

COMPLIANCE WITH SPECIAL OPERATING CONDITIONS
AND CALCULATION OF TRANSMITTER POWER OUTPUT

The applicant recognizes the responsibility to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Special Operating Condition #2: A complete antenna proof-of-performance prepared by American Amplifier Technologies, LLC (AAT) is included as part of the attachment.

Special Operating Condition #3: A certification is attached from licensed/professional land surveyor Leslie K. T. Lau of Action Survey, LLC establishing that the KONI directional antenna has been oriented to the proper azimuth.

Special Operating Condition #4: An affidavit from Steve Wilde of SWE Services, LLC concerning oversight of the KONI transmitting antenna installation is included as part of the attachment.

Special Operating Condition #5: An exhibit (Figure 1) prepared by William Jeffrey Reynolds, Technical Consultant with du Treil, Lundin & Rackley, Inc., Consulting Engineers, demonstrating that the measured directional antenna pattern complies with the community coverage provisions of section 73.315 is included as part of the attachment. As indicated, the 70 dBu contour based on the AAT measured composite directional antenna pattern encompasses 100% of the 2020 Census population and 84% of the land area within Lanai City.

Special Operating Condition #6: The measured horizontally and vertically polarized radiation components do not exceed, at any azimuth, the composite radiation pattern authorized by the construction permit. Furthermore, the principal minima and the associated field strength limit of 2.05 kilowatts across the arc of azimuths from 90 degrees clockwise to 130 degrees true is not exceeded by the measured horizontally or vertically polarized radiation components.

Special Operating Condition #7: The attached spurious emission measurements taken by Steve Wilde of SWE Services, LLC contained in the Transmission System Proof of Performance Report indicate that the authorized KONI operation complies with the spurious emission requirements of Section 73.317.

Special Operating Condition #8: The attached Radiofrequency Electromagnetic Field Exposure Report, prepared by Steve Wilde of SWE Services, LLC indicates that there are no areas that exceed the FCC guidelines for human exposure to RF fields.

Calculation of Transmitter Power Output (TPO): The 10.28 kW (10.12 dBk) figure is based on consideration of total transmission system attenuation of 0.506 dB (89%). Given an antenna power gain of 3.17 (5.01 dB), a TPO of 10.28 kW produces the authorized ERP of 29 kW (14.62 dBk).

Directional FM Antenna System

KONI Lanai City, HI 104.7 MHz

June 21, 2022

Antenna Description

A custom designed circular polarized FM antenna system was used to produce the directional azimuth pattern for KONI Lanai City, HI 104.7 MHz, FIN 17023, FCC CP file number: 0000189311. The American Amplifier Technologies **IV-CP-M-4HW-SP** antenna system consists of a circular polarized antenna system mounted to a vertical structure. The antenna system is to be oriented to 295 degrees true north.

Description of Test Procedure

The test antenna consists of a full-scale circular polarized antenna system mounted to a constructed structure that is identical to the final configuration. The structure and antenna system were mounted to a rotating platform. The platform is wooden, allowing the test antenna's center of radiation to be approximately 35 ft. above ground. All coaxial lines were properly grounded.

The antenna under test was the source antenna, terminated to the transmit port of the TR1300/1 2-Port Vector Network Analyzer. The VNA test instrument was set to 104.7 MHz.

A broadband log-periodic vertically and horizontally polarized antenna system was used to receive the emitted signals. The receive antenna system is located approximately 600 ft from the transmit antenna. The receive antenna is located at the same height above ground as the antenna under test. The receive antenna is terminated to the receive port of TR1300/1 2-Port Vector Network Analyzer. A gain reference was documented using a single dipole tuned to 104.7 MHz.

The antenna under test was rotated in a counter clockwise direction. The relative field strength was plotted using an HP PC-based computer system that documents the relative field strength of each azimuth degree angle. The computer system interfaces with the motorized platform and VNA test instrument, documenting the azimuth degree and relative field values. The system is calibrated to ANS/ISO/IEC 17025 standards.

Conclusions

The **IV-CP-M-4HW-SP** four bay FM antenna system is to be mounted and oriented to 295 degrees true north. The antenna system should be installed in accordance with the provided installation drawing documents. No other antenna system or obstructions should be mounted within 10 ft of the IV-CP-M-4HW-SP antenna system. The antenna system orientation should be confirmed using a licensed surveyor.

The following figures are the results of the antenna proof of performance directional test procedure:

- Figure 1: Measured Vertical & Horizontal Azimuth Pattern with the FCC Composite
- Figure 2: Tabulation of the Horizontal Polarization for the Measured Azimuth Pattern
- Figure 3: Tabulation of the Vertical Polarization for the Measured Azimuth Pattern
- Figure 4: Tabulation of the Composite Polarization for the Measured Azimuth Pattern
- Figure 5: Vertical Plane Relative Field Pattern
- Figure 6: Tabulation of Vertical Plane Relative Field
- Figure 7: Antenna Specifications
- Figure 8: Antenna Drawings

Figure #1 indicates the measured horizontal and vertical azimuth patterns do not exceed the FCC composite pattern at any azimuth. The FCC CP file number 0000189311 indicates that the power may not exceed 29 kilowatts at any azimuth. The power may not exceed 2.05 kilowatts at azimuth degrees between 90 and 130. The measured azimuth pattern does not exceed 29 kilowatts at any azimuth. The measured azimuth pattern does not exceed 2.05 kilowatts between azimuth degrees 90 and 130.

The measured vertical relative field pattern RMS is greater than 85% of filed composite pattern. The measured composite pattern has an RMS that is 95.7 % of the filed composite pattern, as shown in Figure #1.

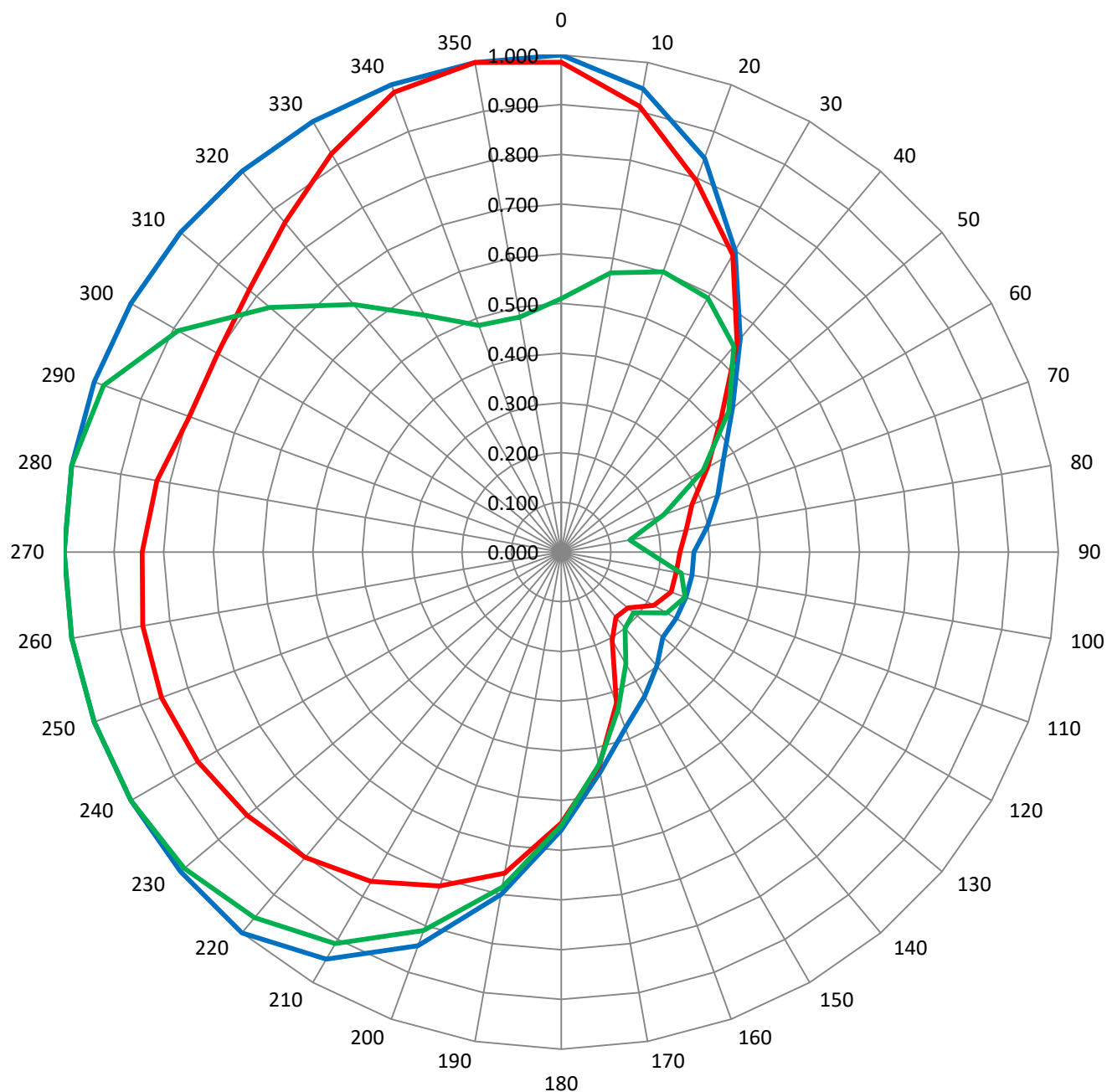


06/21/2022

Horizontal Plane Relative Field Pattern

KONI Lanai City, HI 104.7 MHz
June 21, 2022

Figure 1



Horizontal RMS	0.652	—
Vertical RMS	0.677	—
Composite RMS	0.736	—
FCC Composite RMS	0.769	—

Antenna Model	AAT-IV-M-CP-4HW-SP
Pattern Polarization	Circular

KONI Lanai City, HI 104.7 MHz
June 21, 2022

Figure 2

Tabulation of Horizontal Azimuth Field

Azimuth (°)	Relative Field
0	0.510
10	0.570
20	0.600
30	0.590
40	0.540
50	0.440
60	0.330
70	0.220
80	0.140
90	0.175
100	0.245
110	0.265
120	0.245
130	0.190
140	0.200
150	0.260
160	0.335
170	0.435
180	0.550
190	0.685
200	0.810
210	0.910
220	0.960
230	0.990
240	1.000
250	1.000
260	1.000
270	1.000
280	1.000
290	0.980
300	0.890
310	0.765
320	0.650
330	0.550
340	0.485
350	0.480

KONI Lanai City, HI 104.7 MHz
June 21, 2022

Figure 3

Tabulation of Vertical Azimuth Field

Azimuth (°)	Relative Field
0	0.985
10	0.910
20	0.795
30	0.690
40	0.550
50	0.420
60	0.340
70	0.280
80	0.255
90	0.239
100	0.235
110	0.235
120	0.215
130	0.175
140	0.171
150	0.205
160	0.324
170	0.438
180	0.545
190	0.656
200	0.715
210	0.765
220	0.802
230	0.825
240	0.844
250	0.856
260	0.855
270	0.843
280	0.826
290	0.796
300	0.798
310	0.820
320	0.865
330	0.925
340	0.984
350	1.000

KONI Lanai City, HI 104.7 MHz
June 21, 2022

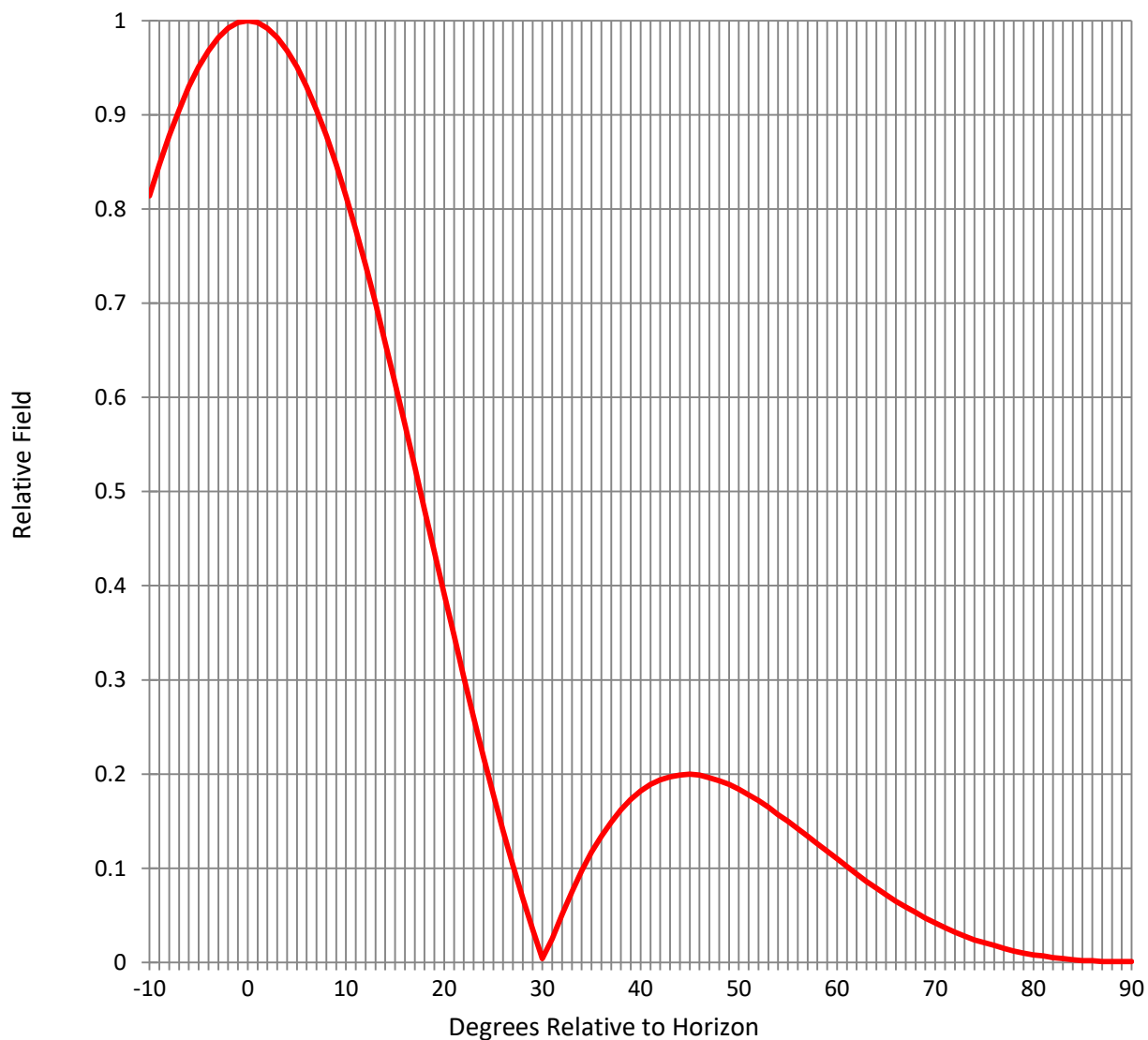
Figure 4

Tabulation of Composite Azimuth Field

Azimuth (°)	Relative Field
0	0.985
10	0.910
20	0.795
30	0.690
40	0.550
50	0.450
60	0.340
70	0.280
80	0.255
90	0.239
100	0.245
110	0.265
120	0.245
130	0.190
140	0.200
150	0.260
160	0.335
170	0.438
180	0.550
190	0.685
200	0.810
210	0.910
220	0.960
230	0.990
240	1.000
250	1.000
260	1.000
270	1.000
280	1.000
290	0.980
300	0.890
310	0.820
320	0.865
330	0.925
340	0.984
350	1.000

Figure 5

Vertical Plane Relative Field Pattern



KONI Lanai City, HI 104.7 MHz

June 21, 2022

Antenna Model: IV-CP-M-4HW-SP	Beam tilt: 0 degrees
Station: KONI	Maximum Gain: 3.17 (5.01 dB)
Frequency: 104.7 MHz	Horizontal Plane Gain: 3.17 (5.01 dB)

Figure 6

Tabulation of Vertical Plane Relative Field

Degree	Relative Field	Degree	Relative Field	Degree	Relative Field	Degree	Relative Field	Degree	Relative Field
-10	0.814	11	0.778	32	0.051	53	0.165	74	0.024
-9	0.847	12	0.740	33	0.075	54	0.157	75	0.021
-8	0.878	13	0.700	34	0.097	55	0.150	76	0.018
-7	0.905	14	0.658	35	0.117	56	0.142	77	0.015
-6	0.930	15	0.615	36	0.134	57	0.134	78	0.012
-5	0.951	16	0.571	37	0.149	58	0.126	79	0.010
-4	0.968	17	0.526	38	0.162	59	0.118	80	0.008
-3	0.982	18	0.481	39	0.173	60	0.110	81	0.007
-2	0.992	19	0.436	40	0.182	61	0.102	82	0.005
-1	0.998	20	0.391	41	0.189	62	0.094	83	0.004
0	1.000	21	0.347	42	0.194	63	0.086	84	0.003
1	0.998	22	0.303	43	0.197	64	0.079	85	0.002
2	0.992	23	0.260	44	0.199	65	0.072	86	0.002
3	0.982	24	0.218	45	0.200	66	0.065	87	0.001
4	0.968	25	0.178	46	0.199	67	0.059	88	0.001
5	0.951	26	0.140	47	0.196	68	0.053	89	0.001
6	0.930	27	0.103	48	0.193	69	0.047	90	0.001
7	0.905	28	0.068	49	0.189	70	0.042		
8	0.878	29	0.035	50	0.184	71	0.037		
9	0.847	30	0.004	51	0.178	72	0.032		
10	0.814	31	0.025	52	0.172	73	0.028		

KONI Lanai City, HI 104.7 MHz

June 21, 2022

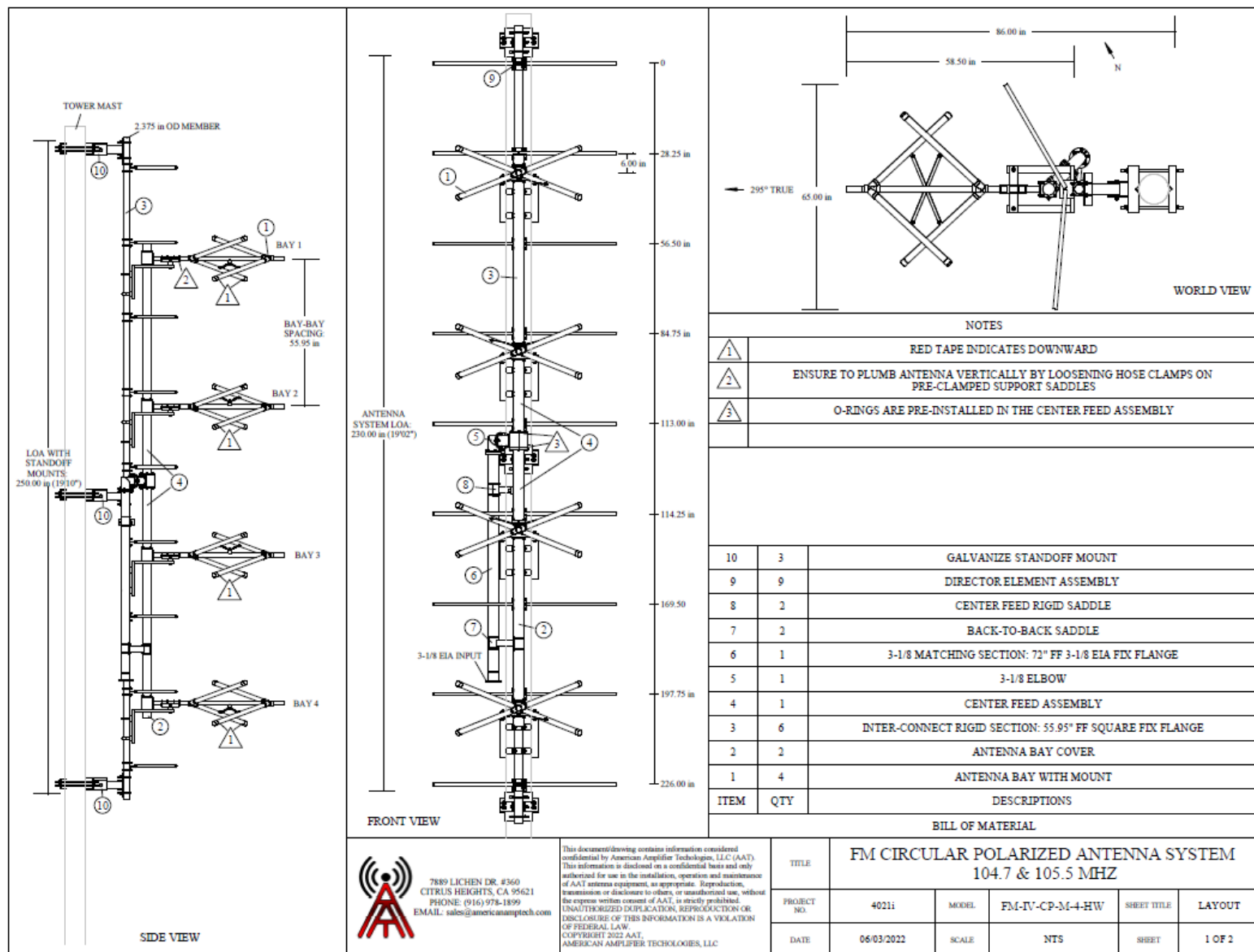
Antenna Model: IV-CP-M-4HW-SP	Beam tilt: 0 degrees
Station: KONI	Maximum Gain: 3.17 (5.01 dB)
Frequency: 104.7 MHz	Horizontal Plane Gain: 3.17 (5.01 dB)

Figure 7

Antenna Specifications

Antenna Model: IV-CP-M-4HW-SP
Station: KONI
Frequency: 104.7 MHz
Beam tilt: 0 degrees
Maximum Gain: 3.17 (5.01 dB)
Horizontal Plane Gain: 3.17 (5.01 dB)
Number of bays: 4
Antenna Length: 226 inches
Aperture length required: 346 inches
Orientation of system: 295 degrees true
Maximum Vertical ERP: 29 kW
Total Antenna Input Power: 9.14 kW

Antenna Drawings



Transmission System Proof of Performance Report

KONI Lanai City, HI

FIN: 17023

104.7 MHz

July 14, 2022

TABLE OF CONTENTS

Introduction	3
Test Equipment	3
Station Equipment	3
Summary	3
Affidavit	4
Measurement Diagrams	5
Harmonic Emissions & Spurious Emissions Measurement Configuration.....	5
Measurement Results	6
Fundamental Frequency Measurement	6
Measurement Methodology	6
Harmonic Emissions Measurement.....	7
Intermodulation Emissions Measurements.....	7

Introduction

The permittee for the KONI (file number 0000189311) construction permit is Hochman Hawaii Publishing, Inc. Stephen Wilde completed the KONI transmitter and combiner proof of performance.

Test Equipment

- Agilent N9912A Spectrum Analyzer, Serial Number MY51464885
- AAT Directional Coupler
- Mini-Circuits High Pass filters
- 2-pole Bandpass Filters

Station Equipment

- FM Transmitter
- AAT Combiner System
- AAT FM Directional Antenna

Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth emissions measurements were completed at the output of the transmission network. The KONI transmitter was operating at 100% power during the time of measurements. The measurements were completed in order to ensure compliance with the requirements of FCC Part 73.317.

Affidavit

STATE OF CALIFORNIA
Sacramento County

I, Steve Wilde, do affirm that:

1. I have been engaged in the RF engineering and installation of broadcast facilities since 2005.
2. I hold Bachelor of Science degree in Electrical Engineering from DeVry University Chicago, IL.
3. I further declare, under penalty of perjury, that the statements contained herein are true and correct to the best of my knowledge.

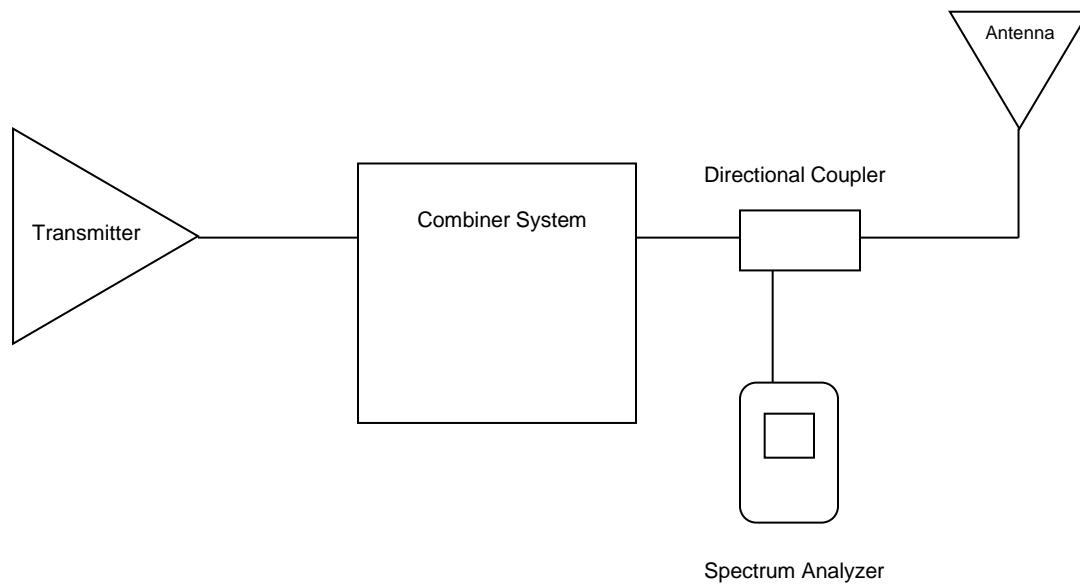
Stephen Wilde
SWE Services, LLC
July 14th 2022

X 

Stephen Wilde

Measurement Diagrams

Harmonic Emissions & Spurious Emissions Measurement Configuration



Measurement Results

Fundamental Frequency Measurement

Assigned Frequency	104.7000000	MHz	Variance in Hz
Measured Frequency	104.7001418	MHz	141.8

Measurement Methodology

To ensure accurate measurements, the frequency response of all couplers, RF filters, and sample ports were measured. The resulting dB characteristics were added to the recorded spectrum analysis measurements to ensure accurate calculations.

The test instrument reference point of the fundamental frequency is 0.02 dBm. The characteristics of the directional coupler forward sample-port is a dB reference relative to the fundamental frequency. Therefore, the directional coupler forward sample-port loss or gain, high pass filter loss, and dB reference point are added to the instrument measurement to provide the resulting dBc calculation.

Harmonic Emissions Measurement

Harmonic	Frequency (MHz)	Directional Coupler (dB)	High Pass Filter (dB)	Reference Level (dBm)	Instrument Reading (dBm)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
X2	209.40	-5.50	0.50	-0.02	-109.60	-114.62	-80.00	34.62
X3	314.10	-9.09	0.40	-0.02	-94.96	-103.67	-80.00	23.67
X4	418.80	-11.64	0.30	-0.02	-108.40	-119.76	-80.00	39.76
X5	523.50	-13.69	0.10	-0.02	-107.50	-121.11	-80.00	41.11
X6	628.20	-15.17	0.10	-0.02	-112.50	-127.59	-80.00	47.59
X7	732.90	-16.42	0.10	-0.02	-114.00	-130.34	-80.00	50.34
X8	837.60	-17.48	0.10	-0.02	-112.90	-130.30	-80.00	50.30
X9	942.30	-18.28	0.20	-0.02	-116.20	-134.30	-80.00	54.30

Intermodulation Emissions Measurements

The KONI transmission circuit was analyzed using an Agilent N9912A spectrum analyzer while all combiner circuits operated at 100% power. The KONI transmission circuit meets the intermodulation spurious emissions requirements.

IM Frequency (MHz)	Directional Coupler (dB)	Band Pass Filter (dB)	Reference Level (dBm)	Instrument Reading (dBm)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
106.3	0.00	1.20	-0.02	-90.50	-89.32	-80.00	9.32
103.9	0.00	1.30	-0.02	-91.66	-90.38	-80.00	10.38

ACTION SURVEY, LLC
P.O. Box 2985 Wailuku, HI 96793
Phone: (808) 891-2400 - Fax: (808) 879-2402

21 July 2022

George Hochman
Hochman Hawaii
1164 Bishop St, #1703
Honolulu, HI 96813
gh5512@aol.com

Re. Fm Circular Polarized Antenna System
729 Waiakoa Rd.
Kula, HI 96790

Dear George:

Subject antenna system was surveyed on 15 July 2022 under my direct supervision.
Measurements show the following:

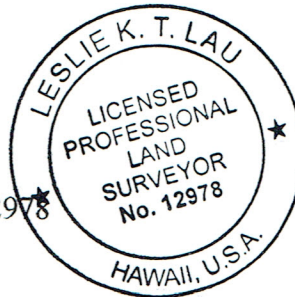
Antennae Orientation: 295° from True North
Antennae Geographic Coordinates: North Latitude 20° 44' 39.5" NAD 27 Datum
West Longitude 156° 18' 38.8" NAD 27 Datum

Thank-you for giving us the opportunity to do this survey for you.

Have a great year,



Leslie K.T. Lau
Licensed Professional Land Surveyor
State of Hawaii Certificate Number LS12978
Land Court License Number 331
License Expiration Date: April 30, 2024
Action Survey, LLC



Affidavit

STATE OF CALIFORNIA
Sacramento County

I, Stephen Wilde, do affirm that:

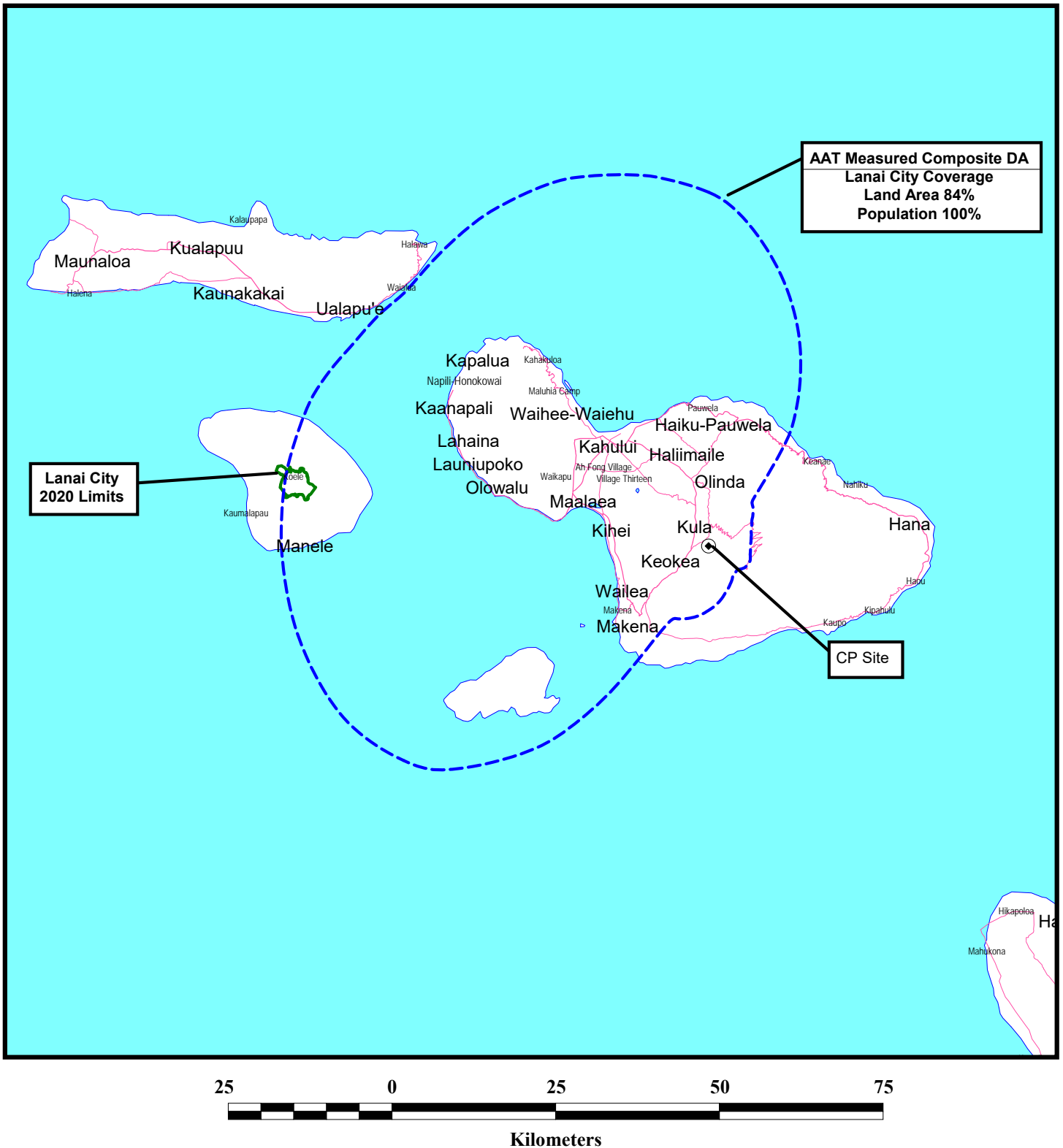
1. I have been engaged in the RF engineering and installation of broadcast facilities since 2005.
2. I directed the installation of the American Amplifier Technologies IV-CP-M-4HW-SP FM antenna system at KONI Lanai City, HI (FIN 17023), CP File Number: 0000189311, for Hochman Hawaii Publishing, Inc, and that the directional antenna was installed in complete accordance with the manufacturer's detailed instructions.
3. I hold Bachelor of Science degree in Electrical Engineering from DeVry University Chicago, IL.
4. I further declare, under penalty of perjury, that the statements contained herein are true and correct to the best of my knowledge.

Stephen Wilde
SWE Services, LLC
July 14th 2022

X



Stephen Wilde



COMPLIANCE WITH SECTION 73.315

FM STATION KONI
 LANAI CITY, HAWAII
 CHANNEL 284C2 29 kW (DA) 165 m

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

Radiofrequency Electromagnetic Field Exposure Report

KONI Lanai City, HI

FIN: 17023

104.7 MHz

July 14, 2022

TABLE OF CONTENTS

Introduction	3
Equipment	3
Summary	3
Drawings	4
RF Exposure Measurement Area	4
Measurement Points	5
General Public and Occupational Exposure Measurement Points	5

Introduction

The permittee for the KONI construction permit (file number 0000189311) is Hochman Hawaii Publishing, Inc. The Radiofrequency Exposure Study was completed on July 14th, 2022. Measurements were recorded at the facility using a Narda SRM 3000 instrument which properly analyzes and compensates for frequency dependent variables in the requirements of OET-65. Measurements were taken while slowly moving the instrument probe between approximately two and eight feet above ground, as well as side-to-side while walking to and from each measurement point. If an area had higher than average readings, further investigation was conducted to determine the extent of the area.

Equipment

- Narda SRM 3000
- SN: N-0010
- Firmware: SRM-FW V1.5.6

Summary

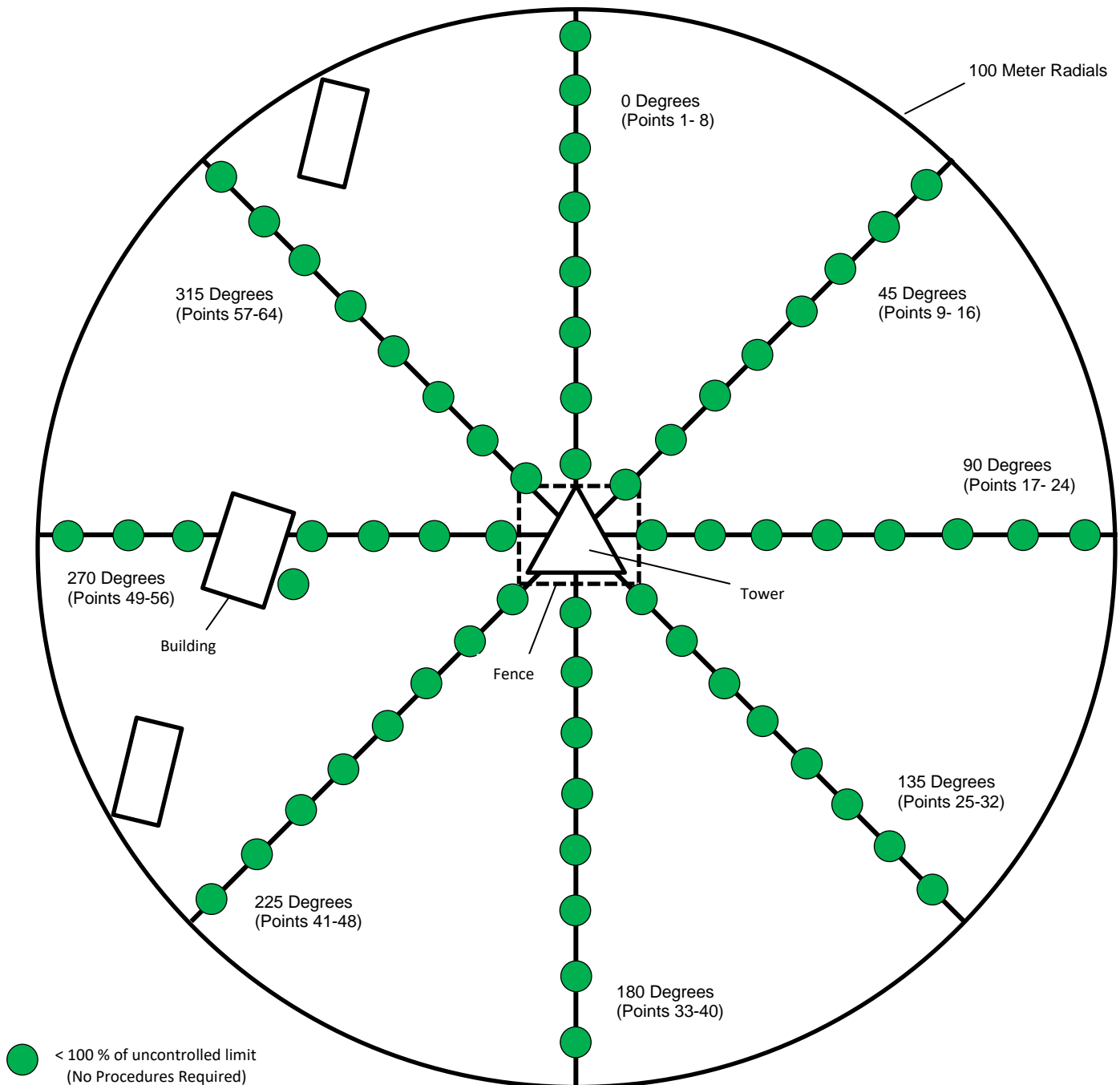
The KONI transmissions were confirmed to be operating at 100% ERP prior to recording measurements. Measurement points were recorded along eight equally spaced radials as well as throughout the accessible areas of the facility.

All measurement points and areas throughout the KONI facility were measured to be below 100% of the uncontrolled limits of OET-65. Therefore, the KONI facility fully complies with the FCC's maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments.

Lastly, though the site will fully comply with the FCC's controlled and uncontrolled exposure limits, access to the site will be restricted and appropriately marked with signage. When it becomes necessary for workers to ascend the antenna structure, the permittee will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Drawings

RF Exposure Measurement Area



Not to Scale

Measurement Points

General Public and Occupational Exposure Measurement Points

Point	Total General Public %	General Public % 104.7 MHz	Total Occupational %	Occupational % 104.7 MHz
1	41.43	18.64	8.29	3.73
2	54.00	24.30	10.80	4.86
3	64.46	29.01	12.89	5.80
4	61.89	27.85	12.38	5.57
5	22.56	10.15	4.51	2.03
6	20.63	9.28	4.13	1.86
7	15.56	7.00	3.11	1.40
8	14.56	6.55	2.91	1.31
9	70.17	31.58	14.03	6.32
10	69.49	31.27	13.90	6.25
11	45.63	20.53	9.13	4.11
12	20.56	9.25	4.11	1.85
13	19.52	8.78	3.90	1.76
14	15.75	7.09	3.15	1.42
15	13.52	6.08	2.70	1.22
16	10.25	4.61	2.05	0.92
17	55.23	24.85	11.05	4.97
18	45.12	20.30	9.02	4.06
19	31.52	14.18	6.30	2.84
20	20.52	9.23	4.10	1.85
21	14.23	6.40	2.85	1.28
22	12.22	5.50	2.44	1.10
23	10.89	4.90	2.18	0.98
24	9.78	4.40	1.96	0.88
25	70.12	31.55	14.02	6.31
26	58.71	26.42	11.74	5.28
27	48.95	22.03	9.79	4.41
28	73.23	32.95	14.65	6.59
29	32.55	14.65	6.51	2.93
30	20.46	9.21	4.09	1.84
31	15.78	7.10	3.16	1.42
32	10.98	4.94	2.20	0.99
33	64.46	29.01	12.89	5.80
34	51.77	23.30	10.35	4.66

SWE Services, LLC

35	78.99	35.55	15.80	7.11
36	61.49	27.67	12.30	5.53
37	44.23	19.90	8.85	3.98
38	24.56	11.05	4.91	2.21
39	15.62	7.03	3.12	1.41
40	14.55	6.55	2.91	1.31
41	52.91	23.81	10.58	4.76
42	58.74	26.43	11.75	5.29
43	61.54	27.69	12.31	5.54
44	61.60	27.72	12.32	5.54
45	40.23	18.10	8.05	3.62
46	20.55	9.25	4.11	1.85
47	15.46	6.96	3.09	1.39
48	12.52	5.63	2.50	1.13
49	56.45	25.40	11.29	5.08
50	47.31	21.29	9.46	4.26
51	58.80	26.46	11.76	5.29
52	65.09	29.29	13.02	5.86
53	30.65	13.79	6.13	2.76
54	20.55	9.25	4.11	1.85
55	14.52	6.53	2.90	1.31
56	12.56	5.65	2.51	1.13
57	64.56	29.05	12.91	5.81
58	59.94	26.97	11.99	5.39
59	62.55	28.15	12.51	5.63
60	43.77	19.70	8.75	3.94
61	25.56	11.50	5.11	2.30
62	20.45	9.20	4.09	1.84
63	14.55	6.55	2.91	1.31
64	12.56	5.65	2.51	1.13