

# KPCL / KTGW RFR Field Measurements

And

## Associated Documentation

8/12/2019

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## Certification of Training and Experience

I, James R. Burt hereby state that I have received training and education and am familiar with the process and the use of the NARDA Field RFR Level Meter. Having performed other field measurements and created the associated reports tabulating the results.

I am Chief Technical Officer of BTA, Inc., a Broadcast technical service company, involved in the building, maintenance, repair, and measurements of radio RF facilities and equipment associated with such facilities.

I have been involved in the technical areas of radio broadcasting for over 30 years.

I hold an FCC General Radio Telephone License number PG-15-6263, issued January 2, 1985, and prior that that an FCC First Class Radio Telephone License.

The field measurements made, and tabulated for this report and the preparation of same was completed by me or under my supervision.

All representations contained herein are true and accurate to the best of my knowledge.

Signed:



Date: August 12, 2019

August 12, 2019

Mr Fareed Ayoub  
Voice Ministries of Farmington, Inc  
Farmington, New Mexico 87401

### **Background**

As Special Operating Conditions number 4 and number 5 of the KPCL Construction Permit number BPH-20180827AAC, and KTGW Construction Permit Number BPED-20180827AAD, BTA, Inc. was requested to perform a series of tests verifying compliance with the requirements of the OET Bulletin No. 65, Edition 97-01, assuring that no levels of radio frequency electromagnetic energy exceeded the permissible level defined as the Maximum Public Exposure Limit of 200  $\mu$ watts as measured by a properly operating and recently calibrated NARDA Field Strength Meter.

### **Test Methods**

The initial test and setup calibration of the meter was performed as directed by the instrument's instruction manual prior to use, setting the indicated scale to that of 1000  $\mu$ watts and that scale was used as the reference level.

While observing the numeric indications on the NARDA Field Strength Meter, the routes indicated on the attached Google Satellite Image were walked, resetting the maximum level to zero or minimum each time a new path was initiated. The probe was waved slowly in a vertical pattern from a level of approximately  $\frac{1}{2}$  meter above ground to a point approximately 2 meters above ground continuously while walking the path. At the end of each path the maximum level was noted on a site sketch and worksheet.

### **Tabulation of Results**

The data collected in the site evaluation and recorded was transferred to a tabulation format showing the actual measured level as a percentage of the maximum permitted Occupational Level. Next a column was provided that reduces the percentage of the lower Public Level. At no time was there ever an indication of a level that exceeded the maximum Public level, and as a result, all indications are that the area around the KPCK / KTGW tower represents no public danger in and around the site.

## Special Operating Conditions or Restrictions

### Callsign: KPCL

Permit No.: BPH-20180827AAC

4 The permittee/licensee shall, upon completion of construction and during the equipment test period, make proper radiofrequency electromagnetic (RF) field strength measurements throughout the transmitter site area to determine if there are any areas that exceed the FCC guidelines for human exposure to RF fields. If necessary, a fence must be erected at such distances and in such a manner as to prevent the exposure of humans to RF fields in excess of the FCC Guidelines (OET Bulletin No. 65, Edition 97-01, August 1997). The fence must be a type which will preclude casual or inadvertent access, and must include warning signs at appropriate intervals which describe the nature of the hazard. Any areas within the fence found to exceed the recommended guidelines must be clearly marked with appropriate visual warning signs.

5 Documentation demonstrating compliance with the preceding special operating condition shall be submitted at the time of filing of FCC Form 302-FM.

### Callsign: KTGW

Permit No.: BPED-20180827AAD

4 The permittee/licensee shall, upon completion of construction and during the equipment test period, make proper radiofrequency electromagnetic (RF) field strength measurements throughout the transmitter site area to determine if there are any areas that exceed the FCC guidelines for human exposure to RF fields. If necessary, a fence must be erected at such distances and in such a manner as to prevent the exposure of humans to RF fields in excess of the FCC Guidelines (OET Bulletin No. 65, Edition 97-01, August 1997). The fence must be a type which will preclude casual or inadvertent access, and must include warning signs at appropriate intervals which describe the nature of the hazard. Any areas within the fence found to exceed the recommended guidelines must be clearly marked with appropriate visual warning signs.

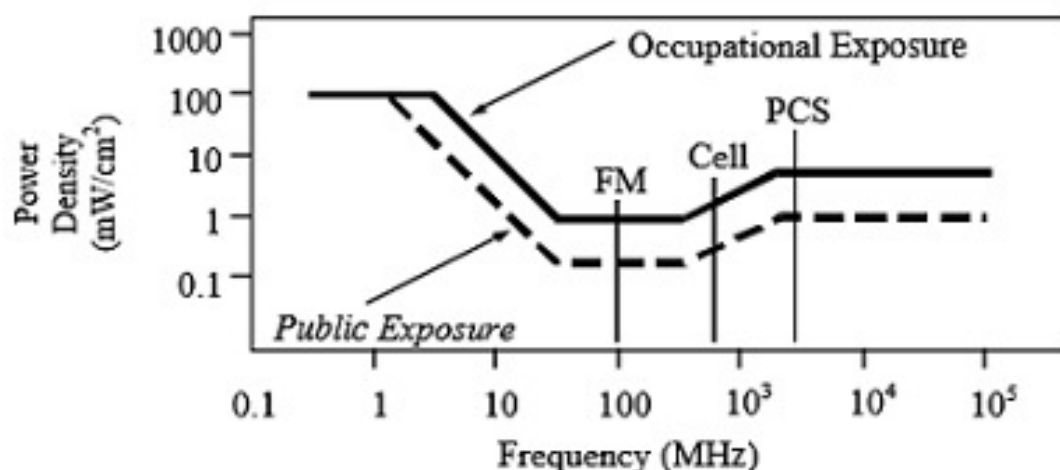
5 Documentation demonstrating compliance with the preceding special operating condition shall be submitted at the time of filing of FCC Form 302-FM.

## FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm <sup>2</sup> )	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f<sup>2</sup></i>
3.0 – 30	1842/f	<i>823.8/f</i>	4.89/f	<i>2.19/f</i>	900/f <sup>2</sup>	<i>180/f<sup>2</sup></i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√f	<i>1.59√f</i>	√f/106	<i>√f/238</i>	1/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.

# Exhibit One

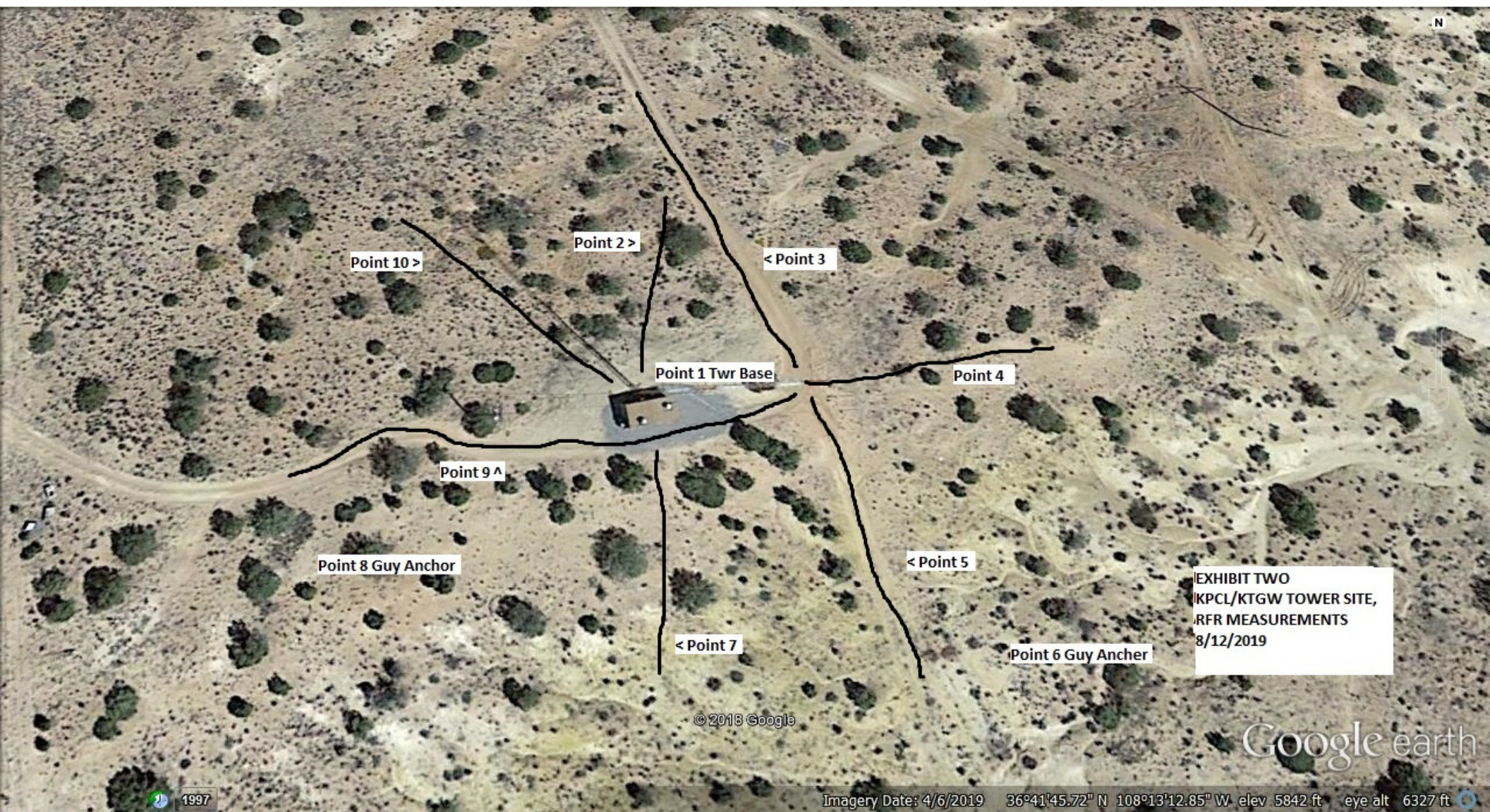
Tabulation of Measured Results  
KPCL/KTGW, South Bluffs Electronic Site  
Farmington, New Mexico  
August 12, 2019

Measurement Points	Measured at Percentage of the Occupational limit of (1,000 $\mu$ Watts/ $CM^2$ )		Calculated Level at the Percentage of the Public Exposure Limit (200 $\mu$ Watts/ $CM^2$ )	
1	9.50	%	47.5	%
2	15.82	%	79.1	%
3	7.60	%	38.0	%
4	8.10	%	40.5	%
5	4.65	%	23.3	%
6	18.15	%	90.8	%
7	10.50	%	52.5	%
8	9.20	%	46.0	%
9	17.53	%	87.7	%
10	18.15	%	90.8	%

Comments:

1. All measurements taken between 1100 hrs and 1215 hrs on August 12, 2019, conditions at the site were dry ground and temperatures ranged around 85 to 90 degrees, and sunny.
2. The points listed in the above matrix (and Exhibit Two) represents the maximum level measured along on radials extending out from the tower and out to a distance of approximately 150 feet or more. Although referenced as points, that indicated level was a maximum along that radial.
3. It is noted that all measurements are shown both as a percentage of the Occupational Limit established at 1000  $\mu$ watts/ $cm^2$ , and at the referenced Public level at 20% of the established Occupational Limit and at no time was there a level over 90% of the Public level.
4. Please refer to site sketch for identification of the measured radials.
5. During the measuring process, it was noted at locations with higher readings, those readings occurred at approximately 0.5 meters above the ground, and decreased as the probe was moved up to the 2 meter level, leading us to suspect re-radiation off the ground.





Point 2 >

< Point 3

Point 1 Twr Base

Point 4

Point 9 ^

Point 8 Guy Anchor

< Point 5

< Point 7

Point 6 Guy Anchor

EXHIBIT TWO  
KPCL/KTGW TOWER SITE,  
RFR MEASUREMENTS  
8/12/2019

© 2018 Google

Google earth

Imagery Date: 4/6/2019 36°41'45.72" N 108°13'12.85" W elev 5842 ft eye alt 6327 ft

1997