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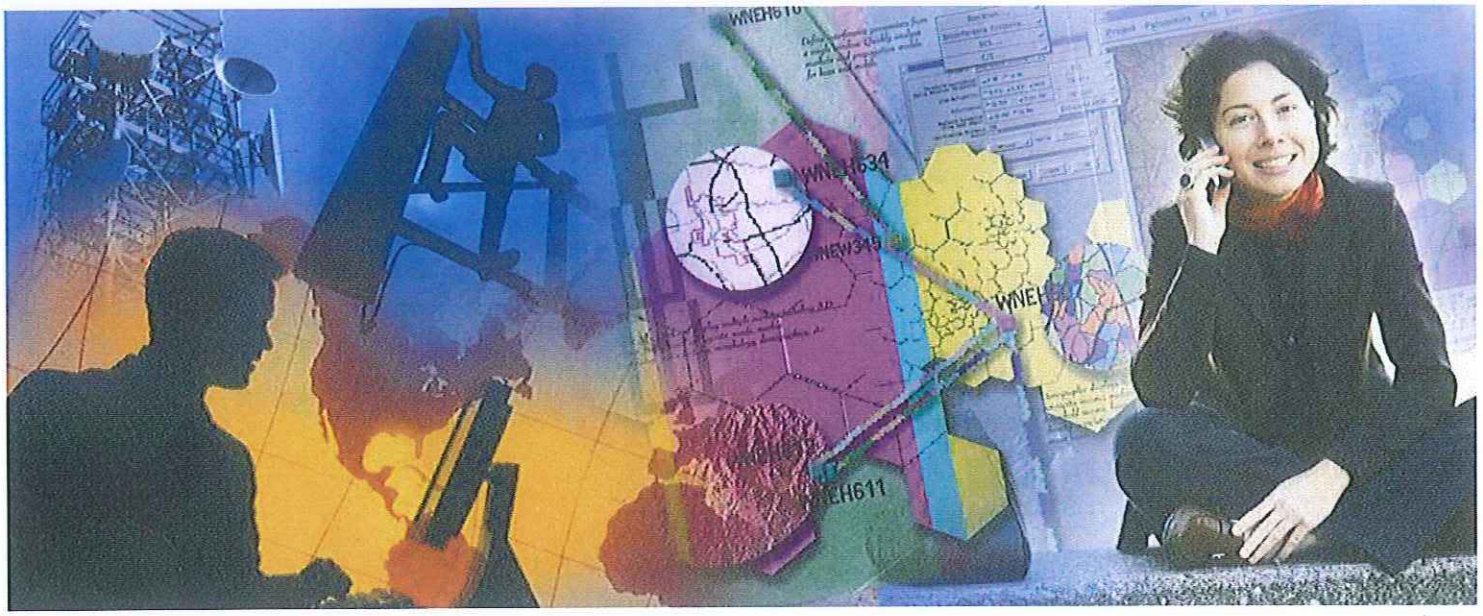

(RF) Power Density Calculations

Proposed Microwave System Relocation
Vineyard Haven (KCO87)

Prepared for

Verizon

May 2017

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

The purpose of this report is to describe and document the results of radio frequency (RF) power density calculations performed on behalf of Verizon by Comsearch for two microwave antenna relocations on a communications tower at a facility near Falmouth, MA. The site name is Vineyard Haven with an FCC call sign of KCO87. Verizon is proposing to relocate four (4) antennas on this tower to higher elevations to obtain path clearance. Only two (2) of these antennas are transmitting and are the focus of this report. Figure 1 is a Google aerial image showing the microwave antennas location. Parameters for the proposed system are in the table below.

Evaluated System Parameters		
	Antenna 1	Antenna 2
Latitude	41° 26' 40.0" N	41° 26' 40.0" N
Longitude	70° 36' 30.0" W	70° 36' 30.0" W
Antenna Azimuth (°)	358.9	357.8
Elevation (ft)	234.55	234.55
Antenna model	UHX8-107	SRD8-59ASE
Antenna gain (dBi)	46.5	41
Antenna diameter (ft)	8	8
Antenna height (ft)	128	125
TX power (dBm)	30	32
TX power (Watt)	1	1.58
Frequency (GHz)	11	6

The calculations in this project were performed to define the RF radiation conditions in and around the microwave installation at ground level. There are 252 data points designated for the calculations at or near to the Verizon facility. The data points are arranged in concentric circles around the facility every 10 meters to a distance of 100 meters. The calculations in this project determine the power density radiated from the relocated Microwave antennas.

The calculated power density levels presented in this report have been compiled and aggregated for the purpose of evaluating whether the proposed Microwave installation will be in compliance with the most recent human exposure guidelines for radio frequency radiation as adopted by the Federal Communications Commission (FCC). The guidelines referenced by the FCC are intended to apply to both occupational (workers at the site) exposures as well as general public exposures to radio frequency radiation. Therefore, the data presented in this report can be used to determine potential non-ionizing radiation hazards, which may affect persons working at or living near this site.

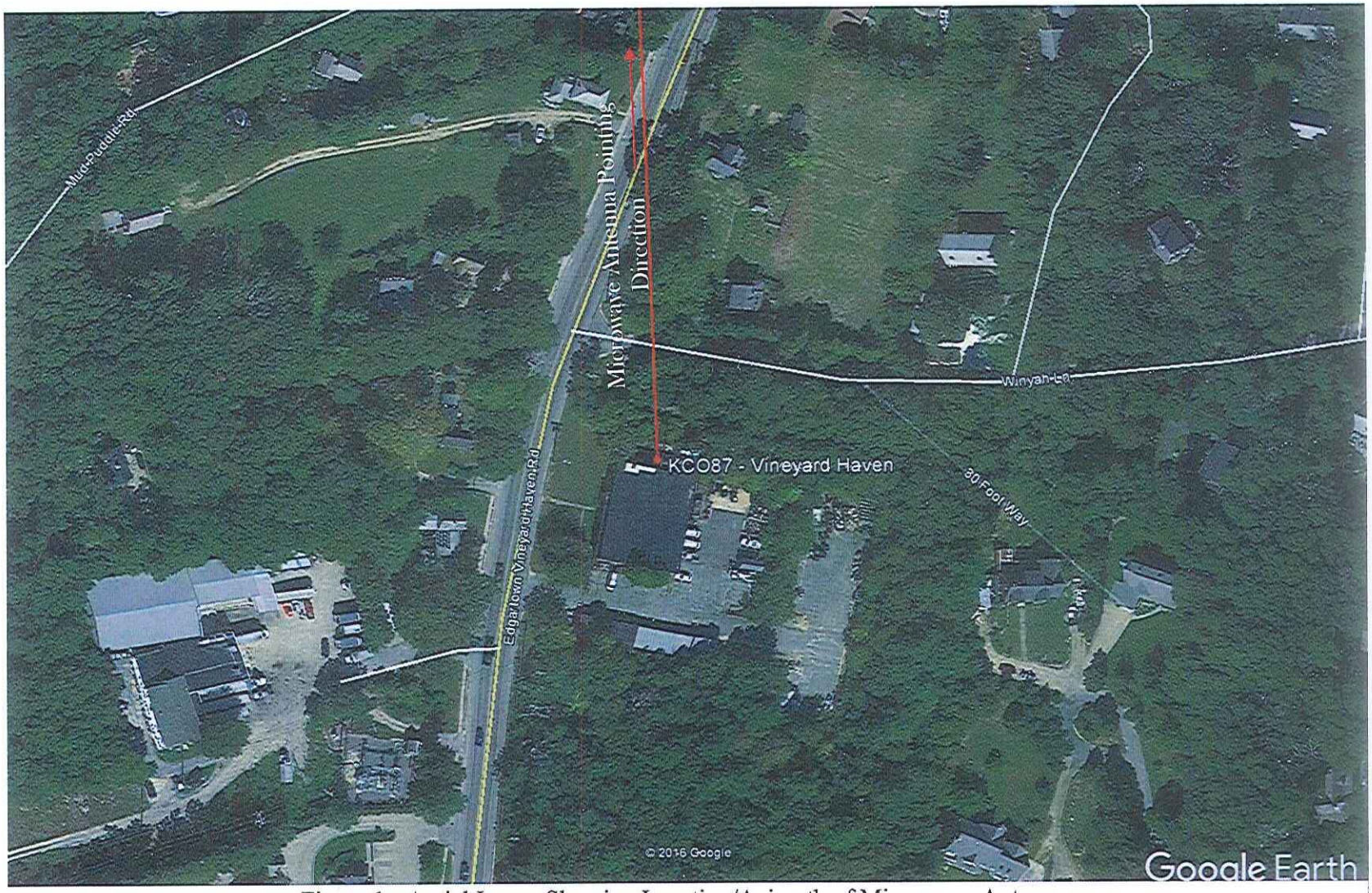

Figure 1 - Aerial Image Showing Location/Azimuth of Microwave Antennas

1.2 Background

The possible adverse effects from exposure to non-ionizing (radio frequency) radiation has become a growing concern in recent years. In light of this concern, research by several organizations has shown that exposure to high levels of RF radiation can be harmful. This research has concluded that the ability of RF energy to heat biological tissues rapidly is one concern deserving attention. It has been shown that the extent of the biological heating is dependent upon several factors including the following:

A) Specific radiated frequency
B) Size, shape, and orientation of the exposed object
C) Duration of exposure to RF radiation
D) Surrounding environmental conditions
E) Efficiency of heat dissipation

These factors along with other health considerations concerning human exposure to RF radiation prompted the Federal Communications Commission (FCC) to consider its responsibility in developing policies controlling RF radiation emissions from FCC licensed and regulated facilities Following several public notices and inquiries to other government agencies, the Commission determined that a FCC regulated facility should be required to comply with established guidelines concerning the potential biological effects and hazards of RF radiation. Therefore, the FCC issued a report in March of 1985 that in effect amended the Commission's rules and provided for an environmental analysis in regard to human exposure to RF radiation. The exposure guidelines for the FCC radiation policy were placed in effect on January 1, 1986.

The FCC has adopted limits for maximum permissible exposure generally based on the exposure guidelines set forth in NCRP Report No. 86 (1986). In the frequency range from 100 MHz to 1500 MHz, exposure limits for field strength and power density are also generally based on those contained in the ANSI/IEEE report (C95.1-1992). These guidelines were chosen because they are scientifically based, widely accepted, and applicable to the general population as well as to workers. The currently adopted FCC standard establishes exposure limits for controlled as well as uncontrolled environments. The FCC has continuously updated the guidelines since 1996, mainly with Notices in 2003 (ET Docket No. 03-137) and 2013 (ET Docket No. 13-84). Although the Notices have been issued with useful information pertaining to safety, the safety criteria have remained the same. In the Notice of 2013 the FCC did state their intention to change the guidelines with respect to safety signage after a period of time during which the telecommunication industry and other interested parties would be allowed to comment on the changes proposed. In 2003 and 2013 the area most discussed was categorical exemption for certain classes of equipment either because of their remote positioning or their low-power of operation.

Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a circumstance of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control over their exposure. The frequencies in use at the facility correspond to exposure limits of 1 milliW/cm^2 for uncontrolled environments, and 5mW/cm^2 for controlled environments (see Figure 2 or Table 1). Table1 is an excerpt from FCC

47CFR1.1310 which can be found at: http://www.ecfr.gov/cgi-bin/text-idx?SID=e1917e1abc228f9473d648dbc9ecda79&mc=true&node=se47.1.1_11310&rgn=div8

Compliance to the FCC's RF radiation safety policy is generally through a process of self-certification. Therefore, at the request of Verizon, power density calculations were performed to ensure compliance with the FCC safety standard regarding RF radiation levels present in and around the proposed Microwave facility.

For additional information, please see FCC Office of Engineering and Technology (OET) Bulletin #65 (Edition 97-01) at: www.fcc.gov/oet/rfsafety, which provides full details regarding FCC guidelines for human exposure to radio frequency electromagnetic fields. Also, in the FCC 2013 Notice, the FCC stated that it was their plan to put the latest information with regard to radiation safety into their Knowledge Data Base (KDB) instead of addendum to OET Bulletin 65.

Table 1 Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

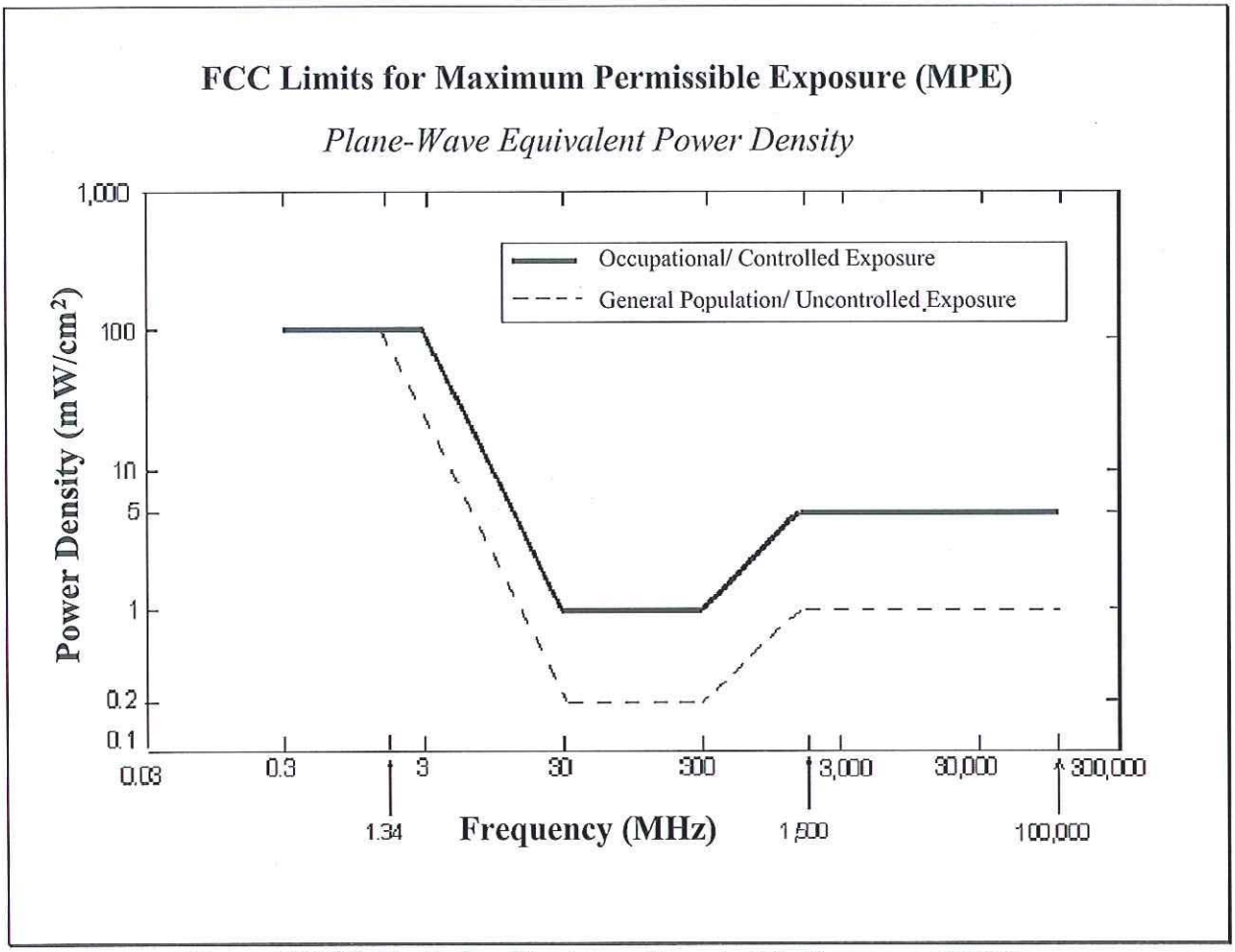

Figure 2 FCC Limits for Maximum Permissible Exposure (MPE)

SECTION 2

METHODOLOGY

The methods used for the calculations and analysis in this radiation safety effort are those described in the FCC Office of Science and Technology (OET) Bulletin No. 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Revision 97-01," August 1997. The FCC adopted limits for the maximum permissible exposure for areas occupied by personnel in their R&O (FCC 96-326) released 1 August 1996. Power density was calculated using the Bulletin No. 65 methods at 252 site points within and around the boundaries of the Microwave installation site to define the radiation conditions.

As shown in Table 1 and Figure 2 the FCC Safety limits vary with frequency. And there are two sets of limits one for the controlled zones and the other for the uncontrolled zones. Generally the controlled zone limits apply to RF radiation knowledgeable workers and the uncontrolled zone applies to all other workers and the general public. For the frequency band utilized by the proposed microwave systems the radiation safety limit is 1 milliWatt/cm^2 for uncontrolled zones and 5 milliWatts/cm^2 for controlled zones.

To carry out the calculations the parameters for the microwave transmitting system were taken from information provided by Verizon for their relocated microwave systems. Table 2 contains the data for the microwave transmitting system at the site. For this project the transmit power, antenna characteristics, antenna center-line, and system frequency of operation are listed in the data table as these parameters are used in the calculations.

In the following table the parameters used for the power density calculations for the proposed transmitting microwave systems is presented.

Table 2 Microwave Transmit Systems

Evaluated System Parameters		
	Antenna 1	Antenna 2
Wavelength (m)	0.026785714	0.047281324
Transmit Power (W)	1	1.58
Antenna Gain (dBi)	28.8	38.8
EIRP	73.5	70
Antenna Model	UHX8-107	SRD8-59ASE
Largest Antenna Dimension (m)	2.438	2.438
Height of Antenna Center-Line (ft)	128	125
Antenna Area (m^2)	4.669	4.669
Antenna Effective Area (m^2)	2.5468	2.2365
Antenna Efficiency (%)	54.64	47.98

2.1 Near-Field Distance Calculation

The formula for determining the Near-Field of an antenna system is given by the following formula.

$$\mathbf{NF = 0.62 * \sqrt{D^3 / \lambda}}$$

Where,

NF = Near-Field Distance, meters
D = Largest Antenna Dimension, meters
λ = Wavelength, meters

Near field distance for the Microwave Antenna 1 is found to be 14.42 meters, or 47.3 feet.
Near field distance for the Microwave Antenna 2 is found to be 10.85 meters, or 35.6 feet.

2.2 Far-Field and Transition-Zone Distance Calculations

The formula for determining the Far-Field of an Antenna System is given by the following formula.

$$\mathbf{FF = 2*D^2/\lambda}$$

Far field distance for the Microwave Antenna 1 is found to be 443.81 meters, or 1456.1 feet.
Far field distance for the Microwave Antenna 2 is found to be 251.42 meters, or 824.9 feet.

And,

The Transition-Zone is the area between the beginning of the Far-Field and the end of the Near-Field. So the formula for the Transition-Zone is given by the following formula.

$$\mathbf{TZ = FF - NF}$$

Where,

TZ = Transition-Zone, meters
FF == Far-Field, meters

Transition Zone for the Microwave Antenna 1 goes from 14.42 - 443.81 meters, or 47.3 - 1456.1 feet.
Transition Zone for the Microwave Antenna 2 goes from 10.85 - 251.42 meters, or 35.6 - 824.9 feet.

2.3 Calculation of the Power Density in the Near-Field

The power density of an antenna in the Near-Field is the highest power density level that the system will radiate. All other power densities radiated from the antenna will be lower. Therefore, if a radiation hazard condition does not exist in the Near-Field it will not occur at any other point of radiation. The Power Density in the Near-Field is constant throughout the entire zone. The zone is directly in front of the antenna and extends out in the shape of a cylinder. The Near-Field does not apply to azimuths away from the front of the antenna. The formula used for calculation the power density in the Near-Field follows.

$$P_{nf} = 0.1*4*P*\epsilon/A$$

Where,

P_{nf} = Power Density in the near field, milliWatts/cm^2
P = Transmit Power of the Microwave System, Watts
A = Physical Area of the Microwave Antenna, meter^2
ϵ = Antenna Efficiency, number = A_e/A
A_e = Effective Are of Antenna, meter^2

And,

$$A_e = G*\lambda^2/4*\Pi$$

Where,

Π = 3.1415

The power density calculated in the near field of the Antenna 1 is 0.046731 milliWatts/cm^2.
The power density calculated in the near field of the Antenna 2 is 0.064839 milliWatts/cm^2.

2.4 Calculation of the Power Density in the Transition-Zone

The Power Density in the Transition-Zone is inversely proportional to the increase in distance. The value is a function of the Power Density in the Near-Field and the distance between the end of the Near-Field and the beginning of the Far-Field. The following formula is used to calculate the Power Density in the Transition-Zone.

$$P_{tz} = P_{nf}*NF/T$$

Where,

P_{tz} = Power Density in the Transition Zone, Watts/meter^2
T = Distance from Antenna in the Transition-Zone, meters

The power density in the transition Zone Antenna 1 will vary from 0.046731 - 0.001518 milliWatts/cm^2.

The power density in the transition Zone Antenna 2 will vary from 0.064839 - 0.002799 milliWatts/cm^2.

2.5 Calculation of the Power Density in the Far-Field and Off-Axis

The Power Density in the Far-field is calculated with the following formula. This formula is also applied to the calculation of off-axis radiation from the microwave antennas. The Gain of the antenna is a function of the angle off-set (Θ).

$$\mathbf{P_d = 0.1 * P_t * G(\Theta)/(4*\Pi)*R^2}$$

$$\mathbf{\%Pd = 100 * P_d/_1\ milliWatt/cm^2}$$

And,

$$\mathbf{\%Limit = \%P_{d1} + \%P_{d2}}$$

Where,

W_d = Radiated power density at the calculation point (point of interest) from the Other transmitting systems in the area, milliWatt/cm^2

P_d = Radiated power density from the transmitting microwave at the calculation point (point of interest), milliWatt/cm^2

P_t = Transmit power of microwave system, Watts

$Gn(\Theta)$ = Gain of the microwave antenna in the direction of the calculation point

R_n = Distance to the calculation point (point of interest) from microwave or other system antennas, meters

0.1 = Factor that converts Watts/meter^2 to milliWatts/cm^2

%Limit = Limit percentage must be less than 100% for safe condition, %

SECTION 3

DATA PRESENTATION

Using the formulas presented in Section 2 the power density calculations were performed. The results of the calculations are presented in this section.

3.1 Calculation Results

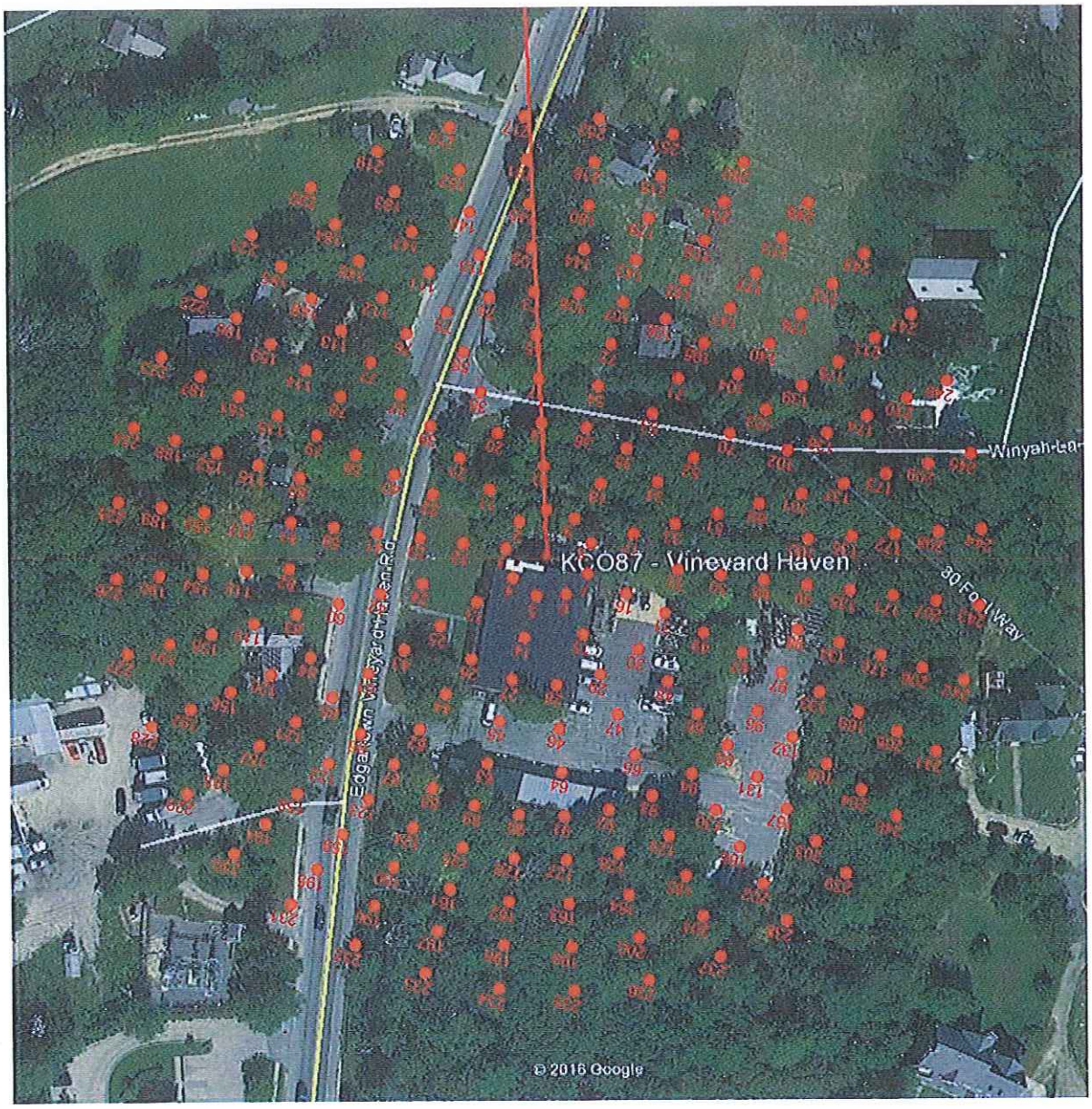

Figure 3 - Microwave Antenna Location and 252 Calculation Points

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
1	40.28	39.39	0.000456467034	4.56E-02	0.000433465962	4.33E-02	8.90E-02	1.78E-02
2	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
3	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
4	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
5	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
6	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
7	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
8	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
9	40.28	39.39	0.000009816495	9.82E-04	0.000010572341	1.06E-03	2.04E-03	4.08E-04
10	43.84	43.03	0.000385222851	3.85E-02	0.000363235304	3.63E-02	7.48E-02	1.50E-02
11	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
12	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
13	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
14	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
15	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
16	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
17	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
18	43.84	43.03	0.000008284362	8.28E-04	0.000008859398	8.86E-04	1.71E-03	3.43E-04
19	49.22	48.49	0.000305701129	3.06E-02	0.000286004108	2.86E-02	5.92E-02	1.18E-02
20	49.22	48.49	0.000006574218	6.57E-04	0.000009765994	9.77E-04	1.63E-03	3.27E-04
21	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
22	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
23	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
24	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
25	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
26	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
27	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
28	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
29	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
30	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
31	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
32	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
33	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
34	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
35	49.22	48.49	0.000006574218	6.57E-04	0.000006975710	6.98E-04	1.35E-03	2.71E-04
36	49.22	48.49	0.000006574218	6.57E-04	0.000009765994	9.77E-04	1.63E-03	3.27E-04
37	55.88	55.24	0.000237160984	2.37E-02	0.000220398452	2.20E-02	4.58E-02	9.15E-03
38	55.88	55.24	0.000005100236	5.10E-04	0.000007525801	7.53E-04	1.26E-03	2.53E-04
39	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
40	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
41	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
42	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
43	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
44	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
45	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
46	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
47	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
48	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
49	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
50	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
51	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
52	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
53	55.88	55.24	0.000005100236	5.10E-04	0.000005375572	5.38E-04	1.05E-03	2.10E-04
54	55.88	55.24	0.000005100236	5.10E-04	0.000007525801	7.53E-04	1.26E-03	2.53E-04
55	63.42	62.86	0.000184093272	1.84E-02	0.000170201543	1.70E-02	3.54E-02	7.09E-03
56	63.42	62.86	0.000003958995	3.96E-04	0.000005811760	5.81E-04	9.77E-04	1.95E-04

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
57	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
58	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
59	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
60	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
61	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
62	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
63	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
64	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
65	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
66	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
67	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
68	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
69	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
70	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
71	63.42	62.86	0.000003958995	3.96E-04	0.000004151257	4.15E-04	8.11E-04	1.62E-04
72	63.42	62.86	0.000003958995	3.96E-04	0.000005811760	5.81E-04	9.77E-04	1.95E-04
73	71.57	71.07	0.000144558380	1.45E-02	0.000133139756	1.33E-02	2.78E-02	5.55E-03
74	71.57	71.07	0.000003108782	3.11E-04	0.000035720422	3.57E-03	3.88E-03	7.77E-04
75	71.57	71.07	0.000003108782	3.11E-04	0.000004546236	4.55E-04	7.66E-04	1.53E-04
76	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
77	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
78	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
79	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
80	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
81	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
82	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
83	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
84	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
85	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
86	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
87	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
88	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
89	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
90	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
91	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
92	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
93	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
94	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
95	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
96	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
97	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
98	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
99	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
100	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
101	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
102	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
103	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
104	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
105	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
106	71.57	71.07	0.000003108782	3.11E-04	0.000003247311	3.25E-04	6.36E-04	1.27E-04
107	71.57	71.07	0.000003108782	3.11E-04	0.000004546236	4.55E-04	7.66E-04	1.53E-04
108	71.57	71.07	0.000003108782	3.11E-04	0.000035720422	3.57E-03	3.88E-03	7.77E-04
109	80.14	79.70	0.000115296112	1.15E-02	0.000105889707	1.06E-02	2.21E-02	4.42E-03
110	80.14	79.70	0.000002479486	2.48E-04	0.000028409434	2.84E-03	3.09E-03	6.18E-04
111	80.14	79.70	0.000002479486	2.48E-04	0.000003615746	3.62E-04	6.10E-04	1.22E-04
112	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
113	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
114	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
115	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
116	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
117	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
118	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
119	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
120	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
121	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
122	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
123	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
124	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
125	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
126	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
127	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
128	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
129	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
130	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
131	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
132	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
133	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
134	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
135	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
136	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
137	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
138	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
139	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
140	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
141	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
142	80.14	79.70	0.000002479486	2.48E-04	0.000002582676	2.58E-04	5.06E-04	1.01E-04
143	80.14	79.70	0.000002479486	2.48E-04	0.000003615746	3.62E-04	6.10E-04	1.22E-04
144	80.14	79.70	0.000002479486	2.48E-04	0.000028409434	2.84E-03	3.09E-03	6.18E-04
145	89.01	88.61	0.000093465580	9.35E-03	0.000085660154	8.57E-03	1.79E-02	3.58E-03
146	89.01	88.61	0.000002010012	2.01E-04	0.000022981993	2.30E-03	2.50E-03	5.00E-04
147	89.01	88.61	0.000002010012	2.01E-04	0.000002924981	2.92E-04	4.93E-04	9.87E-05
148	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
149	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
150	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
151	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
152	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
153	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
154	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
155	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
156	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
157	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
158	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
159	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
160	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
161	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
162	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
163	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
164	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
165	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
166	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
167	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
168	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
169	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
170	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
171	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
172	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
173	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
174	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
175	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
176	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
177	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
178	89.01	88.61	0.000002010012	2.01E-04	0.000002089272	2.09E-04	4.10E-04	8.20E-05
179	89.01	88.61	0.000002010012	2.01E-04	0.000002924981	2.92E-04	4.93E-04	9.87E-05
180	89.01	88.61	0.000002010012	2.01E-04	0.000022981993	2.30E-03	2.50E-03	5.00E-04
181	98.09	97.73	0.000076952439	7.70E-03	0.000070414320	7.04E-03	1.47E-02	2.95E-03
182	98.09	97.73	0.000001654891	1.65E-04	0.000018891647	1.89E-03	2.05E-03	4.11E-04
183	98.09	97.73	0.000001654891	1.65E-04	0.000002404391	2.40E-04	4.06E-04	8.12E-05
184	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
185	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
186	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
187	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
188	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
189	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
190	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
191	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
192	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
193	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
194	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
195	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
196	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
197	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
198	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
199	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
200	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
201	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
202	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
203	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
204	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
205	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
206	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
207	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
208	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
209	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
210	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
211	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
212	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
213	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
214	98.09	97.73	0.000001654891	1.65E-04	0.000001717422	1.72E-04	3.37E-04	6.74E-05
215	98.09	97.73	0.000001654891	1.65E-04	0.000002404391	2.40E-04	4.06E-04	8.12E-05
216	98.09	97.73	0.000001654891	1.65E-04	0.000018891647	1.89E-03	2.05E-03	4.11E-04
217	107.34	107.01	0.000064262969	6.43E-03	0.000058731490	5.87E-03	1.23E-02	2.46E-03
218	107.34	107.01	0.000001381999	1.38E-04	0.000015757229	1.58E-03	1.71E-03	3.43E-04
219	107.34	107.01	0.000001381999	1.38E-04	0.000002005466	2.01E-04	3.39E-04	6.77E-05
220	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
221	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
222	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
223	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
224	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05

Power Density Calculations - Vineyard Haven (KCO87)								
Data Point	Distance from Antenna1 Location (m)	Distance from Antenna2 Location (m)	Antenna 1 Power Density (mw/cm^2)	Antenna 1 MPE % Uncontrolled	Antenna 2 Power Density (mw/cm^2)	Antenna 2 MPE % Uncontrolled	Combined MPE % Uncontrolled	Combined MPE % Controlled
225	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
226	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
227	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
228	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
229	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
230	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
231	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
232	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
233	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
234	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
235	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
236	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
237	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
238	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
239	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
240	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
241	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
242	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
243	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
244	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
245	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
246	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
247	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
248	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
249	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
250	107.34	107.01	0.000001381999	1.38E-04	0.000001432475	1.43E-04	2.81E-04	5.63E-05
251	107.34	107.01	0.000001381999	1.38E-04	0.000002005466	2.01E-04	3.39E-04	6.77E-05
252	107.34	107.01	0.000001381999	1.38E-04	0.000015757229	1.58E-03	1.71E-03	3.43E-04

SECTION 4

CONCLUSIONS

Based on the calculations performed it is concluded that the radiated power density levels will not exceed the FCC MPE Limit safety criteria for uncontrolled areas around Verizon's microwave installation. There antennas are located on the tower (128ft/125ft above ground level) in the controlled zone of the microwave facility and should only be accessible to Designated personnel. The Designated personnel should be cautioned that if maintenance on the antennas is to be performed they should have a procedure that locks out the transmitter before the antenna maintenance is undertaken. The other company workers and general public can only gain admittance to the controlled zone when accompanied by an assigned Designated worker.

RECOMMENDATIONS

No action is required based upon the calculation contained in this report.

While not required (due to calculated values), signs can be posted at the Verizon facility when the Microwave antennas are installed. The purpose of the signs is to inform the general public and Designated personnel that there are systems operating in the area that are producing radiated RF signals. The fence around the controlled zone could have signage on it calling attention to the transmitting antennas.

Certification: I have prepared this report and I certify that the information and results reported are accurate and in conformance with the FCC safety requirements.

Rhett Butler May 2, 2017
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