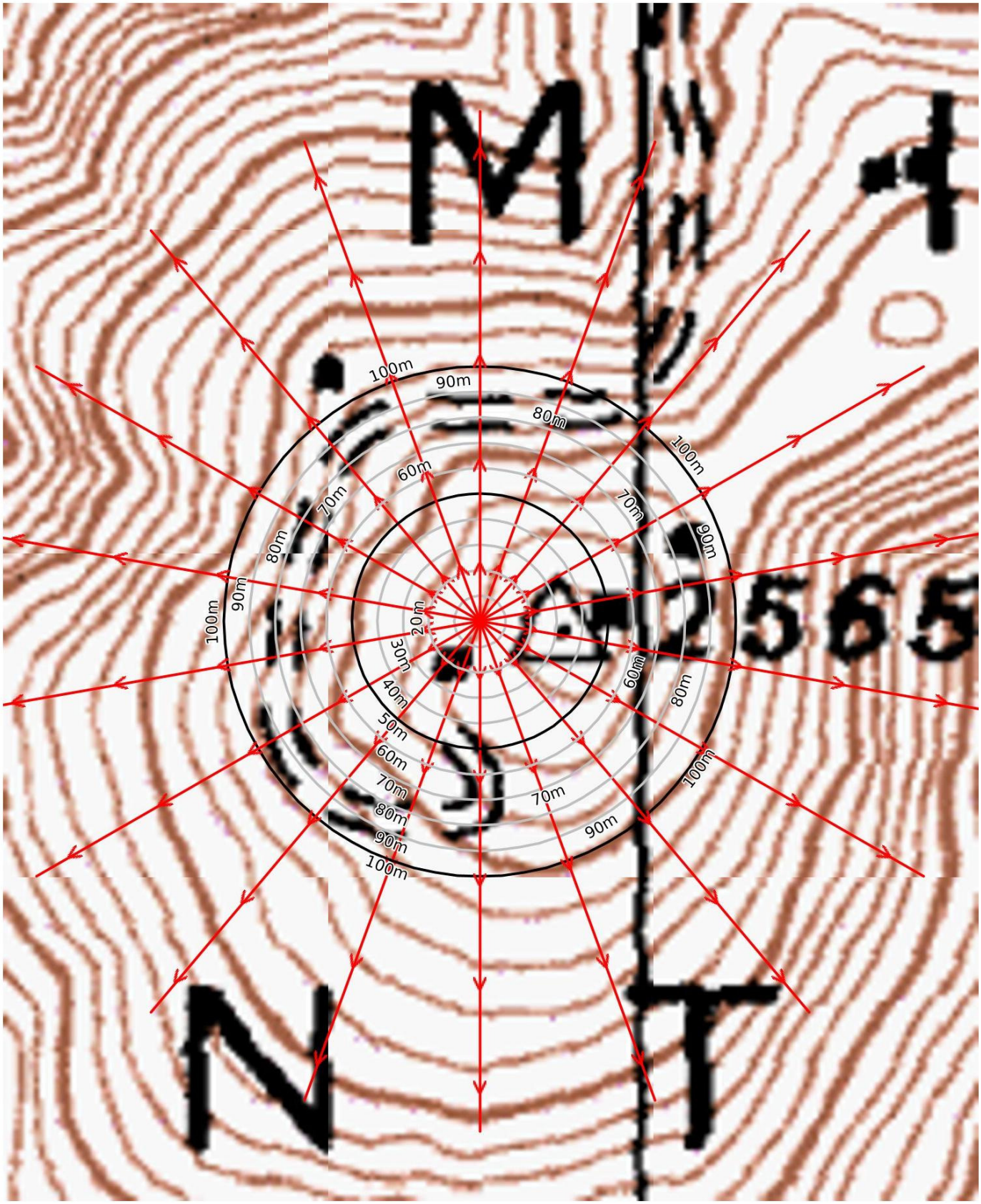
These calculations, detailed on the following pages, show that the maximum calculated power density produced at two meters above ground level by the proposed operation of the KSON auxiliary facility is 22.9 $\mu W/cm^2$, which is 2.3% of 1000 $\mu W/cm^2$ (the FCC standard for controlled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation alone is less than 5% of the applicable FCC exposure limit. Section 1.1307 of the Commission's Rules exempts applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicant's proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.

August 10, 2022

Erik C. Swanson, P.E.



Hatfield & Dawson Consulting Engineers

KSON 279B San Diego

Ground-Level Power Density Calculations

Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters

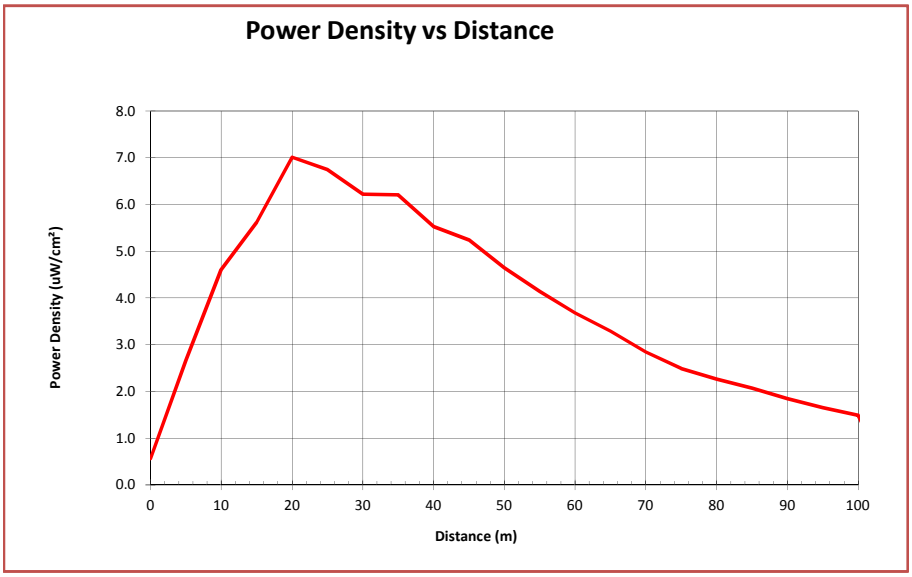
Calculated Maximum is 22.9 uW/cm²

Azimuth	Calculated Max uW/cm²	Distance from tower (meters)	Percentage of Occupational MPE
0	7.0	20	0.7%
20	6.6	30	0.7%
40	2.6	25	0.3%
60	0.4	25	0.0%
80	0.2	25	0.0%
100	0.3	25	0.0%
120	1.3	25	0.1%
140	1.6	20	0.2%
160	0.2	25	0.0%
180	0.6	20	0.1%
200	3.8	25	0.4%
220	7.1	25	0.7%
240	7.8	25	0.8%
260	12.5	25	1.2%
280	20.0	25	2.0%
300	22.9	25	2.3%
320	19.2	25	1.9%
340	12.2	30	1.2%

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**0**	**degrees True**
H Relative Field:	0.525	
V Relative Field:	0.400	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	496	watts H
	288	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 7.0 uW/cm² at 20 meters from the tower



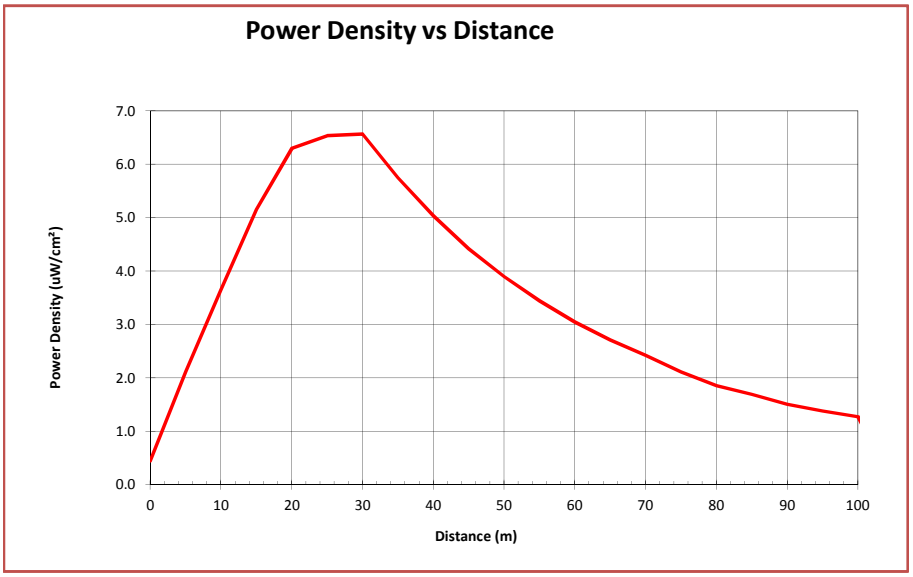
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	13.3	0.57
5	2546	28.0	28.42	79.87	0.287	64.6	2.67
10	2540	29.8	31.44	71.45	0.417	136.2	4.60
15	2535	31.3	34.74	64.42	0.509	202.9	5.62
20	2535	31.3	37.17	57.45	0.608	290.0	7.01
25	2530	32.9	41.29	52.73	0.663	344.3	6.75
30	2525	34.4	45.63	48.89	0.703	387.8	6.22
35	2525	34.4	49.06	44.49	0.755	447.1	6.21
40	2520	35.9	53.75	41.91	0.781	478.1	5.53
45	2520	35.9	57.57	38.59	0.814	519.7	5.24
50	2515	37.4	62.46	36.82	0.832	542.6	4.65
55	2510	39.0	67.40	35.31	0.847	562.4	4.14
60	2505	40.5	72.38	34.00	0.858	577.2	3.68
65	2500	42.0	77.39	32.87	0.867	589.5	3.29
70	2490	45.0	83.24	32.76	0.868	590.6	2.85
75	2480	48.1	89.10	32.67	0.869	591.6	2.49
80	2475	49.6	94.14	31.81	0.876	601.1	2.27
85	2470	51.1	99.20	31.04	0.882	609.6	2.07
90	2460	54.2	105.06	31.05	0.882	609.4	1.84
95	2450	57.2	110.91	31.07	0.881	609.2	1.65
100	2440	60.3	116.77	31.08	0.881	609.1	1.49

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**20**	**degrees True**
H Relative Field:	0.407	
V Relative Field:	0.424	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	298	watts H
	324	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 6.6 uW/cm² at 30 meters from the tower



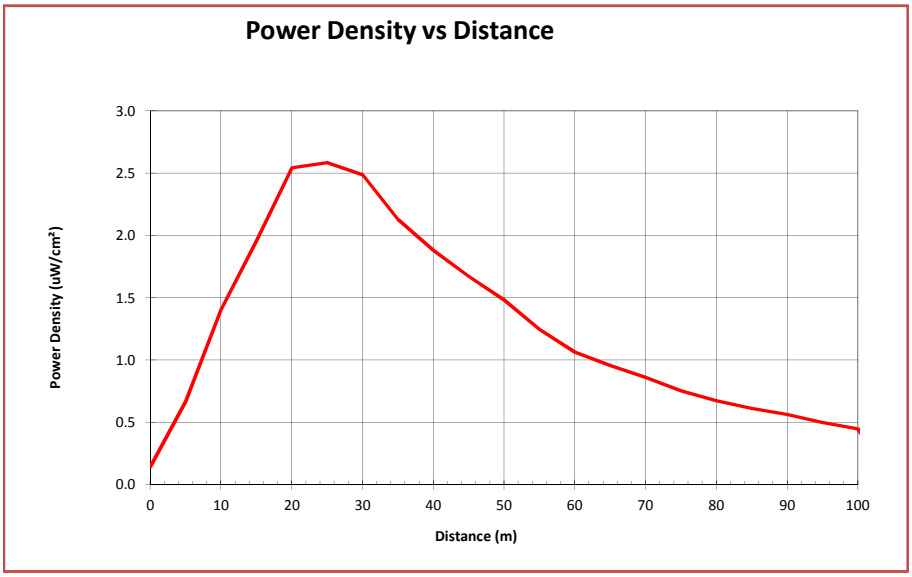
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	10.5	0.45
5	2546	28.0	28.42	79.87	0.287	51.2	2.12
10	2540	29.8	31.44	71.45	0.417	108.0	3.65
15	2540	29.8	33.37	63.29	0.526	171.8	5.16
20	2540	29.8	35.90	56.14	0.625	243.0	6.30
25	2540	29.8	38.90	50.01	0.690	295.9	6.53
30	2540	29.8	42.29	44.82	0.752	351.5	6.57
35	2535	31.3	46.98	41.83	0.782	379.9	5.75
40	2530	32.9	51.76	39.40	0.806	403.9	5.04
45	2525	34.4	56.63	37.38	0.826	424.4	4.42
50	2520	35.9	61.56	35.68	0.843	442.1	3.90
55	2515	37.4	66.53	34.24	0.856	455.7	3.44
60	2510	39.0	71.54	32.99	0.866	466.4	3.04
65	2505	40.5	76.57	31.91	0.875	475.7	2.71
70	2500	42.0	81.63	30.96	0.882	484.0	2.43
75	2490	45.0	87.49	30.99	0.882	483.8	2.11
80	2480	48.1	93.34	31.01	0.882	483.6	1.85
85	2475	49.6	98.42	30.27	0.888	490.1	1.69
90	2465	52.7	104.28	30.34	0.887	489.5	1.50
95	2460	54.2	109.37	29.70	0.892	494.5	1.38
100	2455	55.7	114.47	29.12	0.895	498.3	1.27

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**40**	**degrees True**
H Relative Field:	0.186	
V Relative Field:	0.273	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	62	watts H
	134	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 2.6 uW/cm² at 25 meters from the tower



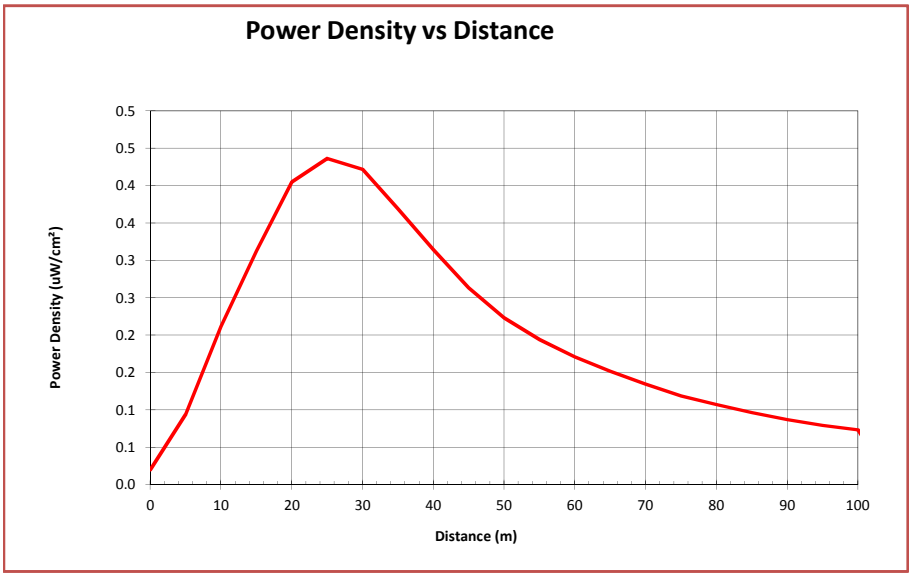
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	3.3	0.14
5	2546	28.0	28.42	79.87	0.287	16.2	0.67
10	2546	28.0	29.71	70.33	0.435	37.1	1.40
15	2546	28.0	31.75	61.80	0.548	59.0	1.96
20	2550	26.8	33.41	53.23	0.658	85.0	2.54
25	2550	26.8	36.62	46.95	0.727	103.7	2.58
30	2550	26.8	40.20	41.73	0.783	120.3	2.49
35	2545	28.3	45.00	38.94	0.811	129.1	2.13
40	2542	29.2	49.52	36.13	0.839	138.2	1.88
45	2540	29.8	53.98	33.52	0.862	145.9	1.67
50	2538	30.4	58.53	31.31	0.879	151.9	1.48
55	2530	32.9	64.07	30.85	0.883	153.2	1.25
60	2522	35.3	69.61	30.47	0.886	154.3	1.06
65	2520	35.9	74.26	28.91	0.897	157.9	0.96
70	2518	36.5	78.95	27.55	0.905	160.8	0.86
75	2510	39.0	84.51	27.45	0.905	161.0	0.75
80	2505	40.5	89.66	26.84	0.909	162.3	0.67
85	2502	41.4	94.54	25.96	0.914	164.2	0.61
90	2500	42.0	99.32	25.02	0.920	166.2	0.56
95	2490	45.0	105.14	25.37	0.918	165.5	0.50
100	2480	48.1	110.96	25.69	0.916	164.8	0.45

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**60**	**degrees True**
H Relative Field:	0.093	
V Relative Field:	0.082	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	16	watts H
	12	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 0.4 uW/cm² at 25 meters from the tower



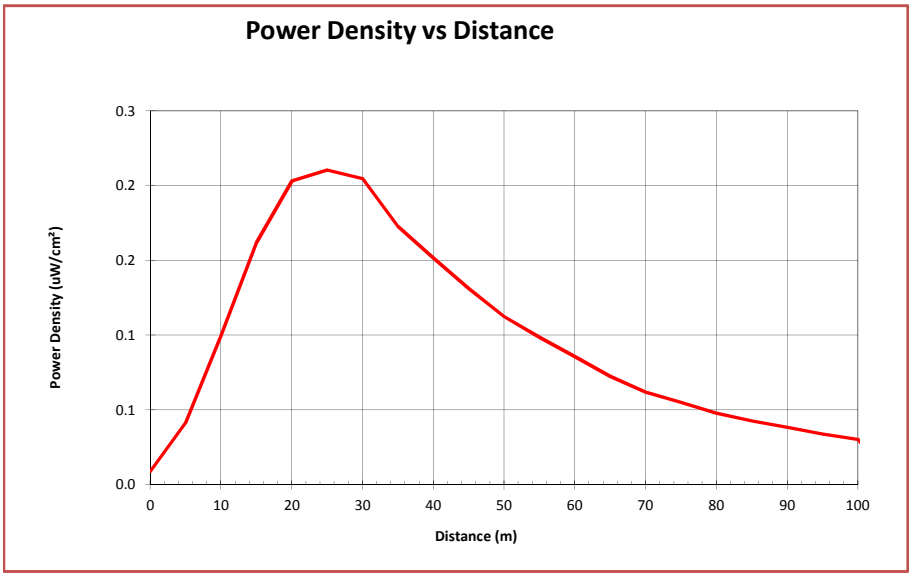
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	0.5	0.02
5	2546	28.0	28.42	79.87	0.287	2.3	0.09
10	2548	27.4	29.14	69.93	0.441	5.4	0.21
15	2550	26.8	30.68	60.73	0.564	8.8	0.31
20	2555	25.2	32.20	51.60	0.674	12.6	0.41
25	2558	24.3	34.88	44.21	0.758	15.9	0.44
30	2560	23.7	38.24	38.32	0.817	18.5	0.42
35	2558	24.3	42.62	34.80	0.852	20.1	0.37
40	2555	25.2	47.30	32.25	0.872	21.0	0.31
45	2550	26.8	52.36	30.74	0.884	21.6	0.26
50	2545	28.3	57.45	29.50	0.893	22.1	0.22
55	2542	29.2	62.27	27.96	0.902	22.5	0.19
60	2540	29.8	67.00	26.42	0.911	23.0	0.17
65	2538	30.4	71.77	25.08	0.920	23.4	0.15
70	2535	31.3	76.69	24.11	0.925	23.7	0.13
75	2530	32.9	81.88	23.66	0.928	23.8	0.12
80	2528	33.5	86.72	22.70	0.934	24.1	0.11
85	2525	34.4	91.69	22.02	0.938	24.3	0.10
90	2520	35.9	96.90	21.75	0.940	24.4	0.09
95	2518	36.5	101.78	21.02	0.944	24.7	0.08
100	2518	36.5	106.46	20.06	0.950	25.0	0.07

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**80**	**degrees True**
H Relative Field:	0.048	
V Relative Field:	0.067	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	4	watts H
	8	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 0.2 uW/cm² at 25 meters from the tower



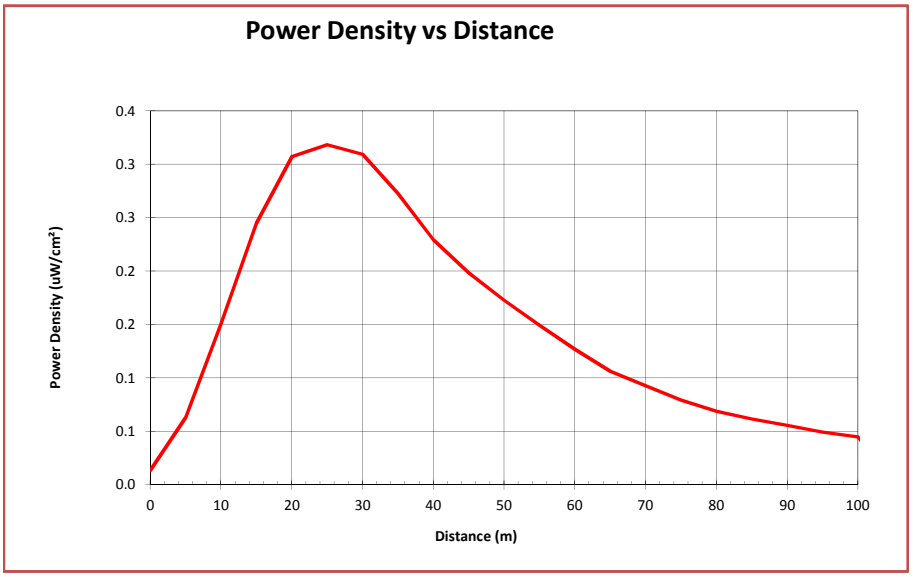
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	0.2	0.01
5	2546	28.0	28.42	79.87	0.287	1.0	0.04
10	2550	26.8	28.57	69.51	0.446	2.4	0.10
15	2555	25.2	29.36	59.27	0.584	4.2	0.16
20	2560	23.7	31.02	49.85	0.692	5.9	0.20
25	2562	23.1	34.04	42.74	0.773	7.3	0.21
30	2565	22.2	37.31	36.49	0.835	8.5	0.20
35	2562	23.1	41.94	33.43	0.863	9.1	0.17
40	2562	23.1	46.19	30.01	0.890	9.7	0.15
45	2562	23.1	50.58	27.18	0.907	10.1	0.13
50	2560	23.7	55.34	25.37	0.918	10.3	0.11
55	2560	23.7	59.89	23.32	0.930	10.6	0.10
60	2558	24.3	64.74	22.07	0.938	10.7	0.09
65	2550	26.8	70.29	22.38	0.936	10.7	0.07
70	2542	29.2	75.85	22.64	0.934	10.7	0.06
75	2539	30.1	80.82	21.88	0.939	10.8	0.06
80	2530	32.9	86.48	22.33	0.936	10.7	0.05
85	2525	34.4	91.69	22.02	0.938	10.8	0.04
90	2520	35.9	96.90	21.75	0.940	10.8	0.04
95	2510	39.0	102.68	22.29	0.936	10.7	0.03
100	2500	42.0	108.46	22.78	0.933	10.7	0.03

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**100**	**degrees True**
H Relative Field:	0.087	
V Relative Field:	0.052	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	14	watts H
	5	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 0.3 uW/cm² at 25 meters from the tower



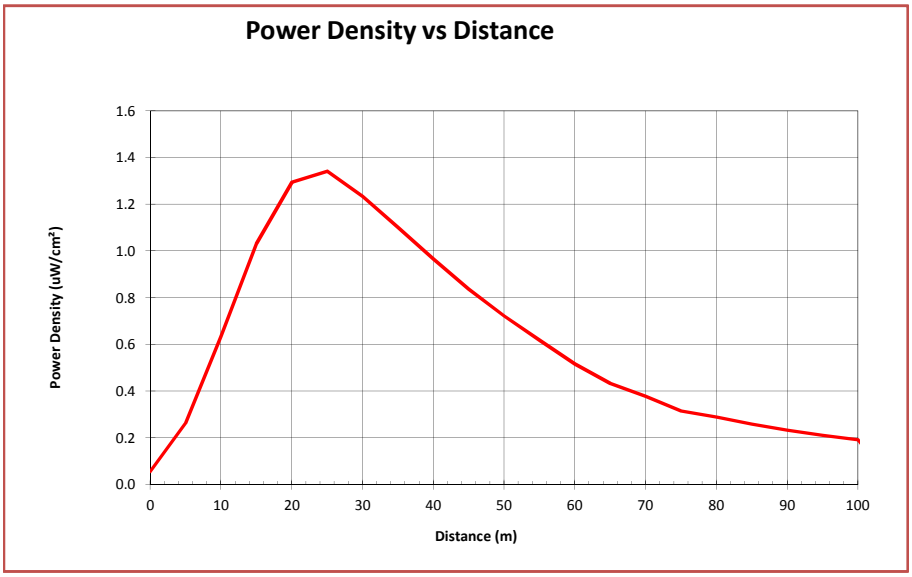
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	0.3	0.01
5	2546	28.0	28.42	79.87	0.287	1.5	0.06
10	2550	26.8	28.57	69.51	0.446	3.7	0.15
15	2555	25.2	29.36	59.27	0.584	6.3	0.24
20	2560	23.7	31.02	49.85	0.692	8.8	0.31
25	2562	23.1	34.04	42.74	0.773	11.0	0.32
30	2565	22.2	37.31	36.49	0.835	12.9	0.31
35	2565	22.2	41.44	32.37	0.871	14.0	0.27
40	2562	23.1	46.19	30.01	0.890	14.6	0.23
45	2562	23.1	50.58	27.18	0.907	15.2	0.20
50	2562	23.1	55.08	24.80	0.921	15.7	0.17
55	2560	23.7	59.89	23.32	0.930	16.0	0.15
60	2555	25.2	65.09	22.81	0.933	16.1	0.13
65	2545	28.3	70.89	23.52	0.929	16.0	0.11
70	2540	29.8	76.08	23.07	0.932	16.0	0.09
75	2530	32.9	81.88	23.66	0.928	15.9	0.08
80	2520	35.9	87.69	24.17	0.925	15.8	0.07
85	2515	37.4	92.88	23.77	0.927	15.9	0.06
90	2510	39.0	98.07	23.40	0.930	16.0	0.06
95	2500	42.0	103.87	23.85	0.927	15.9	0.05
100	2495	43.5	109.06	23.52	0.929	16.0	0.04

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**120**	**degrees True**
H Relative Field:	0.133	
V Relative Field:	0.160	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	32	watts H
	46	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 1.3 uW/cm² at 25 meters from the tower



KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	1.3	0.06
5	2546	28.0	28.42	79.87	0.287	6.4	0.27
10	2550	26.8	28.57	69.51	0.446	15.5	0.63
15	2555	25.2	29.36	59.27	0.584	26.6	1.03
20	2560	23.7	31.02	49.85	0.692	37.3	1.29
25	2562	23.1	34.04	42.74	0.773	46.5	1.34
30	2562	23.1	37.86	37.60	0.824	52.9	1.23
35	2562	23.1	41.94	33.43	0.863	58.0	1.10
40	2562	23.1	46.19	30.01	0.890	61.7	0.97
45	2562	23.1	50.58	27.18	0.907	64.1	0.84
50	2561	23.4	55.21	25.09	0.919	65.9	0.72
55	2558	24.3	60.14	23.86	0.927	66.9	0.62
60	2550	26.8	65.70	24.04	0.926	66.8	0.52
65	2540	29.8	71.51	24.64	0.922	66.3	0.43
70	2535	31.3	76.69	24.11	0.925	66.7	0.38
75	2520	35.9	83.15	25.58	0.917	65.5	0.32
80	2520	35.9	87.69	24.17	0.925	66.7	0.29
85	2515	37.4	92.88	23.77	0.927	67.0	0.26
90	2510	39.0	98.07	23.40	0.930	67.3	0.23
95	2505	40.5	103.26	23.08	0.932	67.6	0.21
100	2500	42.0	108.46	22.78	0.933	67.9	0.19

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**140**	**degrees True**
H Relative Field:	0.143	
V Relative Field:	0.179	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	37	watts H
	58	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 1.6 uW/cm² at 20 meters from the tower

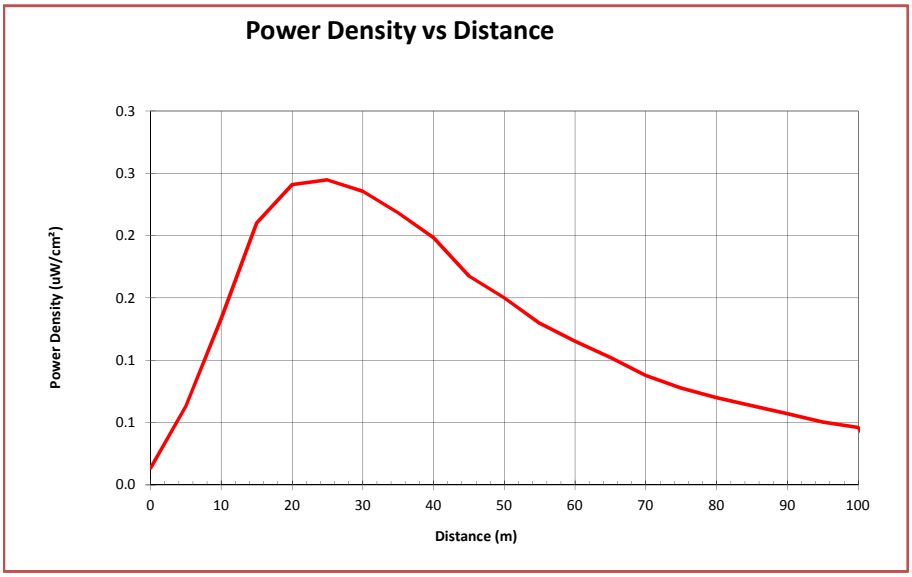
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	1.6	0.07
5	2546	28.0	28.42	79.87	0.287	7.8	0.32
10	2550	26.8	28.57	69.51	0.446	18.8	0.77
15	2555	25.2	29.36	59.27	0.584	32.3	1.25
20	2560	23.7	31.02	49.85	0.692	45.2	1.57
25	2560	23.7	34.46	43.49	0.765	55.3	1.56
30	2560	23.7	38.24	38.32	0.817	63.0	1.44
35	2558	24.3	42.62	34.80	0.852	68.5	1.26
40	2558	24.3	46.81	31.30	0.880	73.1	1.11
45	2555	25.2	51.59	29.28	0.894	75.6	0.95
50	2552	26.2	56.43	27.61	0.904	77.3	0.81
55	2550	26.8	61.16	25.95	0.914	79.0	0.71
60	2545	28.3	66.33	25.24	0.919	79.7	0.61
65	2542	29.2	71.26	24.19	0.925	80.8	0.53
70	2540	29.8	76.08	23.07	0.932	82.0	0.47
75	2530	32.9	81.88	23.66	0.928	81.4	0.41
80	2525	34.4	87.07	23.26	0.930	81.8	0.36
85	2520	35.9	92.27	22.90	0.933	82.2	0.32
90	2515	37.4	97.47	22.58	0.935	82.5	0.29
95	2505	40.5	103.26	23.08	0.932	82.0	0.26
100	2500	42.0	108.46	22.78	0.933	82.3	0.23

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**160**	**degrees True**
H Relative Field:	0.079	
V Relative Field:	0.064	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	11	watts H
	7	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 0.2 uW/cm² at 25 meters from the tower



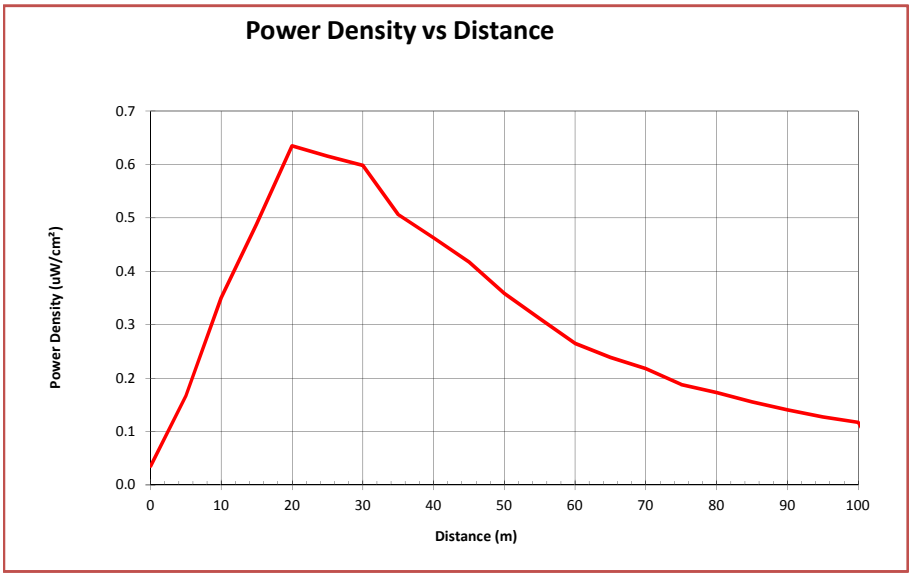
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	0.3	0.01
5	2546	28.0	28.42	79.87	0.287	1.5	0.06
10	2546	28.0	29.71	70.33	0.435	3.5	0.13
15	2550	26.8	30.68	60.73	0.564	5.9	0.21
20	2550	26.8	33.41	53.23	0.658	8.0	0.24
25	2550	26.8	36.62	46.95	0.727	9.8	0.24
30	2550	26.8	40.20	41.73	0.783	11.4	0.24
35	2550	26.8	44.06	37.40	0.826	12.7	0.22
40	2550	26.8	48.13	33.78	0.860	13.8	0.20
45	2545	28.3	53.15	32.15	0.873	14.2	0.17
50	2545	28.3	57.45	29.50	0.893	14.8	0.15
55	2541	29.5	62.41	28.21	0.901	15.1	0.13
60	2540	29.8	67.00	26.42	0.911	15.5	0.12
65	2538	30.4	71.77	25.08	0.920	15.7	0.10
70	2530	32.9	77.33	25.14	0.919	15.7	0.09
75	2525	34.4	82.50	24.63	0.922	15.8	0.08
80	2522	35.3	87.44	23.81	0.927	16.0	0.07
85	2520	35.9	92.27	22.90	0.933	16.2	0.06
90	2515	37.4	97.47	22.58	0.935	16.2	0.06
95	2505	40.5	103.26	23.08	0.932	16.1	0.05
100	2500	42.0	108.46	22.78	0.933	16.2	0.05

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**180**	**degrees True**
H Relative Field:	0.148	
V Relative Field:	0.073	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	39	watts H
	10	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 0.6 uW/cm² at 20 meters from the tower



KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	0.8	0.04
5	2546	28.0	28.42	79.87	0.287	4.0	0.17
10	2546	28.0	29.71	70.33	0.435	9.3	0.35
15	2546	28.0	31.75	61.80	0.548	14.7	0.49
20	2550	26.8	33.41	53.23	0.658	21.2	0.63
25	2548	27.4	37.07	47.59	0.719	25.3	0.62
30	2548	27.4	40.61	42.37	0.776	29.5	0.60
35	2542	29.2	45.58	39.84	0.802	31.5	0.51
40	2541	29.5	49.70	36.41	0.836	34.2	0.46
45	2540	29.8	53.98	33.52	0.862	36.4	0.42
50	2535	31.3	59.01	32.07	0.873	37.4	0.36
55	2530	32.9	64.07	30.85	0.883	38.2	0.31
60	2522	35.3	69.61	30.47	0.886	38.5	0.27
65	2520	35.9	74.26	28.91	0.897	39.4	0.24
70	2520	35.9	78.67	27.15	0.907	40.3	0.22
75	2510	39.0	84.51	27.45	0.905	40.2	0.19
80	2510	39.0	88.98	25.96	0.914	41.0	0.17
85	2505	40.5	94.15	25.46	0.917	41.2	0.16
90	2500	42.0	99.32	25.02	0.920	41.5	0.14
95	2495	43.5	104.50	24.61	0.922	41.7	0.13
100	2492	44.4	109.43	23.96	0.926	42.1	0.12

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**200**	**degrees True**
H Relative Field:	0.285	
V Relative Field:	0.334	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	146	watts H
	201	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated Maximum is 3.8 uW/cm² at 25 meters from the tower

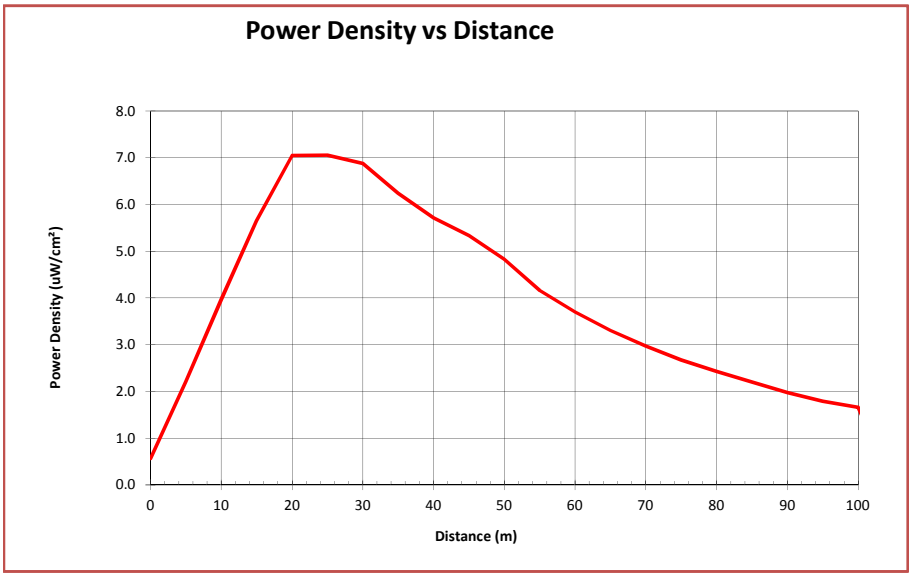
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	5.9	0.25
5	2540	29.8	30.22	80.48	0.277	26.6	0.97
10	2540	29.8	31.44	71.45	0.417	60.3	2.04
15	2542	29.2	32.83	62.81	0.533	98.5	3.05
20	2542	29.2	35.39	55.59	0.632	138.7	3.70
25	2542	29.2	38.44	49.43	0.697	168.5	3.81
30	2540	29.8	42.29	44.82	0.752	196.1	3.66
35	2540	29.8	45.97	40.42	0.796	219.8	3.47
40	2538	30.4	50.25	37.25	0.827	237.6	3.14
45	2530	32.9	55.72	36.13	0.839	244.1	2.63
50	2520	35.9	61.56	35.68	0.843	246.7	2.18
55	2515	37.4	66.53	34.24	0.856	254.3	1.92
60	2510	39.0	71.54	32.99	0.866	260.3	1.70
65	2505	40.5	76.57	31.91	0.875	265.5	1.51
70	2502	41.4	81.32	30.60	0.885	271.9	1.37
75	2500	42.0	85.96	29.25	0.895	277.7	1.26
80	2495	43.5	91.07	28.55	0.899	280.3	1.13
85	2490	45.0	96.20	27.92	0.902	282.6	1.02
90	2485	46.6	101.34	27.36	0.906	284.7	0.93
95	2480	48.1	106.48	26.85	0.909	286.7	0.84
100	2478	48.7	111.23	25.97	0.914	290.0	0.78

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**220**	**degrees True**
H Relative Field:	0.412	
V Relative Field:	0.518	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	306	watts H
	483	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 7.1 uW/cm² at 25 meters from the tower



KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	13.3	0.57
5	2540	29.8	30.22	80.48	0.277	60.4	2.21
10	2535	31.3	32.89	72.30	0.403	128.2	3.96
15	2535	31.3	34.74	64.42	0.509	204.1	5.65
20	2535	31.3	37.17	57.45	0.608	291.6	7.05
25	2532	32.2	40.80	52.21	0.668	351.7	7.06
30	2530	32.9	44.49	47.60	0.719	407.4	6.88
35	2525	34.4	49.06	44.49	0.755	449.6	6.24
40	2522	35.3	53.35	41.42	0.786	486.8	5.72
45	2521	35.6	57.38	38.35	0.817	525.7	5.33
50	2518	36.5	61.91	36.14	0.839	554.5	4.83
55	2510	39.0	67.40	35.31	0.847	565.6	4.16
60	2505	40.5	72.38	34.00	0.858	580.4	3.70
65	2500	42.0	77.39	32.87	0.867	592.8	3.31
70	2495	43.5	82.43	31.87	0.875	603.7	2.97
75	2490	45.0	87.49	30.99	0.882	613.5	2.68
80	2485	46.6	92.57	30.21	0.888	622.3	2.43
85	2480	48.1	97.66	29.50	0.893	628.8	2.20
90	2472	50.5	103.22	29.31	0.894	630.4	1.98
95	2465	52.7	108.62	29.00	0.896	633.0	1.79
100	2462	53.6	113.45	28.18	0.901	640.0	1.66

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**240**	**degrees True**
H Relative Field:	0.525	
V Relative Field:	0.557	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	496	watts H
	558	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 7.8 uW/cm² at 25 meters from the tower

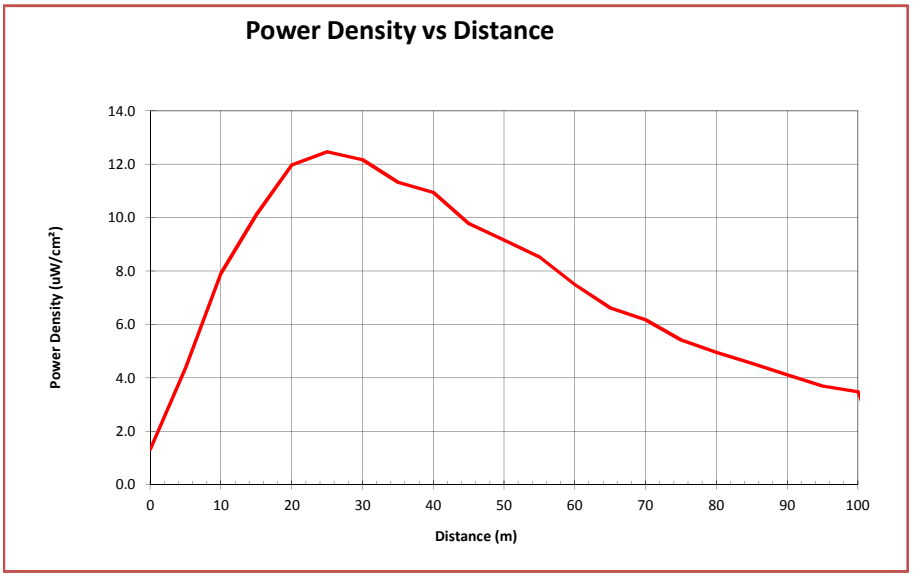
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	17.8	0.76
5	2535	31.3	31.73	80.93	0.269	76.4	2.54
10	2532	32.2	33.76	72.77	0.396	165.1	4.84
15	2530	32.9	36.12	65.46	0.494	257.8	6.60
20	2525	34.4	39.77	59.81	0.577	351.6	7.43
25	2522	35.3	43.25	54.69	0.643	436.2	7.79
30	2520	35.9	46.79	50.12	0.689	500.3	7.64
35	2520	35.9	50.14	45.73	0.741	579.4	7.70
40	2518	36.5	54.16	42.39	0.776	635.2	7.23
45	2510	39.0	59.52	40.88	0.791	660.2	6.23
50	2508	39.6	63.76	38.35	0.816	703.0	5.78
55	2502	41.4	68.83	36.96	0.830	727.1	5.13
60	2500	42.0	73.24	34.99	0.850	762.0	4.75
65	2500	42.0	77.39	32.87	0.867	792.8	4.42
70	2495	43.5	82.43	31.87	0.875	807.4	3.97
75	2490	45.0	87.49	30.99	0.882	820.5	3.58
80	2482	47.5	93.03	30.69	0.884	825.0	3.18
85	2480	48.1	97.66	29.50	0.893	840.9	2.95
90	2470	51.1	103.52	29.61	0.892	839.7	2.62
95	2465	52.7	108.62	29.00	0.896	846.6	2.40
100	2460	54.2	113.74	28.45	0.899	852.8	2.20

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**260**	**degrees True**
H Relative Field:	0.724	
V Relative Field:	0.701	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	944	watts H
	885	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 12.5 uW/cm² at 25 meters from the tower



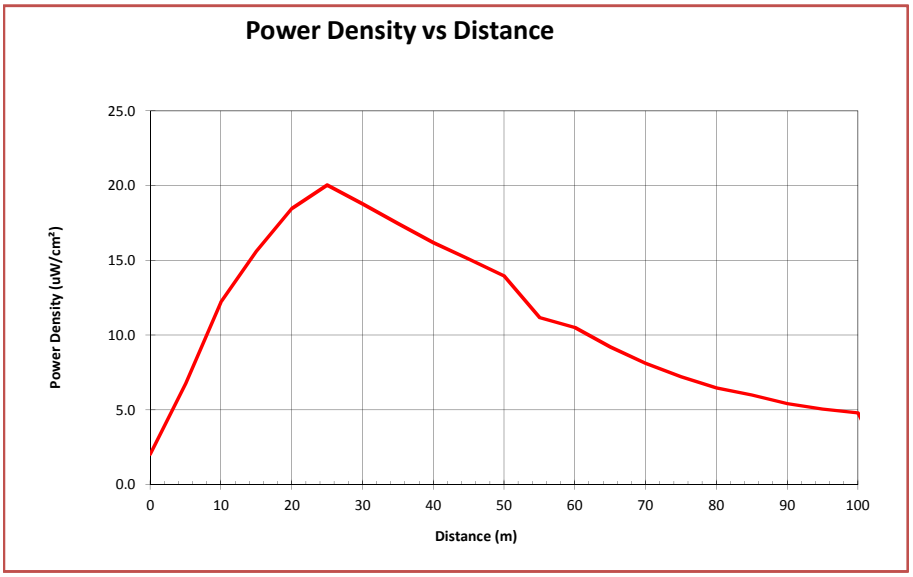
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	30.9	1.32
5	2535	31.3	31.73	80.93	0.269	132.4	4.39
10	2530	32.9	34.34	73.07	0.391	279.3	7.91
15	2525	34.4	37.51	66.43	0.483	426.2	10.12
20	2522	35.3	40.57	60.46	0.568	589.9	11.98
25	2518	36.5	44.25	55.60	0.632	730.6	12.46
30	2515	37.4	47.97	51.29	0.677	838.2	12.17
35	2510	39.0	52.37	48.06	0.713	930.1	11.33
40	2508	39.6	56.26	44.68	0.753	1036.9	10.95
45	2502	41.4	61.14	42.61	0.774	1094.9	9.79
50	2500	42.0	65.30	40.03	0.800	1169.1	9.16
55	2498	42.6	69.57	37.77	0.822	1236.2	8.53
60	2490	45.0	75.03	36.90	0.831	1262.4	7.49
65	2482	47.5	80.50	36.15	0.838	1285.2	6.63
70	2480	48.1	84.93	34.49	0.854	1333.4	6.18
75	2470	51.1	90.78	34.29	0.856	1338.4	5.43
80	2465	52.7	95.78	33.36	0.863	1361.9	4.96
85	2460	54.2	100.81	32.52	0.870	1383.1	4.55
90	2452	56.6	106.33	32.18	0.873	1391.8	4.11
95	2442	59.7	112.19	32.14	0.873	1392.9	3.70
100	2440	60.3	116.77	31.08	0.881	1419.9	3.48

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**280**	**degrees True**
H Relative Field:	0.912	
V Relative Field:	0.857	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	1,497	watts H
	1,322	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 20.0 uW/cm² at 25 meters from the tower



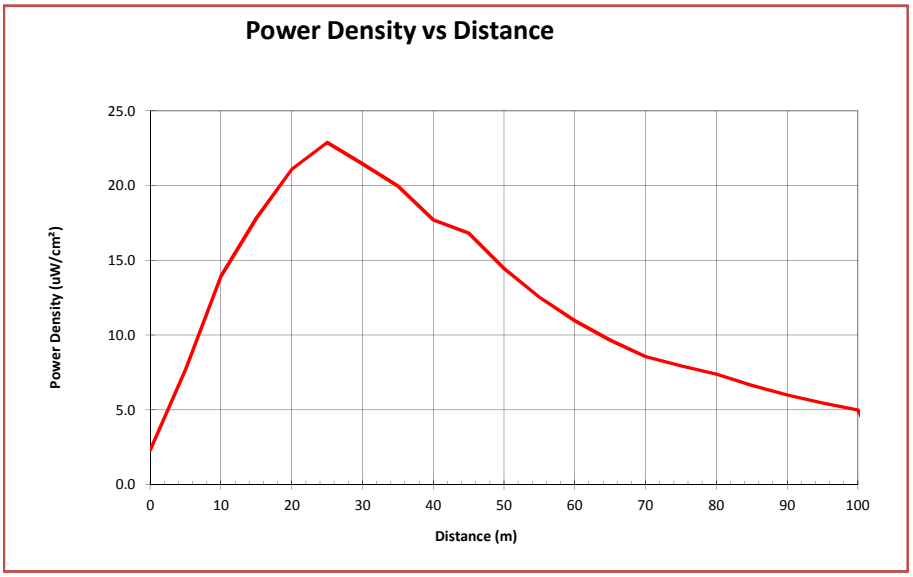
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	47.6	2.03
5	2535	31.3	31.73	80.93	0.269	204.2	6.78
10	2530	32.9	34.34	73.07	0.391	430.7	12.20
15	2525	34.4	37.51	66.43	0.483	657.3	15.61
20	2522	35.3	40.57	60.46	0.568	909.8	18.47
25	2520	35.9	43.75	55.15	0.638	1147.7	20.03
30	2515	37.4	47.97	51.29	0.677	1292.6	18.77
35	2510	39.0	52.37	48.06	0.713	1434.3	17.48
40	2505	40.5	56.91	45.34	0.746	1568.6	16.18
45	2502	41.4	61.14	42.61	0.774	1688.6	15.09
50	2499	42.3	65.50	40.23	0.798	1793.7	13.97
55	2482	47.5	72.66	40.81	0.792	1768.0	11.19
60	2480	48.1	76.90	38.72	0.813	1862.7	10.52
65	2470	51.1	82.71	38.20	0.818	1886.5	9.21
70	2460	54.2	88.53	37.75	0.823	1907.4	8.13
75	2450	57.2	94.35	37.35	0.826	1925.7	7.23
80	2440	60.3	100.17	37.00	0.830	1942.0	6.47
85	2435	61.8	105.10	36.02	0.840	1988.0	6.01
90	2425	64.9	110.94	35.78	0.842	1999.7	5.43
95	2420	66.4	115.90	34.95	0.850	2038.9	5.07
100	2418	67.0	120.37	33.82	0.859	2082.3	4.80

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**300**	**degrees True**
H Relative Field:	0.989	
V Relative Field:	0.901	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	1,761	watts H
	1,461	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 22.9 uW/cm² at 25 meters from the tower



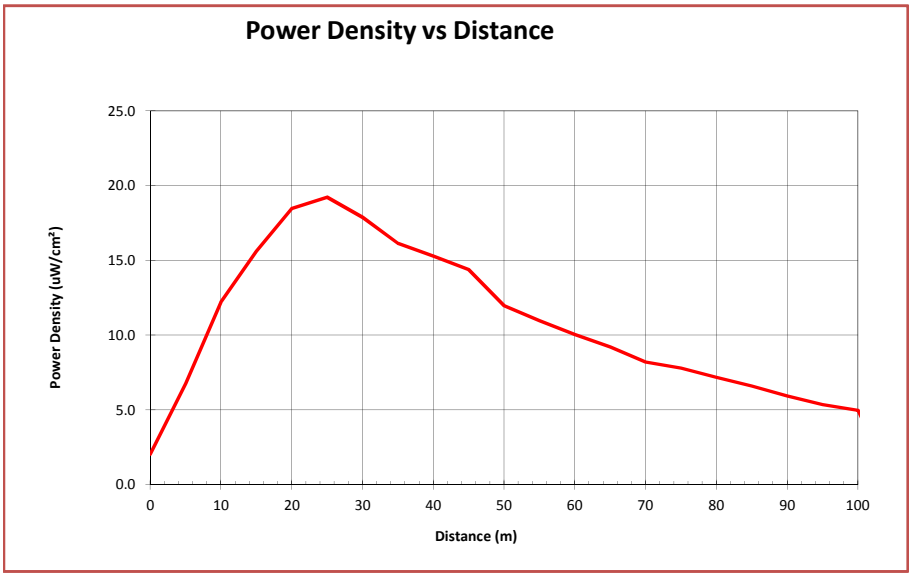
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	54.4	2.32
5	2535	31.3	31.73	80.93	0.269	233.4	7.75
10	2530	32.9	34.34	73.07	0.391	492.2	13.94
15	2525	34.4	37.51	66.43	0.483	751.2	17.84
20	2522	35.3	40.57	60.46	0.568	1039.7	21.11
25	2520	35.9	43.75	55.15	0.638	1311.6	22.89
30	2515	37.4	47.97	51.29	0.677	1477.3	21.45
35	2510	39.0	52.37	48.06	0.713	1639.2	19.97
40	2502	41.4	57.56	45.98	0.738	1756.0	17.71
45	2500	42.0	61.55	43.03	0.770	1909.0	16.83
50	2490	45.0	67.30	42.02	0.780	1959.3	14.45
55	2480	48.1	73.06	41.17	0.788	2002.2	12.53
60	2470	51.1	78.84	40.44	0.796	2039.2	10.96
65	2460	54.2	84.63	39.82	0.802	2071.3	9.66
70	2450	57.2	90.42	39.27	0.807	2099.6	8.58
75	2445	58.8	95.28	38.08	0.819	2162.2	7.96
80	2440	60.3	100.17	37.00	0.830	2219.4	7.39
85	2430	63.3	106.00	36.69	0.833	2236.1	6.65
90	2420	66.4	111.83	36.41	0.836	2251.1	6.01
95	2410	69.4	117.67	36.16	0.838	2264.6	5.46
100	2400	72.5	123.50	35.93	0.841	2276.9	4.99

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**320**	**degrees True**
H Relative Field:	0.813	
V Relative Field:	0.952	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	1,190	watts H
	1,631	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 19.2 uW/cm² at 25 meters from the tower



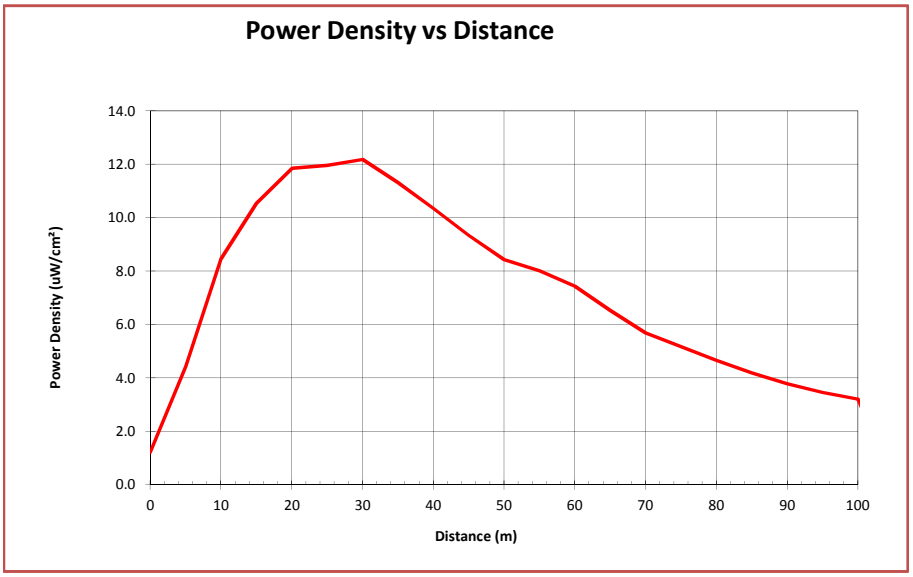
KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	47.7	2.03
5	2535	31.3	31.73	80.93	0.269	204.3	6.78
10	2530	32.9	34.34	73.07	0.391	431.0	12.21
15	2525	34.4	37.51	66.43	0.483	657.7	15.62
20	2522	35.3	40.57	60.46	0.568	910.4	18.48
25	2518	36.5	44.25	55.60	0.632	1127.5	19.24
30	2512	38.3	48.68	51.96	0.670	1267.9	17.87
35	2505	40.5	53.51	49.15	0.700	1383.1	16.14
40	2501	41.7	57.78	46.19	0.736	1527.1	15.28
45	2498	42.6	61.97	43.44	0.766	1653.7	14.39
50	2485	46.6	68.33	42.97	0.770	1674.1	11.98
55	2480	48.1	73.06	41.17	0.788	1753.1	10.97
60	2475	49.6	77.86	39.59	0.804	1824.0	10.05
65	2470	51.1	82.71	38.20	0.818	1887.8	9.22
70	2461	53.9	88.34	37.59	0.824	1915.9	8.20
75	2460	54.2	92.53	35.85	0.841	1997.7	7.80
80	2455	55.7	97.49	34.86	0.851	2043.8	7.18
85	2450	57.2	102.48	33.96	0.858	2078.5	6.61
90	2440	60.3	108.33	33.82	0.859	2083.9	5.93
95	2430	63.3	114.18	33.69	0.860	2088.8	5.35
100	2425	64.9	119.19	32.97	0.866	2117.0	4.98

KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Bearing:	**340**	**degrees True**
H Relative Field:	0.700	
V Relative Field:	0.667	
Main Lobe ERP:	1800	watts
Antenna	ERI 1081-1CP-DA-SP	
ERP	882	watts H
	801	watts V
Antenna AGL (at base)	30	meters
Antenna AMSL	806	meters
MBT	0	degrees

Calculated
Maximum is 12.2 uW/cm² at 30 meters from the tower



KSON 279B San Diego
Ground-Level Power Density Calculations
Using Manufacturer's Vertical Plane Pattern, Horizontal Plane Pattern, and Terrain from 7.5 minute topo

Distance From Tower (meters)	Terrain AMSL from topo map (feet)	Antenna height above 2 meter person at terrain point (meters)	Hypotenuse (meters)	Depression Angle (with MBT adjust) (degrees)	Interpolated Rel Field	Adjusted ERP (watts)	Power Density uW/cm²
0	2546	28.0	27.98	90.00	0.130	28.4	1.21
5	2538	30.4	30.83	80.67	0.274	126.1	4.43
10	2535	31.3	32.89	72.30	0.403	273.6	8.45
15	2530	32.9	36.12	65.46	0.494	411.4	10.54
20	2525	34.4	39.77	59.81	0.577	561.1	11.85
25	2520	35.9	43.75	55.15	0.638	685.1	11.96
30	2520	35.9	46.79	50.12	0.689	798.4	12.19
35	2515	37.4	51.24	46.92	0.727	889.3	11.32
40	2510	39.0	55.83	44.24	0.758	965.9	10.35
45	2505	40.5	60.53	41.97	0.780	1024.6	9.34
50	2500	42.0	65.30	40.03	0.800	1076.2	8.43
55	2500	42.0	69.20	37.37	0.826	1149.1	8.02
60	2498	42.6	73.59	35.38	0.846	1205.0	7.43
65	2490	45.0	79.08	34.72	0.852	1222.2	6.53
70	2480	48.1	84.93	34.49	0.854	1227.5	5.69
75	2475	49.6	89.93	33.49	0.862	1250.7	5.17
80	2468	51.8	95.28	32.90	0.867	1264.4	4.65
85	2460	54.2	100.81	32.52	0.870	1273.3	4.19
90	2452	56.6	106.33	32.18	0.873	1281.2	3.79
95	2445	58.8	111.71	31.74	0.876	1291.6	3.46
100	2440	60.3	116.77	31.08	0.881	1307.1	3.20